ANALYSIS FOR INSTITUTIONAL DECISION:
THE PROBLEM OF FACULTY RANK DISTRIBUTION

by

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ABSTRACT

The purpose of the study was to identify and apply a technique for examining analytical models of faculty flow in universities and models of decision making in universities with the intention of identifying points of conceptual similarity and difference between them. The study used Weathersby's general decision paradigm as the technique to examine the two groups of models.

Faculty flow models and university decision models are used respectively as examples, first, of analytical tools intended to inform decision; and, second, of research-based descriptions of how decisions are made. Those models pertain to the current problem of the upward shift in the distribution of university faculty members among the professorial ranks. The focus on the models derives from failures of analytical studies of important problems to influence the solution of those problems through organizational decision making.

The conceptual framework for examining similarities and differences between analytical models and models of decision making stems from a distinction between them which highlights the importance of messages. In particular, the role of messages between analysts who study problems and decision makers who may try to act on them enables a focus on communication between analysts and decision makers. Examining the way models structure perception and therefore, communication, leads to the suggestion that the conceptual base of the analyst and the conceptual base of those making a decision about the problem should be congruent if the analysis is to influence the decision.

The study uses Weathersby's general decision paradigm to point out common and dissimilar aspects of faculty flow models and decision making models in an exploratory step towards integrating the design of analysis
and the process of deciding so that failures of misconnection may be avoided and superior solutions to important problems obtained.

The study uses faculty flow models as an exemplary group of analytical models. In contrast, two models of decision making about faculty rank distributions, termed organizational process and coalitional decision, were both used in the study. Support for the latter two is found in budgeting studies and requirements for due process in resolving disputes.

Based on the general decision paradigm, each model was summarized into a profile, demonstrating the feasibility of the task of secondary analysis. The faculty flow profile was compared with each of the decision model profiles. Considerable similarity was found to exist between faculty flow models and the organizational process model of decision, including the basic variables, linking structures and treatment of uncertainty. However, faculty flow models and the coalitional model of decision were found to be almost completely dissimilar, involving different variables and structures, and although both exhibit short time horizons, it appears to be for different reasons.

Drawing on the comparisons between profiles, and reflecting on the use of the general decision paradigm, three groups of implications were identified. First, the need for further development of theory from the general decision paradigm was noted. Second, the need for new kinds of faculty flow models and for further study of university decision making is illustrated. Finally, implications for university administration are sought, sharpening the need for continued efforts to integrate analysis for decisions with actual decision making.
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Chapter One

NATURE OF THE STUDY

Understanding human behaviour is at best a complex exercise. Part of the complexity lies in the conduct and development of research in a wide range of disciplines, research which provides enlightenment in its own terms but requires integration with other work to reveal a complete picture. Even as scholars and other observers attempt to achieve understanding and find that picture, a bounty of ideas evolves, for example, about what peoples' roles in organizations should be. Together, the results of inquiry and the proposal of various norms heighten the need for integration of research and theory.

This study may be seen as an attempt to integrate. The study identifies two classes of inquiry and theory concerning decision making. Those two classes differ in terms of their treatment of the phenomenon of decision as a key feature of human activity.

One class of inquiry is called policy research and attempts to understand how and why decisions are made, particularly decisions involving important and far reaching issues. For example, "Why did the United States act as it did during the Cuban crisis of 1962?" The second class of inquiry is called policy analysis and attempts to provide understanding of the particular character of a problem, the solution of which may be attempted through decision. An example of this sort is the assessment of alternative methods for distributing fossil fuels. A central tenet of the study is that characteristics of decision are implicit in the design of analysis in aid of decision.
Recognizing the many ways in which decisions and decision making have been conceptualized, the study attempts to use Weathersby's (1975) "general decision paradigm" which incorporates or subsumes that range. That over-arching paradigm may provide a framework for an integration of many prior studies of decision making and studies undertaken in aid of making particular decisions. To examine the possibility for developing an integrated view, this study undertook to examine the applicability of the general decision paradigm as a means for analyzing and comparing results of inquiry in the two areas identified.

To sharpen the exercise, a case problem is chosen. The case provides a common focus to organize the research about decision making in a particular context, and the analysis concerning the substance of a problem associated with that context. Important far-reaching decisions often are made in the context of an organization or collectivity. The foregoing examples were drawn from government and business. As a type of organization, universities offer an especially interesting context for examining decision making. For reasons developed further in the body of this study, the university context and the particular problem of shifts in the distribution of university faculty towards the upper ranks is selected for case treatment.

ORGANIZATION OF THE STUDY

The study proceeds by reviewing the notion of policy as a class of decision, and a concept which makes a distinction between the conduct of policy making and the conduct of research in aid of policy making. For example, the process of making an important selection or choice may be
seen as distinct from determining which possible choices exist. That
review, along with a discussion of the case problem, is presented in
Chapter Two.

The third chapter identifies a wide range of models or conceptions
of decision making and reviews them in terms of the general decision
paradigm. That general paradigm is proposed as a common set of elements
with which it may be possible to examine diverse bodies of research and
analysis to identify common elements and those in terms of which there
are important differences. The general decision paradigm introduced in
this chapter forms the skeleton upon which the rest of the study is
developed. The paradigm may be the basis for the integration discussed
in the opening section of this chapter.

Chapter Four describes the case problem of faculty rank distribu-
tion in terms of its underlying concepts. The use of those concepts in
developing a family of analytical models is summarized in a three-part
review of the modelling literature which identifies percentage increase,
equilibrium and Markov chain techniques for projecting faculty rank
distribution. Finally, the body of literature describing these applica-
tions of faculty flow models to inform university personnel decisions
is examined using the general decision paradigm to produce the first
set of summary profiles. That profile will be the subject of further
scrutiny in a later section (Chapter Six).

Chapter Five extends the case study by identifying the decisions
which may be seen to affect the case problem, faculty rank distribution.
In particular, the decisions are examined from the perspective of trying
to determine how they are made. For example, the decision to increase or
decrease the total size of a faculty rank distribution involves the use
of university resources, notably money. What elements of the general decision paradigm are supported by research dealing with those decisions? The chapter identifies the organizational process and coalitional models of decision making, and develops the second and third profiles for the study. Each emphasizes different elements of the general decision paradigm, and each is representative of a major line in earlier research with support in the particular instance of decisions affecting faculty rank distribution.

Chapter Six puts the three summary profiles alongside each other and tests consecutively for congruence between the profile of analytical "faculty flow" models and each of the profiles of "organizational process" or "coalitional" decision making as supported by other research. The chapter identifies differences and similarities among the profiles and demonstrates that implicit conceptions of decision are incorporated into the design of research in aid of decision. The general decision paradigm is reviewed as an analytical construct, and its possible role in a more dynamic attempt at integration discussed.

Chapter Seven summarizes the study and draws conclusions and implications from it. Conclusions concern the applicability of the general decision paradigm, the implicit conceptions of decision discovered by examining analytical models and the congruence between analytical models and decision process models in the matter of faculty rank distribution. Implications concern the further development of analytical models for treatment of the case problem, further development of research concerning university decision making and the potential of the general decision paradigm in the development of integrating theory concerning the interface of analysis and decision.
SIGNIFICANCE OF THE STUDY

This study attempts to test a conceptual paradigm for its ability to provide useful scrutiny of diverse bodies of previous work and to indicate directions for integration in the future. That exercise makes a step in the direction of enhancing understanding of human behaviour in organizations.

The pervasiveness of complex organizations in contemporary society makes it important that their decisions and policies meet acceptable standards. It will be shown in the body of the study that for analysis to influence decision, it is reasonable to expect that there be congruence between their conceptual designs. Therefore, to the extent that analysis can be made to improve decisions in terms of society's standards, this study is significant in that it examines a method for bringing about, or at least testing for, congruence. By testing for congruence the study also makes a contribution to the literature itself by applying the general decision paradigm (Weathersby, 1975) to a body of literature in a novel treatment.

The case problem of faculty rank distribution may be understood better on the basis of this summarizing study. For example, there has not been a previous comparison of the elements of modelling developed and applied to faculty flow in the way it is done here. The case problem has been highlighted by several recent publications (e.g. Science Council of Canada, 1979) as an important one in the present and future development of Canada's higher education and research capability. This study may increase understanding of the relationship between university decision making and institutional analysis and thereby may contribute to enhancing that development.
Finally, it should be noted that the research is exploratory, using earlier studies as its subjects for study. The full integration towards which the study ultimately would lead is not undertaken. The exploration of the current topic is a static one, that is, the research lays out the elements of the integration and tests for a form of congruence between policy research and policy analysis in universities; however, the full statement of causal relationships among the elements is not attempted. The research design is unusual in that a case study is warranted because of the early stage in the development of an integrating theory; yet, the lines of inquiry which, themselves, are being examined for integration are highly developed. It is because there exist sophisticated examples of research and analysis that this study is able to proceed; yet, it is because those earlier lines have not meshed as hoped that the study is required at all.
Chapter Two

INTEGRATING POLICY RESEARCH AND POLICY ANALYSIS

This chapter introduces the concepts of policy research and policy analysis as two types of inquiry in need of integration. They are related to a focus on decision making in organizations which arises from a treatment of the concept of policy and its characteristics. Using a methodological distinction between policy research and policy analysis, the "two-world" concept is introduced and examined. A need for integration of policy research and policy analysis is reviewed and the problem of determining the proper role for inquiry in deciding examined. Difficulties in prior efforts at integration are summarized, the strategy of examining the structure of decision and analysis deduced, and the value of an exploratory case study posited. Finally, the applicability of the concepts of policy research and policy analysis to universities is demonstrated and a topic for case analysis identified in the form of a contemporary university decision problem.

POLICY AND DECISION

Organizations, individuals and societies commonly are characterized as having goals they seek and problems that get in the way. An organization can be seen as having policies which recognize goals and problems and provide directions for actions (Dye, 1972). Those policies may be implicit in a series of organizational decisions, or may be stated explicitly in a decision. How they are made is the subject of a vast literature. That literature variously uses the terms policy and decision so that no common usage obtains (Landau, 1973). To introduce the area, it is necessary to
establish useful definitions for the study.

The term "policy" has been used in many settings to capture a sense of action, importance and goal direction:

"a body of principles to guide action (Rothwell, 1951)"

"a critical decision (Selznick, 1957:21)"

"a political decision (Easton, 1957)"

"a guide to discretionary action (Davies-Brickell, 1960)"

"the expression of broad goals or purposes (Campbell et al., 1962)"

"those generalizations about the organizational behavior that affect the structure of the organization (Katz and Kahn, 1966)"

"a general directive (Dror, 1968:14)"

"the outcome of an intricate and complex process called policymaking (Lindblom, 1968)"

"those decisions and actions which have the widest ramifications and the longest time perspective requiring the most information and contemplation (Bauer, 1971:2)"

"the result of government decision making (Quade, 1975)"

These definitions are often tautological, e.g. policy is the outcome of policymaking, and certainly make no distinction between policy and decision. There are elements of importance and future reference and, as Green (1975) notes, one concludes that a policy is a rule or guide, presumably one that is chosen or selected, yet every decision is not a policy decision, nor is every rule a policy. These conditions of policy are clear in several of the definitions offered.

The conditions of importance, future reference and choice are apparent in one or another combination in all definitions listed. They are particularly clear in those provided by Bauer (1971) and Katz and Kahn (1968). For example, Bauer (1971) highlights the factors of longest time perspective and widest ramifications as characteristics. Similarly,
Katz and Kahn (1966) identify the structure of the organization as the principal referent of policy. Taken together, they provide a cornerstone for the study in that policy may then be defined as an explicitly or implicitly selected guideline for future action which affects the structure of the organization, requires a long time perspective and has the widest ramifications of all generalizations about the organization.

As a virtual synonym for choice, decision has been treated as a bureaucratic action based on authority (e.g. Weber, 1947), a product of dynamic consensus (Millett, 1962), the resultant of political forces (Lindblom, 1965), or the outcome of rational analysis (Gulick and Urwick, 1937). There are underpinning arguments for these and other interpretations in organizational theory and it has been shown important to avoid adopting a single view (Allison, 1971; Peterson, 1976). Hence no one definition of decision is offered, rather, a comprehensive treatment is offered in Chapter Three. From the range of definitions and treatment of the terms policy and decision, it is apparent that they have attracted considerable attention since 1950. Much of the conceptualization used in those efforts can be traced back to Harold Lasswell.

**Analysis in Aid of Decision-Making**

Policy analysis is one of the policy sciences as conceived by Lasswell in 1951. Lasswell urged an integration of various disciplines into a more singular thrust to solve the problems of government. He proposed that "... the policy sciences include (1) the methods by which the policy process is investigated, (2) the results of the study of policy, and (3) the findings of the disciplines making the most important contributions to the intelligence needs of the time (1970:3)."
Dror expanded on Lasswell's work and proposed four major dimensions to policy science:

1. **Policy analysis.** An approach and methodology for the design and identification of preferable alternatives in respect of complex policy issues.
2. **Mega policy.** Master policy, a policy for providing guides for a set of discrete policies.
3. **Meta policy.** Policy on policymaking, i.e. policy dealing with the characteristics of the policymaking system.
4. **Realization strategy.** Means and ways to improve policymaking through the application of policy sciences and through the realization of policy sciences recommendations.

(1971)

According to Dror, policy analysis has the purpose of providing methods for identifying policy alternatives. It is concerned with both the creation of novel alternatives and the selection of the best of available alternatives. Policy analysis therefore requires attention to underlying values, understanding and predicting the behavior of various groups, and organizations and the acceptability of alternatives, i.e. their political feasibility (Dror, 1971). In short, the object of policy analysis is to "maximize the appropriateness and effectiveness of the policy" (Downey, 1977:135).

A second aspect of Lasswell's conception of the policy sciences was the study of the dynamics of making policy. The object in this instance is to describe and to understand the behavior of those in the policy-making process (Downey, 1977). To avoid confusion, this aspect will be called policy research, although various labels, including policy science are commonly applied. Policy research is disciplinarian, taking such views of the process as those provided by political science, economics and sociology.

The integration proposed by Lasswell is still troublesome. Research
into policymaking, and that must include the making of policy decisions, has been slow to find application to the analysis of particular policy problems. Indeed, Lindblom and Cohen (1979) fault all of social science for failing to affect the decisions of government and public agencies. Downey notes that "little effort appears to have been made, particularly in education, to combine the knowledge generated [in policy research] with the technologies developed in policy analysis - for the purpose of strengthening the process (1977:136)." We may summarize the need for such a combination as a need to examine the technologies of policy analysis in light of known characteristics of policymaking to identify problems and suggest solutions.

The "Two-World" Concept

Integration of policy research and policy analysis may be approached by being sensitive to the analytical problem noted by Dror: the problem of assessing underlying values and preferences of those by whom the selection of an alternative will be made. This stems from theories of decision making and sharpens a focus on the linkage of analysis to action. Coleman has examined that linkage and offers a distinction between the world of action and the world of research.

Coleman proposes that the distinction hinges on a methodological distinction between "policy research" which is "designed as a guide to social action" and "discipline research" which is "designed to advance knowledge in a scientific discipline" (1972:2). Coleman uses the term policy research in the sense that we have defined policy analysis, as is evident from his discussion of its defining properties:
The research problem originates outside the discipline, in the world of action; and the research results are destined for the world of action, outside the discipline."

(1972:3)

Coleman then observes that stemming from those properties, the notions of a world of action and a disciplined world of research require a translation and a transmission:

For policy research, the research problem enters from outside an academic discipline and must be carefully translated from the real world of policy or the conceptual world of a client without loss of meaning.

(1972:7)

The canons of scientific method and the values implied by these canons govern the execution of policy research. Values from the world of action govern the formulation of policy research problems. The transmission of policy research back into the world of action may be governed by either set of conditions.

(1972:10)

Based on the distinction made by Coleman, our attention is directed to the design of analysis, including canons of the scientific method and the technologies of analysis, and the conceptual world of the client, including the variables in terms of which he perceives, and the relationships among them in which he believes. The problem of linking analysis to action may then be stated as the problem of linking research in aid of decision to the making of decisions, particularly important, far-reaching decisions. That link must be in terms that are of importance to the decision-maker, and use techniques that are consistent with philosophies of science.
Problems in Linking Analysis to Decision

Lindblom and Cohen have recently examined the success of efforts to improve public policy making with social research and observe "many suppliers and users of social research are dissatisfied, the former because they are not listened to, the latter because they do not hear much they want to listen to." (1979:1) Furthermore, they review and find fault with a large literature which examines that dissatisfaction. They identify five themes in the literature and argue that each provides an incomplete assessment of the problem:

1. **Problem as target.** Some studies "take note only of research that is directly addressed to a policy maker's problem, as though assuming no other kind of social science or social research enters into the problem solving" (1979:2).

2. **Inadequate utilization.** Some studies "assume that we already possess satisfactory knowledge that policy makers will not, for various perverse reason, use" (1979:2).

3. **Researcher-Client Problems.** Some studies "assert that the problem lies in unsatisfactory personal relations between social researchers and client, forgetting that in most cases of social research no personal researcher-client relationship exists at all, the user simply drawing on published work of faceless social scientists" (1979:2).

4. **Mismatched contemporaries.** Some studies assume that "the problem is one of an inadequate relationship between contemporary social researchers and their counterpart problem-solvers in government, without thought of the possibility that the most fruitful collaboration may be between the social scientists of
an earlier generation and policy makers of a later one" (1979:2).

(5) Cosmetics. Some studies "conceive of the problem cosmetically; social scientists do not write attractively" (1979:2).

In their book, Lindblom and Cohen extend their thinking past this list of difficulties. They propose a three-part change in conceptions to overcome the problems in linking analysis to decision. First, they propose that an additional broad concept of interactive problem solving is required to make tractable and sensible a general treatment of the problem of using knowledge. They distinguish between analytical problem solving, seen as an attempt to solve a problem by "someone's understanding the situation and its possible remedies so that a solution or preferred outcome can be decided upon" (1979:20), and interactive problem solving in which action (usually interactive) is undertaken (so that the preferred outcome comes about without anyone's having analyzed the given problem or having achieved an analyzed solution to it" (1979:20). An example of one of their interactive solutions would be selecting a movie by voting where the only information shared or identified is the list of options and movies' cast; similarly, an analytic solution to the same problem could involve the calculation of a utility value for the group for each movie.

The importance of admitting interaction methods for solving problems is supported by Lindblom and Cohen's illustration using the Edwards and Sharkansky (1978) study which acknowledges the emergence of an outcome from an interaction among decision makers, "each of whom is in pursuit of solutions to his own problems rather than the ostensible
problem." Lindblom and Cohen contend that this citation of an interactive outcome is evidence that the typical presumption of a unitary or group decision-maker which selects an alternative is misleading and oversimple.

Lindblom and Cohen suggest that when Edwards and Sharkansky write:

We examine policy making from the perspective of the decision makers, scrutinizing the intellectual tasks facing those who must both make policy decisions and see that they are implemented. On what are they to base their decisions? What criteria are they to use to choose between alternatives?

(1978:5)

the questions they raise are appropriate only to a view of problem solving that is analytic and excludes interaction. This proposition would seem to close off the policy sciences from a vital line of research. Indeed, Lindblom and Cohen specifically criticize the "carelessness, professional bias or audaciousness (1979:37)" of such authors as Harold Lasswell when he writes "the principle strategy of the policy sciences can be summed up as guiding the focus of attention of all participants in decision (1971:61)." It is essential, therefore, that a carefully constructed conceptualization of decision making be used to overcome the bias or audacity that Lindblom and Cohen point out. The task of that construction is undertaken in Chapter 3.

Normative Issues in Linking Analysis to Decision

Lindblom and Cohen (1979) point to problems in actually influencing decisions with the results of analysis. A larger theoretical question is the appropriate role for inquiry in policy making. This has been the subject of considerable debate in the literature, and
has polarized around two extreme positions.

One position is represented by the "public interest scientists." For example, Primack and von Hippel (1975) contend that scientists are obligated to carry the results of analysis to the public in the public interest and to lead the attack on irresponsible behavior on the part of government. They contend that the misuse of analysis is almost invariably the responsibility of non-scientists. Scientists are culpable only to the extent that they have permitted government and industrial leaders to mislead the public and ignore the broader public interest. Thus scientists have a responsibility both to be unbiased and preserve the integrity of their analysis in the lab and in the public record, and to campaign actively against the special interests who would dominate the policy process.

This view is tempered in Boffey's observations that:

There are relatively few public policy questions whose answers are purely technical. In almost all cases, an element of informed judgment is required, and what comes out strutting as 'objective' wisdom is actually the subjective opinion of those who prepared the advice. Unfortunately, those expert advisers can be just as biased and pigheaded as you and me, and they can be just as foolishly wrong as we often are.

(1975:xii)

The opposing view is that the proper role of the expert is to serve the policy maker. Since the analyst has no special expertise in the area of values or social choices, it is argued, he ought not inject his own preferences or biases into the policy process (e.g. Baker, Michaels and Preston, 1975). While not advocating the position, Lerner notes that:
Experts often become preoccupied with the technology of their subject matter and indifferent—indeed oblivious—to the value or implications of larger political issues associated with their work. They are immersed in the technological aspects of their work and perceive it as an intellectual abstraction—a chess game sponsored by government or corporation. The involvement is cerebral in the sense that the expert is numb to political problems associated with the work of his unit.

(1976:179)

Perhaps whimsically, Lerner refers to this phenomenon as the "expert-as-mechanic." (1976:179)

Two problems with the misuse of analysis in policy making emerge. First is the distortion or suppression of analysis for political purposes to further the position of a particular interest group. Secondly, focusing attention on technical aspects of decisions may shift inappropriately the attention of policy makers away from political and social aspects of the policy problems at hand.

Problems of the first type may be overcome by the analysts using channels of influence beyond those based in his professional expertise; i.e. by adopting an independent public stand on issues. The ability to do this stems from the social prestige which still holds for science and the public image of the objectivity of the independent analyst. Overcoming the second type of problem is, in some ways, the more significant challenge; yet at the same time it is the more difficult in a social or organizational setting. It does, however, emphasize the importance of acknowledging values and variables in the environment when conducting analysis of a policy problem.
A STRATEGY FOR INTEGRATION

It has been noted that there is a need to examine the technologies of policy analysis in light of known characteristics of policy making. The importance of conceptions of decision in attempting to link analysis to action has been highlighted. That linking may be approached by hypothesizing that analysis can only influence decision when it is in terms that are of importance to decision makers.

It has been shown that scientific or technical information in policy making "is often - perhaps, primarily - used to legitimate decisions reached on other grounds, that is, prior to an adequate analysis of the magnitude of the problem and the probable consequences of alternative policies . . . rather than to influence policy decisions" (Sabatier, 1978:396). Drawing on a review of the literature, Sabatier identifies five principal variables which have been shown to affect the influence of technical information on policy decisions:

(1) the resources of the information source;
(2) the content of the message;
(3) the timeliness of the message;
(4) the political and policy context; and,
(5) the resources and perspectives of the policy maker.

(1978:406)

While it is clear that analysis may serve to legitimate as well as to influence, the set of variables affecting influence assists in identifying those aspects that are important to decision makers. At the very least, the emphasis on messages focuses on theories of cognitive dissonance which indicate that information that does not support the predispositions of a decision maker will be ignored or distorted (Festinger, 1957; Brown, 1956). The Sabatier (1978) list and the
applicability of cognitive dissonance highlight the role of communication between organizational units, such as analysts and decision makers, may be noisy or repelled if moderate or sharp differences in cognitive style exist between them.

If dissonance or inconsistency is a factor inhibiting the use of analysis in decision, then it may reasonably be inferred that enhancement of the role of analysis in decision may require consistency between variables incorporated into analysis and variables describing the decision process.

The role of cognitive style has been developed into a typology of inquiring systems (Churchman, 1971; Mason and Mitroff, 1973) which stresses that the psychological type of the user should be congruent with the philosophy of evidence, inquiry and knowledge in the inquiring system (Mason and Mitroff, 1973). This focuses attention on the matter of how an individual perceives the world, or the variables in whose terms those processes occur.

On the basis of those observations, we may highlight the necessary but perhaps not sufficient condition of consistency between the systems of inquiry on the part of the analyst and the decision maker in attempting to link analysis to action. It is appropriate, therefore, to test the technologies of policy analysis for their congruence with characteristics of decision making.

The notion of congruence commonly is used in geometry as a test for exact agreement in superposition, e.g. two triangles would overlap exactly if they have two adjacent sides and one included angle in common. A broader view of congruence is provided by the Oxford dictionary which defines it as "the factor condition of according or agreeing; agreement
in character or quality." Therefore, one may test for congruence between abstract ideas by identifying their respective characters and comparing them.

In the present case, the respective characters of policy analysis technologies and decision making models are of interest. Therefore, it is necessary to identify the structural elements of each that are in common. A fully articulated statement of cause and effect between design of research and the outcome of decision making would provide a theory for enhancing their interaction. That is a project beyond the scope of this study. However, an exploratory treatment comparing the elements of analysis and decision in terms of a comprehensive taxonomy or paradigm of the elements of decision making is an essential first step towards that more complete integration. Indeed, by testing for consistency between the "two worlds," it may be determined whether further integration is possible. If the variables and structures of the world of analysis are not consistent with those of the world of action and decision, then no further effort need be devoted to trying to follow the current line integrating them. It is the study which permits "strong inference" (Platt, 1964) in closing off a fruitless line of inquiry which enables science to move most efficiently towards the development of theory.

The problem of integrating analysis of policy problems with research into the making of policy decisions by comparing the structural elements of analysis technologies with models of decision making is a novel venture. McGrath (1964) posits that in the early phases of theory development, one should concentrate on exploratory field studies to gather information about the subject of interest.
Given the novel character of the present research, it is appropriate that an exploratory case study be undertaken. The case design is unusual in that while the integration being examined is novel, the two lines of research to be integrated have been developed extensively.

A key feature of policy is the residence in the world of action of the problems with which policy makers and analysts must deal. The case will, therefore, draw a particular policy problem as its focus, and identify outstanding examples of research conducted in each of the modes of inquiry relevant to examination of the substance of that problem. With two or three exemplars of each mode represented as analytical models, the case will proceed to analyse each exemplar through a general paradigm of decision structure to identify the character of those models.

Similarly, examples of research concerning the making of decisions with respect to the policy problem will be examined through the same general paradigm to determine their character. Finally, the test for congruence will compare the sets of characteristics for their agreement or otherwise. Note that by carefully developing the use of a common paradigm, the test may proceed as a comparison of profiles in terms of a common set of criteria.

A wide range of organizational types and settings from which a policy problem may be drawn exists. While much of the literature on policy has government and public bureaucracies as its focus, complex organizations such as universities are also of interest. Moreover, universities provide an especially important environment for the study of policy decision making because they have, somewhat paradoxically, commitments to both the scientific rationality of classical economics and the collegiality of popular politics. Finally, the present exercise
requires that reasonably sophisticated research concerning decision
making in the type of organization selected and analyses of policy
problems in that type of organization be available. As following chap­
ters will elaborate, both these conditions are met by universities and
a university problem will be chosen as the focus for the study.

POLICY ANALYSIS IN UNIVERSITIES

While Lasswell and Dror wrote primarily in terms of government
and public policy, similarities among decision makers in public institu­
tions and agencies, including universities, have been demonstrated
(e.g. Salanick and Pfeffer, 1974; March and Cohen, 1974; Baldridge,
1971). The conduct of analysis intended to solve the policy problems
of universities has been called institutional research (Russell, 1967).

Demonstrating the parallel between institutional research and the
two-world concept proposed by Coleman (1972), Fincher observes:

In brief, institutional researchers have clearly opted
for a role in which they will not explain the nature
and functions of higher education as a social institu­
tion but one in which what they investigate, study, and
report will be directed to the improvement of institu­
tional functions and activities.

(1975:143)

With that orientation to improvement of universities functions,
Fincher summarizes three classes of distinctions between institutional
research (on the right) and the disciplines. The concern (a) the data
base, (b) the methods, and (c) the subject matter domain (see Figure 1).

The data used for institutional research reflects differences in
method of investigation and subject matter. Data are primarily oriented
to the client or policy maker rather than the testing of theory, and may
frequently be the administrative or statistical records of an institution
FIGURE 1
"A SCHEMA FOR POLICY RESEARCH AND ANALYSIS"

<table>
<thead>
<tr>
<th>DATA BASE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory-oriented</td>
<td>User/product oriented</td>
</tr>
<tr>
<td>Conclusion-oriented</td>
<td>Decision-oriented</td>
</tr>
<tr>
<td>Norm-referenced</td>
<td>Criterion-referenced</td>
</tr>
<tr>
<td>Validity/reliability</td>
<td>Credibility/fidelity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>METHODOLOGY</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Experimental design</td>
<td>Quasi-experimental design</td>
</tr>
<tr>
<td>Classical sampling statistics</td>
<td>Statistical decision theory</td>
</tr>
<tr>
<td>Summative evaluation</td>
<td>Formative evaluation</td>
</tr>
<tr>
<td>Prediction as verification</td>
<td>Forecasting as instrumental</td>
</tr>
<tr>
<td>Hypothesis-testing</td>
<td>Developmental-demonstration</td>
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</tbody>
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<table>
<thead>
<tr>
<th>SUBJECT-MATTER DOMAIN</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Antecedents lead to consequences</td>
<td>Alternatives lead to consequences</td>
</tr>
<tr>
<td>Conclusions provide explanations</td>
<td>Recommendations with interpretation</td>
</tr>
<tr>
<td>General theory answers how?</td>
<td>Choices and decisions answer which?</td>
</tr>
<tr>
<td>Nomological nets that are law-like</td>
<td>Idiographic structures that are unique</td>
</tr>
<tr>
<td>Knowledge as the outcome</td>
<td>Planned and programmed action</td>
</tr>
</tbody>
</table>

(Fincher, 1978)
which have been fathered for another purpose. The data must be credible to the client who may not accept the results of research even though standards of validity and reliability are maintained.

The distinction in methodology is between testing a hypothesis and developing or demonstrating the feasibility or advisability of a particular action. The most radical distinction involves the subject matter of institutional research. Other more traditional modes of research "seek a relationship between antecedents and consequences [whereas] policy research is attuned to alternatives that are permissable in the future as well as their likely consequences. Where traditional modes work toward conclusions that will explain some natural phenomenon or event, policy research hopes to derive recommendations for specific action that can be interpreted to unsophisticated audiences" (Fincher, 1975:144). Note that Fincher uses policy research in the sense that we have defined policy analysis; indeed institutional research has an analytic orientation, rather than the disciplinarian.

Institutional research as a variant of policy analysis has been examined from the researcher's perspective in an effort to conceptualize the problem of linking analysis to decision. Sheehan (1974) proposed the "three hat theory" as a model for distinguishing between the analyst and the decision maker, and between the analyst and the technician who actually performs the calculations. The model strives to differentiate in terms of the perspectives, i.e. the conceptions, of the three. In summarizing his theory, Sheehan more recently wrote:
The three-hat theory says that in responding to the need for planning and management information, institutional research analysts must be sufficiently versatile to assume the perspectives of three people: (1) the decision-maker, such as the president or the academic senate, asking for information and choosing to use it for decision-making, (2) the analyst, wearing his or her own hat and translating the information needed into terms that will admit a solution—that is, taking into account the imprecisions of the question, inadequacies of the data base, limitations of available tools and techniques, time, talent, and other resources for proper analysis; and (3) the technician to whom the practical and technical aspects of gathering information are clear and the meaning of the resultant data is unmistakable. The analyst must be capable of wearing the technician's hat and hence be able to direct the study, analysis, and other activities of the technician and be able to appreciate the results. As an advisor and data provider to the decision-maker, the analyst must be capable of wearing the decision-maker's hat in order to gain the new insights, use the ideas, and formulate the information to match the decision-maker's need. The effectiveness of the communication between the analyst and the decision-maker depends on the confidence they have in each other.

(1977:93)

The translations and transmissions required under Coleman's two world concept are crystallized in Sheehan's image of the analyst who is able "to wear the hat" of the decision maker so that he ultimately can match the decision maker's need. The "hat" may be interpreted as the model of the decision problem or structure that obtains in the decision forum. The analyst's own "hat" may be interpreted as the model used for analysis. Using Sheehan's metaphor, the importance of consistency or congruence between the models used for analysis and models used for deciding is underscored.
A UNIVERSITY DECISION PROBLEM

The Science Council of Canada foresees a troubled future for universities in Canada (Fortier, 1979). The rapid growth of Canadian universities in the 1960's resulted in a system with many structural weaknesses in the 1970's. Analyses published by Statistics Canada have highlighted the rank distribution of full-time faculty as one of those weaknesses (von Zur-Muehlen, 1977). Projections of university enrolment in the 1980's are forecast generally to decline (see, for example, Clark et al., 1979) and it is observed that the hiring of new faculty may be restricted.

The problem is not unique to Canada, and a European writer notes that a major implication of such restriction could be a "loss in the productivity and creativity of the research population which will retard the advancement of science" (Elstermann, 1978). The nature or likelihood of such a loss is not predictable, but attention to restriction of faculty hiring has raised the problem of forecasting or controlling the distribution of faculty among the academic ranks. The matter of rank distribution of faculty is examined in some detail in Chapter Four. However, the selection of it as an exemplar of university policy problems requires comment here.

The hallmarks of policy are its importance, wide ramifications for the structure of the institution, and long time perspective. These are the fundamental elements in the definition of policy established for the study. Similarly Coleman (1972) has noted that a policy problem has the essential feature of arising in the world of action. The matter of distribution of university faculty members among the academic ranks satisfies that criterion by arising in the university,
but outside any discipline. There is no theory of rank.

Moreover, it is an important problem because "the excellence of a university is the excellence of its faculty" (e.g. Smith, 1978) and there seems to be some danger of that diminishing. Indeed, it has been speculated that "perhaps the most intransigent challenge facing the faculty personnel system is the rapid growth of faculty holding tenure" (Smith, 1978). It will, of course, be necessary to examine those linkages to excellence as part of this study. However, it may be assumed to be sufficient if faculty rank is seen to be a problem, for there is no necessary condition that a concern or problem be demonstrable empirically for it to catalyze action or draw the attention of policy makers.

The matter of intransigence touches upon the time dimension of the faculty rank problem. Long time commitments are associated with senior rank through the vehicle of academic tenure. On this dimension as well, therefore, faculty rank distribution is a policy matter.

Small (1979) has crystallized concern about academic careers in two contrasting "assumptions" about university staffing including academic rank. The "traditional" assumption states: "The interests of the institution are best served by a stable body of satisfied academics, who are tied to the institution by loyalty, seniority and conditions of work." (1979:63). Noting the inflexibilities which characterize universities, Small proposes an alternative staffing assumption which states: "The interests of the institution are best served by a fluid professoriate whose mobility potential is enhanced by conditions of appointment." (1979:64).

The possibility of moving from the "traditional assumption"
to the alternative suggested by Small makes understanding the implications of each essential. Taken together, the importance, long-time perspective and fundamental ramifications of maintaining or modifying the faculty rank distribution in universities makes its selection as a case problem for this study especially appropriate.

SUMMARY

This chapter has introduced the notions of policy, policy research and policy analysis. Policy was defined as an explicitly or implicitly selected guideline for future action which affects the structure of the organization, requires a long time perspective and has the widest ramifications of all generalizations about the organization. Policy research is the study of the dynamics of policy making, whereas policy analysis is the creation and study of the substance of policy in an effort to maximize its appropriateness and effectiveness.

The problem of enhancing policy analysis with the results of policy research to improve policy making was reviewed to identify the need to examine the technologies of policy analysis in light of known characteristics of policy decision making to identify problems and suggest solutions. Based on the notion of two worlds, action and research, interfacing in the making of decisions, a strategy for examining the potential for links between analysis and decision was proposed.

Drawing on the notion of cognitive dissonance as a factor inhibiting the use of analysis in decision, the possible requirement for conceptual congruence between analysis and decision was highlighted. In particular, testing for congruence between the design of analysis and models of decision making processes was identified as the primary focus
for the study. It was suggested that congruence could be examined by examining analytical models and decision models in terms of a common set of decision-related criteria and then comparing the resulting profiles. To provide a parsimonious example for examining congruence, a case study approach was selected. That case would require a basis of both relevant policy research and policy analysis.

After identifying universities as a class or organizations of particular interest, a case problem was chosen from the university environment. Noting the importance of the faculty of a university and the far-reaching implications of the conditions of faculty employment, the case problem of a faculty rank distribution was identified. Moreover, the importance of the case problem for contemporary universities was underscored.

The concept of decision is vital as a possible means to develop comparisons of selected models used for policy analysis and of decision making models derived from discipline research. The case approach requires a reasonable set of models of both types. However, before any review of those models can proceed, it is necessary to develop a comprehensive paradigm or conception of decision that will provide the common set of criteria for that exercise.
Chapter Three

A GENERAL DECISION PARADIGM

Introduction

This chapter introduces and illustrates a general model of the structure of a decision. Research demonstrating the sensitivity to conceptualization that is characteristic of analyses of decision making is summarized to posit the value of a broad conceptual view to avoid bias. Several competing theories of decision are sketched and an overarching conceptual framework presented. The framework uses three types of variables, four linking structures, a time horizon and treatment of uncertainty to relate existing conceptions of decision as special cases of a larger view. The general framework is examined from the viewpoint of other attempts at synthesis and is elaborated as a frame of reference for research by developing operational definitions of its elements and indicators of variation on each through a review of selected literature.

THE PROBLEM OF MODEL BIAS

A problem in any study is the possibility of distortion in the collecting and interpreting of data. This is a version of the Experimenter Effect (Rosenthal, 1966) in which the researcher unintentionally seeks only those data which support his hypothesis. Moreover, the academic background of the researcher can effect his perception of reality. Specifically, the decision model a researcher uses to frame investigation can "filter, distort, and predetermine his research findings and bias the resulting determination of the real decision process" (Kent, 1975:37).
Thomas Kuhn notes that the current theoretical model or "paradigm" that a discipline proposes will restrict research (1970). In "The Structure of Scientific Revolutions" Kuhn uses the term paradigm to describe the ways that the scientific community views the world. It therefore follows that to adopt a paradigm is to adopt a criterion for choosing problems for study. In this sense, the paradigm is a filter which can inject bias into inquiry by emphasizing a particular perspective of reality.

In a similar vein, Polanyi focused on the bias attributable to the conceptual approach to a study by noting that:

The scientist's imagination does not roam about casting up random hypotheses to be tested by him. He starts by thrusting forward ideas he feels to be promising because he senses the availability of resources that will support them - and his imagination then goes on to hammer away in directions felt to be plausible, bringing up material that has a reasonable chance of confirming these guesses.

(1968:7)

In reviewing several studies of decision making in an urban setting, Walton noted that political scientists, for example, could well be finding only artifacts of a method by relying on a single technique in over thirty different studies (1966).

Mead points out that the repertoire of responses possessed by an individual is a function of genetics, his environmental history and the paradigm with which he works (1956); moreover, these all influence his perception of the world, since "the person carries this repertoire and its implications for noticing wherever he goes" (Weick, 1969:26). Hence support for the notion of model bias exists in both studies of perception and analytical treatments on the scientific method.
In case analyses of government decisions (Allison, 1971; Kent, 1975), and university decisions (Millett, 1978), supporting evidence for each of multiple models of decision making is found. In Kuhn's terms, the problem may be interpreted as one of a lack of comprehensive theory to which the several models may be related by showing each model to be an isomorph of one subsection of an integrated conception.

Rudner cautions us about over-enthusiastic use of the term theory. In the present case, the requirements of a theory are not fully met in several ways. Rudner defines a theory as "a systematically related set of statements, including some lawlike generalizations, that is empirically testable" (1966:10). He notes that much of what the social scientist will achieve will not meet that definition for two reasons: "first, because, though the scientist may be directly aiming at the complete formulation of a theory, achieving this is simply too difficult; and, second, because the scientist may not be aiming at the formulation of a theory at all, but rather some other kind of formulation" (Rudner, 1966:28). With those comments in mind, a note on the limitations of models, as a class of incomplete theoretical entities, will serve to provide specific caveats for the study.

A Note on Models and Modelling

Kaplan proposes that:

... any system A is a model of System B if the study of A is useful for the understanding of B without regard to any direct or indirect causal connection between A and B ... In a word, when one system is a model of another they resemble one another in form and in content.

(1964:263)
Kaplan also describes a model as a "scientific metaphor" which identifies similarities to another system and incorporates them into the model's system. Thereby, model building leads to theory building by identifying or incorporating the previously undetected or unrelated. In identifying elements of the real world which are important to its understanding, models provide the researcher with a concreteness which is not available in the abstractness of a theory, yet is amenable to theorizing for it requires only a translation into the theoretic when results in the model are obtained (Rudner, 1966). Finally, models assist in the organization of data by providing a framework to highlight specific elements of reality.

On the limitations of models, Kaplan makes five observations. First, models are not reality and care must be exercised in translating to reality or theory. Second, "... science advances on the basis, not of what is logically possible, but of what is available to it in the concrete problematic situation" (Kaplan, 1964:279). Therefore, conclusions must be based on insights gained by relating a model back to reality, not merely on relationships in the model itself. Third, the powerfully selective highlighting of elements of reality has a price as well as a virtue. The utility of a model is limited to the extent that it ignores elements of reality, and one must not presume that all relationships are reflected even in a complex formulation. Fourth, models tend to overemphasize precision and rigor. Therefore, they are often improperly exact or appear to show exactness that is not obtainable. Finally, a "map reading" error can be made in failing to realize that a model is only a particular type of representation. Map reading errors are "... the obverse of the error of oversimplication: instead of
leaving out of the model something which should be in it, we read the model as containing something which is in fact not a part of it" (Kaplan, 1964:285).

One of the types of nontheoretic structures identified by Rudner is the "conceptual model" (1966:28). The nontheoretic are distinct from theories "in that they contain no empirical assertions; whatever truths they contain are logical or analytic" (1966:29), we may look, therefore, to his classifications of "definitional schemata" and "analytical conceptual schemata" for characteristics of conceptual models.

Definitional schemata make no statements about their predicates; they consist only of the predicates and definitions thereof. They are a special case of the analytical conceptual schemata in that an analytical conceptual schemata also includes "a set of analytic, or logically true or "truistic" sentences" (Rudner, 1966:29). They are models in the sense that Kaplan provides for a scientific metaphor, based in definitional precision and rigor in assembling statements relating one element to another; yet they are not so developed as to be called theories. There is an intermediate stage implied here, and Rudner hints at it when he states that "Both definitional schemata and analytical conceptual schemata though themselves nontheoretic constructions in social science, are, nevertheless, presumably destined for ultimate inclusion within some social-science theory." (1966:31).

Our attention is therefore directed to the identification of the predicates used in conceptualizing about decision making, to the definition of those predicates, and the development of statements relating them. This exercise should pay particular attention to overcoming model bias by surveying a broad literature of conceptualization and should
attempt to find those terms and concepts which may relate to an integrated conception and provide for further development towards theoretical status. With its theoretical orientation, if not substance, such an exercise is clearly part of a disciplinary inquiry. For the purposes of the study, a limitation on its scope is necessary.

The literature of decision making is large and multi-faceted. The problem of model bias will be controlled for in examining the literature by drawing on studies which used multiple models, either for analysis of cases, or for attempts at synthesis. In so doing, a broader literature is identified and its salient features highlighted.

The next section accomplishes this by briefly sketching several schools of thought or models of decision making in universities, stating a synthesizing model which claims to incorporate each as a special case, critiquing the "meta-model," and examining its applicability in some detail.

MODELS OF ORGANIZATIONAL DECISION MAKING

Similarities in adaptive behavior have been demonstrated among public bureaucracies and other types of organizations such as business firms and universities (Cohen and March, 1974; Manses and March, 1978). Conceptual models of decision-making in organizations have been developed on the basis of a variety of theories of organization. Models of decision making in universities have been examined by many researchers and may be summarized under eight alternative conceptual structures: bureaucracy, collegium, political incrementalism, open system approach, compound system, organized anarchy, rational analysis and cybernetics (Weathersby, 1975).
Bureaucracy

Stroup (1966) examined universities from the viewpoint of Weber's characteristics of a bureaucracy and identifies eight conditions which are important to a bureaucratized view and are satisfied by institutions of higher education:

1. Competence is the criterion used for appointment;
2. Officials are appointed not elected;
3. Salaries are fixed directly by the organization rather than determined in a "free fee" style;
4. Rank is recognized and respected;
5. The career is exclusive, no other work is done;
6. The style of life is centered around the organization;
7. Security is present in the tenure system;
8. Personal and organizational property are separated.

(Baldridge, 1971:10)

The bureaucratic view is based on the organizational chart of the institution and implies that decisions are made at or near the top of the pyramid and are implemented through it on the basis of authority delegated from the top. However, the informal processes of influence and persuasion have been proposed to be more important in the real formation of decisions in universities than the formal structure of authority (Baldridge, 1971).

Collegium

An emphasis on equality among colleagues and a preference for consensus as the rule for making decisions are characteristic of the collegium model. John Millett expressed the model as reflecting
a community of scholars:

The concept of community presupposes an organization in which functions are differentiated and in which specialization must be brought together, or the coordination, if you will, is achieved not through a structure of superordination and subordination of persons and groups but through a dynamic of consensus.

(1962:234-235)

This view places the responsibility for implementation of decisions on the subunit charges with administration. However, the role of administrators in making decisions is merely as catalyst or consensus starter for faculty. The differentiation of functions is based on technical competence rather than implied in an official role and stems from the professional stature of faculty (Parsons, 1972).

Faculty are members of more than one collegium, however, and can demonstrate loyalties to a discipline rather than to the particular institution by which they may be employed at a given time. Moreover, under conditions of scarce resources, the achievement of consensus is made difficult since a gain by one is a loss by another and raises an emphasis on interpersonal or intergroup power.

Political Incrementalism

Political scientists and sociologists have demonstrated that the power of a single individual in an organization is rarely the power to decide; rather it is the power to persuade. The decision, when it is made, is the resultant of political forces which impinge on individuals and are expressed by individuals.

Graham Allison acknowledged the role of conflict, bargaining, advocacy, coalition and pressure groups and summarized the political incremental model in these terms:
The organizing concepts of this paradigm can be arranged as strands in the answer to four interrelated questions: Who plays? What determines each player's stand? What determines each player's relative influence? How does the game combine players' stands, influence, and moves to yield governmental decisions and actions?

(1971:164)

Using the sociological concepts of conflict theory, community power and interest groups in organization in building his analysis of decision making at New York University, Baldridge found support for a political model (1971). He comments:

Rather than a wholistic enterprise, the university is a pluralistic system, often fractured by conflicts along the lines of disciplines, faculty subgroups, student subcultures, splits between administrators and faculties, and riffs between professional schools. The academic kingdom is torn apart in many ways, and there are few kings of the system who can enforce cooperation and unity. There is little peace in academia: warfare is common and no less deadly than it is polite. The critical point is this: because the social structure of the university is loose, ambiguous, shifting, and poorly defined, the power structure of the university is also loose, ambiguous, shifting and poorly defined.

(1971:107)

Allison's four questions provide the key to understanding a decision under the political model. No one person really decides. Individuals choose to join a coalition or lobby independently and the outcome of the process is a function of individual or group power (Salancik and Pfeffer, 1974).

Open System Approach

Katz and Kahn (1966) applied the concepts of open systems to organizations and challenged the possibility of a single global goal. James Thompson used an open systems view to identify major dimensions
to any decision issue: (1) beliefs about cause/effect relations, and (2) preferences regarding possible outcomes (1967:134). On the basis of those two, Thompson proposed four strategies for decision making based on perceptions of uncertainty. When preferences about outcome and beliefs about relationships are both certain, a computational strategy for decision is most appropriate. When preferences are certain and beliefs about causal relationships are not, a judgmental strategy is most appropriate. When there is certainty about cause and effect relationships, but preferences about possibly outcomes is uncertain, a compromise strategy is most appropriate. When there is uncertainty about both preferences and causation, an inspirational strategy is most appropriate (1967:134-135).

The emphasis on uncertainty arises in Thompson's interpretation of open systems:

Most of our beliefs about complex organizations follow from one or the other of two distinct strategies. The closed system strategy seeks certainty by incorporating only those variables positively associated with goal achievement and subjecting them to a monolithic control network. The open-system strategy shifts attention from goal achievement to survival, and incorporates uncertainty by recognizing organizational interdependence with environment. A newer tradition enables us to conceive of the organization as an open system, indeterminate and faced with uncertainty, but subject to criteria of rationality and hence needing certainty. (1967:13)

Richman and Farmer have developed an open systems approach for understanding university decision making which is based on Thompson. They define a university decision system thus:
a continuously importing - transforming - exporting system. The system remains in dynamic, not static, equilibrium - if it survives - and continuous feedback can lead to changes in inputs, transformation processes, and future outputs. The organization is viewed as transacting with external environmental elements with respect to the importing and exporting of money, people, energy, material, goods and services, information, and so on. An open system seeks multiple goals, and the individuals constituencies, sub-units, and subsystems involved often have different values and objectives.

... a university is a set of interdependent parts that together make up a whole because each contributes something and receives something from the whole which, in turn, is interdependent with some larger environment. The whole is not just the sum of the parts - there is synergy - but the system itself can be explained as a totality.

(Richman and Farmer, 1974:5)

**Compound System**

Three basic concepts are used by Helsabeck to identify a compound decision system. The number and autonomy of decision making units or subsystems in the system is the system's **centricity** (which may range from federated to corporate); the proportion of unit members who are involved in decision making by that unit is the amount of **participation** (which may range from mass democratic to monarchic); and, the variation in decision making across the organization for various kinds of decisions is the **decision structure variance** (Helsabeck, 1973:53). Four types of decisions are identified (authority allocation, resource allocation, resource acquisition and production) and two levels of decision making: system and subsystem. Finally, Helsabeck proposes three criteria of organizational effectiveness: resource acquisition, goal formation and goal attainment, and membership satisfaction.

Using centricity and participation as orthogonal coordinates,
Helsabeck illustrates how different types of decision making could be used as an organization or subunit treats different kinds of decisions. Helsabeck has applied these concepts to colleges and universities and proposes a set of relationships to demonstrate the interrelated influences of environment, decision type and the criteria of organizational effectiveness.

Organized Anarchy

Cohen and March (1974) studied 42 universities and colleges and concluded that they were organized anarchies with problematic goals, unclear technologies and fluid participation. They wrote:

... the American college or university is a prototypic organized anarchy. It does not know what it is doing. Its goals are either vague or in dispute. Its technology is familiar but not understood. Its major participants wander in and out of the organization. These factors do not make the university a bad organization or a disorganized one; but they do make it a problem to describe, understand and lead.

(1974:3)

To describe the decision making process in universities and colleges, Cohen and March proposed the "garbage can" model of choice. That model is summarized in these terms:

... problems, solutions, and participants move from one choice opportunity to another in such a way that the nature of choice, the time it takes, and the problems it solves all depend on a relatively complicated intermeshing of the mix of choices available at any one time, the mix of problems that have access to the organization, the mix of solutions looking for problems, and the outside demands on decision makers.

(Cohen and March, 1974:90)
Rational Analysis

Quade (1975) identifies the five basic factors for rational analysis of a decision to be made: (1) the objectives, (2) the alternatives, courses of action by which a decision maker hopes to accomplish the objectives, (3) the impacts or consequences of those actions, (4) the criteria by which to rank the alternatives by order of desirability, and (5) the model or models that describe the consequences that flow from a given alternative (1975:46-47). Incorporating those five factors, Quade diagrams the process of rational analysis as having five steps: formulation, search, comparison, interpretation and verification (see Figure 2).

Cybernetics

Steinbruner finds fault with the analytic paradigm of individual decision making and argues that a cybernetic paradigm is both more appropriate and more accurate (1974). Basically, Steinbruner's paradigm depends on pre-programmed decision rules based largely on past experience. These rules are applied in a "highly structured, appropriately arranged environment" (1974:13). Real decision problems are mostly complex (i.e. multiple objectives, possess uncertainty, diffuse authority) and Steinbruner assumes that cognitive processes based on learning structure reality sufficiently for each individual to allow his paradigm to be a reasonable descriptor and for probabilistic judgments to be made.

The pre-programmed decision rules minimize the effects of uncertainty by only incorporating response to critical variables, regardless of whatever else is happening; cybernetic "decision processes screen out information which the established set of responses are not programmed to accept" (Steinbruner, 1974:67). The political incremental
FIGURE 2
A RATIONAL POLICY ANALYSIS PARADIGM (Quade, 1975:52)
model described by Lindblom (1965) is a special case of the cybernetic model in that a few critical variables will be monitored and a noteworthy deviation from a learned level of preference will trigger a feedback process which results in a small change. Note, however, that a fundamental change is also possible under the cybernetic model, hence, incrementalism is a more limited notion.

A GENERAL DECISION PARADIGM

Several conceptual frameworks have been applied to the analysis of specific cases (e.g. Allison; 1971; Peterson, 1976; Kent, 1975) and show that each conceptualization of decision making directs the analyst to different sources and types of evidence. However, the danger of drawing inferences based on only one view is not overcome by using a number of views; rather, one develops three or four descriptions each of which proposes relationships about which other treatments are silent (Murphy, 1977). The problem, therefore, is to use a comprehensive model which is able to relate the various conceptualizations to a larger framework.

Weathersby asserts that nine elements or attributes describe an individual's decision context; that those elements are defined for particular decision situations for each individual; and, that while few of the elements are observable in a given situation, they provide a "consistent point of departure to understand current decisions" (1975:34).

The nine elements Weathersby proposes come from a synthesis of the eight conceptualizations reviewed above and comprise: three types of variables, four linking structures, the planning horizon and the nature of uncertainty. Weathersby states that "for a particular individual in a specific decision context we can define:
Three kinds of variables:

- **control variables** (or decision variables) are those variables which can be specified, determined -- literally controlled -- at this point in time [designated u(t)];

- **exogenous variables** are those variables that cannot be controlled or influenced by this individual in this context and at this time [designated z(t)]; and

- **state variables** are those variables that can be influenced though not controlled by this individual [designated x(t)].

Four linking structures:

- **observing system**, how the individual seeks to learn about the context of the decision, information on the current state and exogenous variables, and the basis for information for other linking systems [designated y(t) = h(x,u,z,t)];

- **value system**, the relative value to this individual in achieving various current and future states [designated v(x,u,z,t)];

- **causal relationships**, the assumed or estimated cause and effect relationships between action and consequence, between current decision or control variables and future state variables [designated x(t+1) = f(x,u,z,t)]; and

- **constraints**, those actually binding constraints or identities that interrelate all three variables, such as budget or space constraints [designated C(x,u,z,t)].

Two other considerations:

- **time horizon**, how far in the future one considers the effects of a current decision (designated T); and,

- **uncertainty structure**, which relationship, observation, inferences or structures are uncertain and what is the nature of that uncertainty [designated p(x,u,z,t,h,V,f,C)].

i.e. \[ \sum_{t=T_0}^{T} \int \int V(y,t) \cdot p(x,u,z,t,h,V,f,C) dp \]
The classic decision and control theoretic formulation of an individual's decision problem (Weathersby, 1970) is to:

$$\max_{u(t)} \sum_{t=t_0}^{T} \int \int V(y,t) \cdot p(x,u,z,t,h,V,f,C) \, dp$$

subject to

\[
\begin{align*}
y^{(+)} &= h(x,u,z,t) \\
x(t+1) &= f(x,u,z,t) \\
C(x,u,z,t) &= 0 \\
x(t_0) &\text{ known.} \\
t &= (t_0, T)
\end{align*}
\]

(Weathersby, 1975:35-36)

Under Weathersby's conception, a decision is treated as an optimal outcome which is a function of the values, observing system, assumptions about causal relationships, perceived constraints, time horizon and assumptions about uncertainty that an individual holds at a given time.

On decision making in groups, Weathersby states:

The transition to group decision making allocating group resources can be analyzed in at least two ways: individuals agree to be bound in a group decision according to some decision rule (such as voting); or individuals perceive participation to have current and/or potential future value and, therefore, expand their perception of state variables to include the nature, process and vitality of the group.

(1975:37)

It is important to note that the nine part mode developed by Weathersby does not consider decision making between organizations, hence the economic market is not included within it. Moreover, Weathersby contends that his model is superior to earlier analysis of group decision rules, notably those by Kenneth Arrow (1967). The grounds for this claim are that the Arrow analyses "do not provide a basis for describing individual choice to participate in or, once participating, to
contribute towards decisions in a group responsible for allocating group resources" (Weathersby, 1975:37).

The importance of incorporating the decision to join a group is evident in the impracticality of unlimited individual decision making. Some of the factors constraining the choices made by an individual include: the need for specialization, and attendant interdependencies; the existence of public goods, which are available to everyone, whether or not they pay for them; the presence of externalities or the effects of one's decisions on others (spillover effects); the notion of common property resources, or resources that entail access which cannot be effectively denied to an individual, yet their use by an individual is a separable use [see, for example: Olsen (1965), Ostrom (1973), Schmidtlein (1974)].

Weathersby allows those individual choices to fit within the variables of his model by expanding individual control variables "to include their behavior in the group," expanding individual state variables "to include their effectiveness in motivating group behavior or creating a more viable group," expanding individual causal assumptions "to include the likely consequences of different personal behavior," and expanding the individual's "notion of uncertainty to include the responses (strategies, gaming) of other group participants" (Weathersby, 1975:37).

Relationships Between General Paradigm and Other Paradigms

The paradigms outlined in the earlier part of this chapter each may be seen to emphasize one or more of the elements of the general decision paradigm proposed by Weathersby. Weathersby suggests interpretations of each as special cases of the general paradigm.
A bureaucracy is based on formal delegations of authority which create a hierarchy of decision variables (that which is controllable at one level is exogenous or a constraint at a subordinate level). Bureaucracies attempt to structure value functions by imposing rank structures and stating explicit criteria for promotion and reward. Thereby, bureaucracies reduce some uncertainties (e.g. provide tenure as a form of job security) and provide superior members of the bureaucracy with substantial personal leverage through their control of extensive resources for subordinate individuals and groups. Information is a medium of exchange in the power structure and is acquired and distributed according to that structure. Since only the organization has responsibility for outcomes, internal decisions are made almost entirely on the basis of inputs, causal relationships are rarely tested, and novel techniques are viewed suspiciously because their costs are only infrequently balanced by improvements in effectiveness of the organization which themselves go unrewarded.

A collegium has the feature of a group decision process. It may be inferred that participating in the group provides greater benefits to the individual if an essential role in the group is perceived. In a collegium, authority is not delegated formally, therefore no one has control over the resources of the group. If beliefs about causal relationships are weak, or if individual perceptions differ from those of the collegium, a non-hierarchical peer structure may be formed to avoid major shortfalls in the satisfaction of individual preferences and to insure maximum participation of the individual in the group. In this arrangement, a collegium reflects a perceived dissonance of values rather than a set of shared values. By providing for equal participation, the
danger of misrepresentation is minimized; however, uncertainty and ambiguity increase with the degree of collegiality.

Political rationality is distinguished by the preeminence of coalitions and interest group politics. This means that the individual joins a group because he or she perceives it to be in his or her best interest to do so. The political process occurs in the absence of agreed-upon decision rules. However, the political process involves the playing of roles by individuals and the political incrementalists do not provide for assessment of how each individual chooses those roles (e.g. which faction to create or join, how strong a commitment to make). The decision to join in the tactics of political bargaining is the process that the general paradigm addresses.

An external view of individual choice is provided through the open system approach. With the assumption that each individual perceives a mechanically responding system in the rest of the organization, Thompson emphasizes three elements of the general paradigm by highlighting assumed causal relationships, the effects of uncertainty and comparison of values and outcomes.

The compound system view considers only two aspects of the general paradigm. The concept of centricity assesses the formal delegation of control variables and the attendant degree of centralization of decision making. The amount of participation addresses the degree of individual participation in decision making by the group. According to Helsabeck (1973), these two concepts describe variation with the type and substance of a decision. However, in Weathersby's terms, they address only one element of decision making by the individual, and a summary characteristics of the roles of all individuals in group choice.
The organized anarchy concept makes four assertions. First, structural uncertainty is so great that individuals cannot act on values or assumed causal relationships. Second, no one has any organizational control variables. Third, rewards are unclear. Fourth, formal authority systems are neither clear nor effective. Cohen and March recommend a series of individual decisions about individual behavior in a university which they contend will maximize an individual's power (1974), given no organizational control variables and no obvious way to participate in group choice. They do not state their assumed causal relationships, constraints or values; however, they do assume that the intelligence or observing system will generate misleading information and advise against administrative "learning."

The classical analytical model is generally consistent with the general paradigm prepared by Weathersby, with one exception: the analytical model is inappropriate as a paradigm for group decision making. The failure to find evidence to support the analytical model may be attributed to its application to group decisions, many of which have been political (e.g. Allison, 1971).

The cybernetic paradigm emphasizes the decision function almost exclusively. Steinbruner (1974) argues that the number of calculations and the structural uncertainty of the analytical model preclude its use and that, as an alternative, judgment and experience lead to pre-programmed decision rules as they are applied to reality through cognitive processes which are limited. Indeed, the presence of decision rules that appear pre-programmed is observed; however, from those observations it is not possible to determine whether they have been produced by analysis or by cognitive processes. The cybernetic paradigm is narrower
than the general paradigm in that it provides for inter-individual and
intergroup interaction only through variables which are exogenous to an
individual, whereas a wider variety of ways to affect individual decision
in all its elements is observed.

In summary, the general paradigm may be seen to encompass the
variety of decision models which exists in the literature. It provides
a framework for their comparison and, possibly, integration. As a
taxonomic description of the elements of an individual decision, the
general decision paradigm is descriptive of the structure of a decision.
However, it is silent on the content of the decision, its organizational
setting or traits of the individual. As such, it identifies the ingre­
dients for moving from conceptual models of decision making to a
theoretic statement. However, it does not provide the generalizations
required for a full theory. The structural focus does identify the
predicates upon which a theory could be built, and in so doing provides
a basis for comparison between research about deciding and research
intended to inform decision.

APPLYING THE GENERAL DECISION PARADIGM

It has been proposed that conceptual congruence between analysis
and decision is important. In particular, close congruence may contri¬
bute to greater influence on the decision by the analysis. It has also
been proposed that a conceptually broad model of the structure of
decision may provide a common set of variables in terms of which
analytic and decision process models can both be analyzed and, therefore,
compared or tested for congruence.

Using the general decision paradigm, in the case of perfect
congruence between analysis and decision, the design of research in
aid of decision would be identical with the decision making process in terms of their structural variables, linking structures, time horizon and treatment of uncertainty. This would provide a one-to-one correspondence between the analysis and the terms that are important to the decision maker.

Therefore, the design of research in aid of decision, i.e. analytical models, may be analyzed using the nine elements of the general decision paradigm. That analysis must be a static one, identifying the characteristics of the taxonomy that are embodied in those designs (see Chapter 4). Similarly, the general decision paradigm may be used to analyze the structure of decision processes in alternative models of deciding in universities which have been more fully developed than the brief sketches in this chapter.

**Operational Definitions**

The general decision paradigm emphasizes the role of the individual in deciding. The phenomenon of group decision making is subsumed through considering an individual's membership and participation in a group as part of a set of individual decisions. The definitions proposed by Weathersby for the nine elements in the general paradigm require elaboration before being applied to models of analysis and research.

**Control variables.** Control variables were defined as those which can be specified or determined by the decision maker at this point in time, under these conditions. Therefore they may be seen as defining the options open to the decision maker. In an analytical model they would be those variables which are manipulated in the model to simulate the effects of different alternatives or to achieve a particular outcome.
**State variables.** State variables have been defined as those which can be influenced but not controlled by the decision maker. They may be interpreted as those variables which describe the outcomes of a decision, as distinct from the control variables which are manipulated directly. The linkage between control and state variables is through the causal relationships assumed or estimated to be in operation.

**Exogenous variables.** Exogenous variables are defined simply as those which cannot be classified as control or state variables.

**Observing systems.** Observing systems are the means by which information concerning the three kinds of variables are collected, and form the basis of information for other linking structures. These will include the bases of information and the methods of inquiry used to gather it.

**Value system.** The value system links the individual to the three kinds of variables by stating the relative value to him that is associated with the current status of each and with achieving alternative future conditions of each.

**Causal relationships.** Causal relationships link control and state variables across time. They provide the relationship between present control and future outcomes. They may be a function of exogenous variables to the extent that a form of causal relationship may be determined by factors not open to control or influence by the decision maker.

**Constraints.** Constraints are those relationships which limit the total variance among the three kinds of variables, and in particular between control and state variables. For example, the sum of indicators
on control and state variables may not exceed a certain constraining limit.

**Time horizon.** The time horizon in a decision is the distance into the future that state variables are monitored as a result of manipulating control variables in a current decision.

**Uncertainty structure.** The uncertainty structure identifies those elements in the decision problem which are uncertain, and the degree of those uncertainties. Dror (1970) provides a distinction between those instances with "primary" uncertainty when virtually nothing is known about possible outcomes, i.e. total surprise predominates, and those with "secondary" uncertainty where, although the dimensions of an outcome are known, the probability distributions, i.e. relative likelihood of specific outcomes, are not.

**Other Considerations**

It is important to note that a control theory solution to the problem associated with a decision provides for determining what inputs or control variable settings are required to achieve a specified and preferred outcome among state variables. Therefore Weathersby's formulation of the individual decision problem (p. 46) assumes a control of variables towards a specific objective.

In contrast, the control variables may be manipulated simply to determine what outcomes would accrue as a result of those manipulations. In that mode, the exercise merely simulates rather than optimizes the outcomes. In the simulation mode, the presence of an objective is not assumed. The purpose of the exercise may be to discover the forecasted outcome of current practice, or to illustrate the responsiveness of
control variables.

SUMMARY

This chapter has reviewed the problem of model bias in the conduct of research and highlighted the problem of producing results of analysis which are artifacts of the research design. In particular, various models were sketched as they each attempt to present a model of decision making.

The competing views provided by the eight models noted in the opening sections were shown to provide one or another sets of conclusions and, therefore, to contribute to model bias if only one or another view was taken. A general decision paradigm was summarized as a larger framework within which the particular models were shown to be special cases. The general decision paradigm provides, therefore, an overarching conception with which it is proposed to analyze both analytical models and decision process models pertaining to the case problem.

The general decision paradigm was expanded with discussion of operational definitions which would enable its applications. Nine elements comprise the paradigm:

- control variables
- exogenous variables
- state variables
- observing system
- value system
- causal relationships
- constraints
- time horizon
- uncertainty structure.

The next two chapters present reviews of literature describing analytical models and decision process models concerning faculty rank distribution. Each chapter uses the nine elements of the general decision paradigm to summarize that literature and provide summary profiles for comparison in Chapter Six.
Chapter Four

THE PROBLEM OF FACULTY RANK DISTRIBUTION

This chapter introduces the concepts of faculty rank distribution and faculty flow. The types and conditions of faculty appointment are discussed and a framework for categorizing academic appointments developed. The significance of faculty rank distribution as a policy problem is examined and the literature describing analytical models used to project academic rank distributions is reviewed. Three conceptually distinct types of models are summarized and an example of each selected for analysis. Each of the three examples is analyzed using the general decision paradigm to produce a profile of the structural elements of decision which it includes.

THE NEW "CRISIS" OF CANADIAN UNIVERSITIES

A university is a special kind of institution primarily concerned with higher education. Its status in society derives from several distinguishing characteristics: it is concerned with the encouragement and development of intellectual excellence; it seeks to foster the kind of education that makes for intelligent and sensitive citizenship and effective leadership; it provides a setting in which ideas of all sorts are developed, scrutinized, discussed, and evaluated; it encourages its members to pursue knowledge both as a good in itself and as a means of solving some of the problems in a changing world; it makes its resources of learning available to the community at large; and it trains adult students in the application of specialized knowledge.

(Porter, et al., 1977:1)

The characteristics of a university relate very closely to those of its faculty members, indeed "... among the durable truisms about
universities are 'A university is its faculty,' or "The excellence of a university is the excellence of its faculty." (Smith, 1979:1). However, the future ability of universities is seen to be threatened as opportunities for new entrants to faculty ranks decrease, and existing faculty become obsolete or experience a loss in productivity or creativity (e.g. Mackie, 1979; Maslen, 1979). In Canada, the phenomenon has been called "The New 'Crisis' of Canadian Universities" (von Zur-Muehlen, 1977) and directs attention to the policies by which appointments as faculty are made or changed. Particular attention is focused on the proportion of faculty holding senior rank or appointments with tenure.

Faculty Appointments

The basic concept underpinning academic appointments is that of tenure. To hold tenure is to hold "... appointment without term, which may be terminated only through resignation, retirement or dismissal for good reasons established by a proper hearing" (CAUT, 1979:2). The Canadian Association of University Teachers' (CAUT) Policy on Academic Appointments and Tenure provides three classes of appointments:

(i) those that confer tenure;

(ii) those that confer probationary status on the candidate, implying that at the end of a stated period the university will either confer tenure on him/her or discontinue the appointment;

(iii) those made in some exceptional cases, where a university may find it necessary to make appointments with a contractually limited term, carrying no implication of renewal or continuation beyond the term and no implication that the appointee is on probation for a
permanent appointment (1979:9).

Those holding or eligible for tenure are almost exclusively full-term appointees and hold an academic rank of Professor, Associate Professor, or Assistant Professor although, in some instances, a tenured appointment at a lower rank obtains (Michaels, 1974). In general, eligibility for award of tenure implies a commitment to the full range of research, teaching and service functions of the university (CAUT, 1979) and holding tenure is taken as a prerequisite for and sign of academic freedom (Shulman, 1979).

Probationary status is limited to a finite duration, usually five years for Assistant Professors and two years for higher grades. These limits are provided by the CAUT Guidelines for the Policy on Academic Appointments and Tenure and represent typical practice both in Canadian (Michaels, 1974) and American universities (Trow, 1973). The practices of awarding tenure, limiting the duration of non-tenured appointments, and providing tenure only for those with professorial rank and full-time appointments establish *de facto* a set of variables for describing the faculty of an institution.

It should be noted that provision recently has been made for holding tenure as a part-time member of faculty. This development may lead to significant changes in patterns of faculty appointments. So few cases exist at present, however, that they do not comprise a significant element in describing the faculty of an institution.

**Faculty Rank Distribution**

The distribution of faculty rank refers simply to the number of persons holding appointments at each of the ranks included in a distribution. As such, the title of academic rank is used as a simple method
for categorizing individuals according to a nominal scale. Of course, the distribution can be described in many ways including absolute numbers and percentages of the total, but the distribution normally refers to the total population of full-time faculty in an institution. In that context, the academic ranks are the professorial grades common in North America; i.e. Professor, Associate Professor, Assistant Professor and the lower ranks, usually including Instructors, and Lecturers.

Faculty rank distribution was introduced as a contemporary issue of higher education management in Canada by von Zur-Muehlen (1977). However, the matter of limited prospects for appointment to academic rank, or promotion to higher rank was related to current Canadian demographics and rank characteristics by Holmes in 1974. More generally, the study and modelling of academic rank populations was reported by Bartholemew in 1969.

Interest in academic rank distribution rarely restricts examination to point-in-time data. From an administrative viewpoint, any one distribution is seen as an indicator or reflection of policy concerning academic staffing (Dill, 1974). Since policy is an instrument to achieve desired goals (Dye, 1972), current staffing policy has referents and impacts in the future that make forecasting rank distribution important to understanding both existing policy and possible changes.

Given that future orientation, the duration of an academic appointment becomes an important variables, as well as academic rank. It is, therefore, possible more specifically to categorize academic appointments in terms of the nominal label attached; i.e. professorial rank, and the temporal description, i.e. duration (See Figure 3). A special class of
appointments are those without a finite duration, commonly referred to as tenured appointments. As a class, they provide a particular constraint on the future of academic appointment rank distributions.

FIGURE 3

A FRAMEWORK FOR CATEGORIZING ACADEMIC APPOINTMENTS

<table>
<thead>
<tr>
<th>DURATION</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FULL PROFESSOR</td>
</tr>
<tr>
<td></td>
<td>ASSOCIATE PROFESSOR</td>
</tr>
<tr>
<td></td>
<td>ASSISTANT PROFESSOR</td>
</tr>
<tr>
<td></td>
<td>INSTRUCTOR</td>
</tr>
<tr>
<td></td>
<td>LECTURER</td>
</tr>
</tbody>
</table>

Any distribution of academic appointments may be described using the categorization framework in Figure 3. However, the framework does not provide any relationships among its cells, or states, hence no further distributions can be derived from it. To describe the temporal relationships among the states, or subsets of states, a set of mathematical equations linking distributions at different times also is used. Together the component states and relationships among them constitute models (Kaplan, 1964) which provide for description and analysis of faculty appointment distributions at different times by simulating the progression of faculty members into, out of and within the categorization framework. It is important to note that any abstract summarization of the individual members of a university faculty on the basis of height or degrees held or, as in this example, on the basis of their rank or appointment type, loses a vast amount of information about each member. Moreover, by focusing on the overall movement of faculty with respect to
a categorization scheme, the fact that each particular movement requires individual decisions and decisions about individuals can be lost as one gathers an impression of steps taken by collectivities.

Significance of Faculty Rank Distribution

We have defined policy as a guideline for future action which affects the structure of the organization, requires a long time perspective and has the widest ramifications of all generalizations about the organization. In what ways does faculty rank distribution constitute a policy problem?

First, faculty rank distribution provides the differentiation among faculty which may be seen as the structure of the university. Of course, organization into departments and faculties may also be taken as the main feature of university structure, but academic rank within those subunits is still a major structural variable. Whether one emphasizes the academic collegium over the bureaucratic structure or vice versa has a major influence on the primacy of rank as a structural variable; however, it is as a matter of degree rather than exclusivity.

Second, awarding tenure to a faculty member at age thirty implies a commitment of roughly thirty-five years duration, since the individual may stay with the institution till he or she retires. Of course, there is a variety of other things that could happen; the newly tenured person may leave in a year or two; however, that decision is largely made by the individual and may require that he or she be replaced with another person to whom a similarly long institutional commitment must be made. Matters with financial and academic implications extending over nearly two scores years are clearly those which require a long time perspective in their
consideration, hence faculty rank distribution, being the sum of individual commitments, must have a long time perspective.

Finally, it has been noted that the faculty are the source of excellence of a university. Since the encouragement and development of excellence are the bases for the university's status in society, the pursuit of knowledge and its dissemination through teaching are the subjects of the most basic generalizations about the university. If excellent performance of those tasks is in jeopardy, then the matter of a stagnating faculty is profound, and does indeed carry the widest ramifications for the university. Hence, it becomes important to examine the relationships between academic rank and the production of knowledge or teaching.

Relating Academic Rank to University Outputs and Inputs

The major kinds of "outputs" from a university are teaching, research and public service (Yuker, 1974), while the principal input relating to rank is money for salaries. In both cases, rank is an intervening factor, neither an output nor an input. The evidence linking senior rank or holding tenure to level or quality of those outputs is mixed. Elstermann (1978) notes that examining the productivity of researchers does not reveal a significant correlation between age and productivity. Bayer and Dutton (1975) report various curvilinear relationships between productivity and career age, but their compelling conclusion is that career age is a poor predictor of research activity. Heseldenz (1976) reviewed several earlier studies and observed
that "no researcher has dealt directly with faculty workload differences according to academic rank" (p. 322). In a study of 795 faculty at a large state university, Heseldenz found a modest decrease in time devoted to instruction with increasing professorial rank, and an increase in institutional or professional service with increasing academic rank (see Table I). Interestingly, there was no statistical difference among the total amounts of time devoted to university activity by members of different rank. Rather, instructional time and institutional or professional service time were found to be complementary; i.e., a decrease in time devoted to instruction was not reflected in an increase in research activity, but with an increase in time devoted to service activities, including meetings for administrative purposes within the university.

### Table I

**TIME DEVOTED TO ACADEMIC ACTIVITIES BY ACADEMIC RANK**

<table>
<thead>
<tr>
<th>RANK (NUMBER)</th>
<th>INSTRUCTION</th>
<th>RESEARCH</th>
<th>PUBLIC SERVICE</th>
<th>INST. PROF. SERVICE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor (208)</td>
<td>25.1</td>
<td>13.9</td>
<td>1.6</td>
<td>13.8</td>
<td>57.3</td>
</tr>
<tr>
<td>Associate (255)</td>
<td>27.1</td>
<td>14.7</td>
<td>1.6</td>
<td>10.8</td>
<td>54.1</td>
</tr>
<tr>
<td>Assistants (332)</td>
<td>31.0</td>
<td>13.9</td>
<td>1.6</td>
<td>8.7</td>
<td>55.0</td>
</tr>
</tbody>
</table>

(All figures are self-reported hours per week)  
(Adapted from Tables 2 and 5, Heseldenz, 1976)

Analysis of faculty workload using self-reporting instruments such as that employed by Heseldenz has been critiqued by Yuker (1974) who notes that considerable reporting bias can reduce the reliability of such results. If one is able, for the purpose of analysis, to rely on the Heseldenz results, the differences among academic ranks in terms of their...
use of time are not great. While use of time is a poor measure of faculty output (Yuker, 1974) it does offer a basis for comparison.

On the other hand, Woodring (1973) observes that effectiveness in the professions and indeed in higher education appears to be more dependent upon experience, knowledge, wisdom and maturity than on youthful vigor (1973:24). Similarly, Blackburn (1972:31) finds a relationship indicating that performance, adaptation, and thoughts of reform increase with rank and age; while there was no evidence that tenure led either to stagnation or curtailed output.

In an analysis of university researchers supported by Canada's NRC, Meunier (1977) notes that "the decline in the productivity of the research force as a result of the decreasing number of research assistants and technical support staff is thought to be more critical for the health of university research than the aging of the researchers" (1977:22).

Whether conditions of academic activity have changed since the early 1970's, or whether the findings reported are generalizable, is not clear. At best, evidence gives little support to the argument that holding either or both of senior rank and tenure threatens the productivity of university faculty. Of course, two major changes in contemporary academic life can be documented. First is the diminishing number of new appointments (Statistics Canada, 1979) and the attendant possible reduction in adding new ideas and energy to the work of senior colleagues that such a change could cause. Second is the erosion of federal research dollars over the past decade (CAUT, 1980).

With unclear links between academic rank and university outputs,
attention may be directed to the relationship between academic rank distribution and university inputs. While various methods of compensating faculty members exist (e.g. Beaumont, 1978) it generally is true that salaries increase with academic rank (e.g. Holmes and von Zur-Muehlen, 1979). Therefore, the fiscal requirements for a group of faculty with higher rank will be greater than for a lower ranking faculty group of equal size. Under conditions of constraint in university financing, the problem of an increasingly expensive faculty will be seen to increase pressure on university budgets.

Whichever concern, outputs or inputs, is central in the mind of a policy maker, there is ample evidence that the increasing proportion of faculty holding tenure and senior rank is seen as a contemporary problem for universities (e.g. Kenny, 1977). Several policy positions exist in attempting to grapple with the problem, for example Bolte et al. (1976) outline six alternative promotion plans variously incorporating time-in-rank requirements, quotas, specific and general criteria and combinations thereof.

As outlined in the opening sections of this chapter, the faculty rank distribution can be described in terms of a simple framework. The promotion plans outlined by Bolte et al. provide various rules for making judgments about individuals as they move from one state to another in that framework. However, our attention is directed to the faculty rank distribution as a summary statement of many decisions made with respect to individuals. Since the disposition of specific cases involves application of institutional policy in conjunction with other criteria, e.g. peer review, to making particular decisions about
individual appointments. Moreover, the year to year change in the
distribution of faculty among the ranks is the most commonly used
indicator for analysis in attempting to understand the implications
of institutional practices. Several mathematical treatments of that
overall evolution have been devised and are reviewed in the next
section.

**FACULTY FLOW MODELS**

Two basic characteristics determine the structure of a faculty
flow model: (1) the sets of rank and/or appointment durations used as
an organizing framework; and, (2) the form of the mathematical linkages
between the sets across time. Three general structures have been used
in earlier research:

(a) percentage point increases (e.g. von Zur-Muehlen, 1977;
    Holmes and von Zur-Muehlen, 1979);
(b) equilibrium models (e.g. Oliver, 1969; LaSalle, 1972;
    Higbee, 1975); and,
(c) Markov chains (Bartholomew, 1969; Schroeder, 1973;
    Hopkins, 1974; Goveia, 1975; Bloomfield, 1976).

Another method of projecting faculty rank distribution assesses
the likelihood of a change in rank or appointment for each individual
faculty member and sums all the transactions into a new distribution.
This Monte Carlo technique does not relate distributions across time and
will not be considered further, although it is useful to note that, in
comparison with a Markov chain, "... both methods arrived at remarkably
similar results" (Goveia, 1975). No other mathematical techniques were
found to be applied to faculty rank distribution.
Percentage Point Increase Models

The most simple of faculty flow models has been applied to data summarizing all the universities in Canada (von Zur-Muehlen, 1977; Holmes and von Zur-Muehlen, 1979). The approach used examines the historical change in relative proportions of faculty at each of four academic ranks (see Table II) and makes a set of projections based on a constant growth in the percentage of Full Professors and Associate Professors, with associated declines in the proportions of Assistant Professors and the Rank Below Assistant; the sum of the declines and increases is set at zero on the assumption of no increase in the overall size of the professoriate.

Algebraically, the percentage change approach may be expressed:

\[
\left[ \frac{N_i}{N} \right]_{(t+1)} \times 100\% = \left[ \frac{N_i}{N} \right]_t \times 100\% + P_i
\]

Where:

- \( N_i \) = the number of faculty holding appointment at rank \( i \)
- \( P_i \) = a fixed percentage rate of growth for the population holding rank \( i \).
- \( i = 1 \) for Instructors/Lecturers
- \( i = 2 \) for Assistant Professors
- \( i = 3 \) for Associate Professors
- \( i = 4 \) for Professors

Such that:

\[
\sum_{i=1}^{4} N_i = N ; \quad \sum_{i=1}^{4} P_i = 0
\]

and, for no growth:

\[
N(t+1) = N(t)
\]
TABLE II

ACADEMIC RANK DISTRIBUTION OF FULL-TIME UNIVERSITY TEACHERS,
SELECTED YEARS, 1967-68 TO 1977-78

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(in percent)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Professor</td>
<td>18.5</td>
<td>21.3</td>
<td>23.2</td>
<td>25.7</td>
<td>26.7</td>
<td>27.8</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>25.2</td>
<td>29.1</td>
<td>32.5</td>
<td>35.6</td>
<td>37.1</td>
<td>38.2</td>
</tr>
<tr>
<td>Sub-total</td>
<td>43.7</td>
<td>50.4</td>
<td>55.7</td>
<td>61.3</td>
<td>63.8</td>
<td>66.0</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>37.0</td>
<td>37.4</td>
<td>34.7</td>
<td>31.3</td>
<td>29.7</td>
<td>28.0</td>
</tr>
<tr>
<td>Rank Below</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>19.3</td>
<td>12.2</td>
<td>9.8</td>
<td>7.4</td>
<td>6.5</td>
<td>6.0</td>
</tr>
<tr>
<td>Sub-total</td>
<td>56.3</td>
<td>49.6</td>
<td>44.5</td>
<td>38.7</td>
<td>36.2</td>
<td>34.0</td>
</tr>
<tr>
<td>Number Reported*</td>
<td>16132</td>
<td>26973</td>
<td>28399</td>
<td>30784</td>
<td>31676</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Includes the "other" category of teachers ungraded and visiting professors.

**Estimates based on 40 universities.

(adapted from Holmes and von Zur-Muehlen, 1979:6)
The percentage growth approach seeks simply to fit a mathematical curve to a set of summary data. In so doing, the approach is an application of "curve-fitting" (Wing, 1974; Kraetsch, 1979). The historical proportion of appointments at each rank ignores the question of duration, and the linking of one distribution to a later version does not address any of the transition details incorporated into equilibrium or Markov models. The relative size of rank populations uses the most simple combination of concepts, and mathematically is the simplest of the three classes of models.

The percentage increase approach has been applied to the population of full-time university teachers in Canada on the basis of three alternative sets of assumptions about rates of change in proportions of the professoriate, $P_i$ (Holmes and von Zur-Muehlen, 1979). The following table summarizes the percentage change in the proportion of each rank under each assumption:

**TABLE III**

<table>
<thead>
<tr>
<th>ALTERNATIVE</th>
<th>FULL PROFESSOR</th>
<th>ASSOCIATE PROFESSOR</th>
<th>ASSISTANT PROFESSOR</th>
<th>RANK BELOW ASSISTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.5</td>
<td>0.8</td>
<td>-1.1</td>
<td>-0.4</td>
</tr>
<tr>
<td>B</td>
<td>0.8</td>
<td>1.5</td>
<td>-1.7</td>
<td>-0.6</td>
</tr>
<tr>
<td>C</td>
<td>1.0</td>
<td>2.0</td>
<td>-2.2</td>
<td>-0.8</td>
</tr>
</tbody>
</table>

(Note: all rates are percentage of total professoriate, calculated annually.)

(Holmes and von Zur-Muehlen, 1979)
Each alternative assumes a fixed size for Canada's professoriate. The extreme projection (see "C" in Table IV) would see 87% of Canada's university teachers holding senior rank by 1984-85 with the virtual elimination of the rank below Assistant.

Equilibrium Models

Equilibrium models links a small number of cells, usually three or four, with a modest number of input and output and transition paths among them. By linking specific states with specific pathways, the equilibrium model incorporates more complex causal links than percentage point increase models. Rather than only fitting data to a curve, this class of models are part of the larger class of causal, as distinct from curve-fitting, models (Wing, 1974). For example, Oliver (1969) does not incorporate any rank variables, but uses two cells, based on the tenure/non-tenure distinction, plus a cell for retiring faculty in conjunction with a total of seven paths. (See Figure 4). Similarly, LaSalle (1972) uses a three-cell format, using the three professorial ranks as cell identifiers, and incorporates nine possible pathways. (See Figure 5).

An application of equilibrium modelling to a Canadian institution was made at McMaster University (Higbee, 1975; Pardasani, 1972). The McMaster framework was developed from a slightly more complex formulation, but in final form uses four rank only cells (and twelve pathways). (See Figure 6). It provides for hiring of new staff at each rank ($H_i$) promotion through the ranks ($P_i$), separation through death or resignation from each rank ($T_i$) and retirement from the rank of Professor ($R$). Another application in a Canadian setting was at Waterloo University (Foord, 1974). That equilibrium model was the most complex, using ten
<table>
<thead>
<tr>
<th>ACADEMIC YEAR</th>
<th>FULL PROFESSOR</th>
<th>ASSOCIATE PROFESSOR</th>
<th>SUB-TOTAL</th>
<th>ASSISTANT PROFESSOR</th>
<th>LECTURER/INSTRUCTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1978-79</td>
<td>(0.5)</td>
<td>(0.8)</td>
<td>(1.0)</td>
<td>(1.0)</td>
<td>(1.5)</td>
</tr>
<tr>
<td>1979-80</td>
<td>28.3</td>
<td>28.6</td>
<td>28.8</td>
<td>39.2</td>
<td>39.7</td>
</tr>
<tr>
<td>1980-81</td>
<td>28.8</td>
<td>29.4</td>
<td>29.8</td>
<td>40.2</td>
<td>41.2</td>
</tr>
<tr>
<td>1981-82</td>
<td>29.3</td>
<td>30.2</td>
<td>30.8</td>
<td>41.2</td>
<td>42.7</td>
</tr>
<tr>
<td>1982-83</td>
<td>29.8</td>
<td>31.0</td>
<td>31.8</td>
<td>42.2</td>
<td>44.2</td>
</tr>
<tr>
<td>1983-84</td>
<td>30.3</td>
<td>31.8</td>
<td>32.8</td>
<td>43.2</td>
<td>45.7</td>
</tr>
<tr>
<td>1984-85</td>
<td>30.8</td>
<td>32.6</td>
<td>33.8</td>
<td>44.2</td>
<td>47.2</td>
</tr>
</tbody>
</table>

Note: The percentage in brackets indicates for the projections A, B and C the assumptions on which the distributed shifts are based. The number of full-time university teachers has been kept constant at 32,000 during the projection period.

(Holmes and von Zur-Muehlen, 1979:8)
FIGURE 4

A TWO-STAGE EQUILIBRIUM FLOW MODEL BASED ON
DURATION OF APPOINTMENT (SPECIFIED VS. UNSPECIFIED)

(Oliver, 1969:10)
FIGURE 5
A THREE-STAGE EQUILIBRIUM FLOW MODEL
BASED ON ACADEMIC RANK
(LaSalle, 1972)

FIGURE 6
A FOUR-STAGE EQUILIBRIUM FLOW MODEL
BASED ON ACADEMIC RANK
(Higbee, 1975)
states based on the three professional ranks in conjunction with three
types of appointment (definite term, probationary, tenure), plus a state
for lecturers on definite term appointments.

As an example of the more usual equilibrium formulation, the
McMaster model may be examined in some detail. The equations which hold
for the model (Pardasani, 1972: 2 through 4) are:

\[ N = N_1 + N_2 + N_3 + N_4 \]  \hspace{1cm} (1)
\[ D = D_1 + D_2 + D_3 + D_4 \]  \hspace{1cm} (2)
\[ V_1 = \frac{N_1}{N} \]  \hspace{1cm} (3)
\[ V_2 = \frac{N_2}{N} \]  \hspace{1cm} (4)
\[ V_3 = \frac{N_3}{N} \]  \hspace{1cm} (5)
\[ V_4 = \frac{N_4}{N} \]  \hspace{1cm} (6)
\[ R_1 = u_1 \cdot N_1 \]  \hspace{1cm} (7)
\[ R_2 = u_2 \cdot N_2 \]  \hspace{1cm} (8)
\[ R_3 = u_3 \cdot N_3 \]  \hspace{1cm} (9)
\[ R_4 = u_4 \cdot N_4 \]  \hspace{1cm} (10)
\[ S_1 = q_1 \cdot N_1 \]  \hspace{1cm} (11)
\[ S_2 = q_2 \cdot N_2 \]  \hspace{1cm} (12)
\[ S_3 = q_3 \cdot N_3 \]  \hspace{1cm} (13)
\[ S_4 = q_4 \cdot N_4 \]  \hspace{1cm} (14)
\[ T_1 = \frac{1}{u_1 + q_1} \]  \hspace{1cm} (15)
\[ T_2 = \frac{1}{u_2 + q_2} \]  \hspace{1cm} (16)
\[ T_3 = \frac{1}{u_3 + q_3} \]  \hspace{1cm} (17)
\[ T_4 = \frac{1}{u_4 + q_4} \]  \hspace{1cm} (18)
Where:

\[ N = \text{Total No. of Faculty} \]
\[ N_1 = \text{No. of Instructors} \]
\[ N_2 = \text{No. of Assistant Professors} \]
\[ N_3 = \text{No. of Associate Professors} \]
\[ N_4 = \text{No. of Full Professors} \]
\[ D = \text{Total No. of faculty hired each year} \]
\[ D_1 = \text{No. of new Instructors hired each year} \]
\[ D_2 = \text{No. of new Assistant Professors hired each year} \]
\[ D_3 = \text{No. of new Associate Professors hired each year} \]
\[ D_4 = \text{No. of new Full Professors hired each year} \]
\[ V_1 = \text{Ratio of Instructors to Total Faculty} \]
\[ V_2 = \text{Ratio of Assistant Professors to Total Faculty} \]
\[ V_3 = \text{Ratio of Associate Professors to Total Faculty} \]
\[ V_4 = \text{Ratio of Full Professors to Total Faculty} \]
\[ R_1 = \text{No. of Instructors leaving (due to death and resignation) each year} \]
\[ R_2 = \text{No. of Assistant Professors leaving (due to death and resignation) each year} \]
\[ R_3 = \text{No. of Associate Professors leaving (due to death and resignation) each year} \]
\[ R_4 = \text{No. of Full Professors leaving (due to death and resignation) each year} \]
\[ S_1 = \text{No. of Instructors promoted each year (to Assistant Professors)} \]
\[ S_2 = \text{No. of Assistant Professors promoted each year (to Associate Professors)} \]
\[ S_3 = \text{No. of Associate Professors promoted each year (to Full Professors)} \]
\[ S_4 = \text{No. of Full Professors retiring each year} \]
\[ U_1 = \text{Resignation and death rate of Instructors} \]
\[ U_2 = \text{Resignation and death rate of Assistant Professors} \]
U3 = Resignation and death rate of Associate Professors  
U4 = Resignation and death rate of Full Professors  
Q_1 = Promotion rate of Instructors (to Assistant Professors)  
Q_2 = Promotion rate of Assistant Professors (to Associate Professors)  
Q_3 = Promotion rate of Associate Professors (to Full Professors)  
Q_4 = Retirement rate of Full Professors  
T_1 = Average service life of an instructor  
T_2 = Average service life of an Assistant Professor  
T_3 = Average service life of an Associate Professor  
T_4 = Average service life of a Full Professor  

In addition, the condition of no growth in the size of faculty requires that:

\[ D_1 = S_1 + R_1 \]  \hspace{1cm} (19) 
\[ D_2 + S_1 = S_2 + R_2 \]  \hspace{1cm} (20) 
\[ D_3 + S_2 = S_3 + R_3 \]  \hspace{1cm} (21) 
\[ D_4 + S_3 = S_4 + R_4 \]  \hspace{1cm} (22)

Finally, the following inequalities hold either (1) by definition (equations 23 through 30), (2) to allow no layoffs (equation 31 through 34), or (3) to allow no demotions (equations 35 through 38).

\[ N_1 \geq 0 \]  \hspace{1cm} (23) 
\[ N_2 \geq 0 \]  \hspace{1cm} (24) 
\[ N_3 \geq 0 \]  \hspace{1cm} (25) 
\[ N_4 \geq 0 \]  \hspace{1cm} (26) 
\[ R_1 \geq 0 \]  \hspace{1cm} (27) 
\[ R_2 \geq 0 \]  \hspace{1cm} (28) 
\[ R_3 \geq 0 \]  \hspace{1cm} (29) 
\[ R_4 \geq 0 \]  \hspace{1cm} (30)
D1 \geq 0 \quad (31)
D2 \geq 0 \quad (32)
D3 \geq 0 \quad (33)
D4 \geq 0 \quad (34)
S1 \geq 0 \quad (35)
S2 \geq 0 \quad (36)
S3 \geq 0 \quad (37)
S4 \geq 0 \quad (38)

In all cases, the equations linking rank distributions at any initial time (t₀) and a later time (t¹) use historically determined rates of promotion and separation in conjunction with actual cell populations at t₀ to project the base populations forward one time unit, usually one year. Under the equilibrium assumption implied in the name of these models, the size of the target distribution at t¹ is equal to the total distribution at t₀, i.e. the faculty does not grow.

Application of equilibrium models has indicated that, for example, ". . . conservation requirements that must hold for appointment, promotion and attrition of faculty and quota restrictions on the total number of faculty severely restrict the choice of independent variables. . . [and] . . . extrapolation of current Berkeley data to the years 1975-80 where we expect equilibriums to set in indicates that there are no feasible equilibria for current appointment policies" (Oliver, 1969:3). The general message provided by analysis with equilibrium models seems clear enough, however, there reportedly may be problems with their precision (Hopkins, 1974).

**Markov Chain Models**

Superior modelling of appointment distributions is deemed to be
possible through definition of "... the states (i.e. categories of faculty members) in a way that is both useful for analyzing changes in policy and meaningful as a description of individual behavior" (Hopkins, 1974:400). This in turn requires more states than used in equilibrium models, and more transitions such as "... service-dependent promotion rates for non-tenure faculty, ... and the rank distribution of new appointments" (Hopkins, 1974:401).

Multiple states can be accommodated readily in Markov chain models in which the appointment distribution at $t_1$ is dependent on the distribution at $t_0$ and the two distributions are linked by a set of transition probabilities (Draper and Klingman, 1967).

With considerable detail about the factors and transitions contributing to a future distribution, Markov chains are stochastic. As such they are members of the same general class as equilibrium flow models, but differ from the simpler curve-fitting approach used in the percentage point increase technique.

Brown states the key assumptions of a Markov chain when applied to the movement of personnel:

1. The Markovian axiom states that an individual's past history has no impact on his future movement except through the status that he presently occupies. Its main function is seen as a simplifying one since a model which acknowledged the unique history of every individual would be extremely complex.

2. The independence assumption states that moves on the part of one individual are made independently of moves on the part of others.
(3) The homogeneity assumption states that all persons are alike in terms of their propensity to move.

(4) The stationarity assumption that states that the probabilities of movement from one status to another do not vary over time. Since it must be acknowledged that no perfectly stationary process exists, this axiom must be regarded as an idealization.

(Brown, 1975:145 and 146)

The independence assumption may be accepted since universities do not require a change in rank or duration of appointment to be contingent upon any change for another individual (Michaels, 1974), hence, those changes may be considered to be independent. On the contrary, the traditions and practices of universities place considerable stress on promotion and tenure being related to the individual (CAUT, 1979). However, the application of tenure or rank quotas would cause this assumption to be violated.

One of the earliest applications of a Markov transition matrix was by Rowe, Wagner and Weathersby as part of the Ford Foundation's program of research in university administration. They divided the variables which characterize faculty distribution into "... (a) those variables which the decision maker can directly control, called control variables and designated by the symbol u; (b) those endogenous variables which cannot be controlled by the decision maker, called state variables and designated by the symbol x; and (c) those exogenous variables impinging upon the system, which are designated by the symbol z." (1970:4).

In the university context, the state variables and control
variables, $x$ and $u$,

... refer to the four academic instructional ranks of all disciplines: (1) full professor, (2) associate professor, (3) assistant professor, and (4) instructor, where $x(i)$ are the number of faculty of each rank continuing at the end of academic year $i$, and $u(i)$ are the number of faculty of each rank hired at the beginning of year $i$.

(1970:5)

By defining, matrix "f" to provide for retention within a rank $(f_{i,i})$ or promotion to next rank $(f_{i,i+1})$ and vector "g" to provide for differential retention of newly hired personnel, the relationships are then written:

$$
\begin{bmatrix}
  x_1(t+1) \\
  x_2(t+1) \\
  x_3(t+1) \\
  x_4(t+1)
\end{bmatrix} =
\begin{bmatrix}
  f_{11} & f_{12} & 0 & 0 \\
  0 & f_{22} & f_{23} & 0 \\
  0 & 0 & f_{33} & f_{34} \\
  0 & 0 & 0 & f_{44}
\end{bmatrix}
\begin{bmatrix}
  x_1(t) \\
  x_2(t) \\
  x_3(t) \\
  x_4(t)
\end{bmatrix} +
\begin{bmatrix}
  g_{11} & 0 & 0 & 0 \\
  0 & g_{22} & 0 & 0 \\
  0 & 0 & g_{33} & 0 \\
  0 & 0 & 0 & g_{44}
\end{bmatrix}
\begin{bmatrix}
  u_1(t) \\
  u_2(t) \\
  u_3(t) \\
  u_4(t)
\end{bmatrix}
$$

(Rowe, et al., 1970:6)

The authors state

... in other words, the number of full professors in the system at the end of next year is a function of the number of full professors completing this year (persistence), the number of associate professors completing this year (promotion), and the number of full professors hired this year. We assume that (1) no faculty member is promoted more than one rank in each year, (2) no faculty member is demoted to a lower rank, and (3) no newly hired faculty member is promoted within the first year of his or her contract. There have been very few exceptions to these assumptions in the recent history of the University of California.

(Rowe, et al., 1970:6)

Hopkins (1974, 1975) applied a Markov model to two schools within Stanford University. The model was based on a 17-state transition
matrix. (See Table V). The initial seven states related to years of pre-tenure appointment, with probabilities of separation from the institution and award of tenure specified for each state. The next seven states refer to tenured faculty, with states defined by age brackets and state-specific probabilities of resignation, death and retirement identified. The final three states refer to those separating due to resignation, retirement or death.

The Stanford model is made relatively simple by the relative uniformity of university policy about academic appointments (Bloomfield, 1975). The model does not address rank as a variable, a reasonable approach since new appointments at Stanford are normally at the rank of Assistant Professor, and since promotion to Associate Professor generally coincides with award of tenure. Such conditions do not universally apply to public universities, neither in Canada nor in the United States (Bolte et al., 1977).

To extend the Stanford framework in applying Markov models to a more complex policy environment, Bloomfield compiled a 161-state Markov matrix to represent the entire Oregon State University. (See Table VI). Five basic variables are used in the model, with from two to four possibilities for each. First, tenure status is binary, states being either tenured or non-tenured. Second, academic rank has four possibilities: Instructor, Assistant Professor, Associate Professor, and Full Professor. Third, the number of years in rank is broken down into four conditions: 0-3, 4-6, 7-9, 10 and over. Fourth, the age of a faculty member is described as one of four possibilities: 0-39, 40-49, 50-59, and 60 or over. Fifth, the duration of an appointment in the years of service is a binary state, being either 0-3 or 4 or more. Taken together the
TABLE V

STATE DEFINITIONS FOR THE STANFORD FACULTY FLOW MODEL

(Hopkins, 1975)

<table>
<thead>
<tr>
<th>STATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nontenure - First year</td>
</tr>
<tr>
<td>2</td>
<td>Nontenure - Second year</td>
</tr>
<tr>
<td>3</td>
<td>Nontenure - Third year</td>
</tr>
<tr>
<td>4</td>
<td>Nontenure - Fourth year</td>
</tr>
<tr>
<td>5</td>
<td>Nontenure - Fifth year</td>
</tr>
<tr>
<td>6</td>
<td>Nontenure - Sixth year</td>
</tr>
<tr>
<td>7</td>
<td>Nontenure - Seventh year</td>
</tr>
<tr>
<td>8</td>
<td>Tenure - Age 30 to 34</td>
</tr>
<tr>
<td>9</td>
<td>Tenure - Age 35 to 39</td>
</tr>
<tr>
<td>10</td>
<td>Tenure - Age 40 to 44</td>
</tr>
<tr>
<td>11</td>
<td>Tenure - Age 45 to 49</td>
</tr>
<tr>
<td>12</td>
<td>Tenure - Age 50 to 54</td>
</tr>
<tr>
<td>13</td>
<td>Tenure - Age 55 to 59</td>
</tr>
<tr>
<td>14</td>
<td>Tenure - Age 60 to 64</td>
</tr>
<tr>
<td>15</td>
<td>Retirement</td>
</tr>
<tr>
<td>16</td>
<td>Resignation</td>
</tr>
<tr>
<td>17</td>
<td>Death</td>
</tr>
</tbody>
</table>
TABLE VI
STATE DEFINITIONS FOR THE OREGON STATE UNIVERSITY COMPREHENSIVE FACULTY FLOW MODEL
(Bloomfield, 1976)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>CATEGORIES</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenure Status</td>
<td>Nontenured, Tenured</td>
<td>2</td>
</tr>
<tr>
<td>Rank</td>
<td>Instructor, Assistant Professor,</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Associate Professor, Professor</td>
<td></td>
</tr>
<tr>
<td>Years in Rank</td>
<td>0-3, 4-6, 7-9, 10+</td>
<td>4</td>
</tr>
<tr>
<td>Age</td>
<td>0-39, 40-49, 50-59, 60+</td>
<td>4</td>
</tr>
<tr>
<td>Years of Service</td>
<td>0-3, 4+</td>
<td>2</td>
</tr>
</tbody>
</table>

The complete model provides for 256 possible states, however, Bloomfield simplified it to 160 using Hopkins' criterion of meaningfulness in terms of individual behavior. The years of service variable for tenured faculty was removed (64 states) as was the possibility of untenured full professors (32 states). Finally, one state to absorb those separating from the institution was provided to result in the final 161-state formulation.

Assuming 95% replacement of losses, the model projected rank distributions which show a steep reduction in the number of Assistant Professors, a steady increase in the number of Full Professors, and a peaking in the number of Associate Professors before they decrease as well. (See Figure 7). Although the projections are over a twenty-year horizon, Bloomfield reports that "... uncertainties with regard to enrolments and economic conditions for the first ten years are not quite so severe, and the continuity characterizing the personnel patterns of a
FIGURE 7
RANK DISTRIBUTION FOR TENURED AND TENURE-TRACK FACULTY
OREGON STATE UNIVERSITY 1975 TO 1995
(Bloomfield, 1976)
university establishes a ten-year forecast as a realistic and credible basis for managerial decisions." (1976:21).

The Oregon State analyses support the general findings of Higbee, LaSalle, and Oliver, in particular that "... none but the most drastic and abrupt change in personnel policies will materially affect staffing distributions in the immediate three to five year period, the zone from five to ten years in the future constitutes a very fruitful and effective planning horizon for analyzing impacts of present faculty staffing policies" (Bloomfield, 1976:21).

All the applications of faculty flow modelling reviewed to this point produce distributions of faculty rank as their end product. Schroeder (1973) incorporated a faculty flow condition into a resource planning model for studies of university budgeting. The faculty flow condition was applied as a constraint on the general solution to the budgeting problem, and took a Markovian form. As such, the Schroeder application makes a novel attempt to achieve a particular rank distribution as a function of university budget, teaching load, support staff, hiring, etc.

Summary of Faculty Flow Models

Three kinds of analytical models have been used to project distributions of academic rank or appointment from aggregate data and may be summarized in terms of (1) the concepts used to categorize appointments; and, (2) the form of the mathematical relationships employed (see Table VII).
The summary table shows that two of the three types of model (i.e. percent growth and equilibrium) are based on a single variable for categorization and use small numbers of states in combination of small numbers of equations to relate rank or tenure distributions across time. In contrast, Markov models use larger numbers of variables and states, therefore, the number of relationships is also much larger.

ANALYSIS OF FACULTY FLOW MODELS

The general decision paradigm (Weathersby, 1975) provides nine categories of elements to describe decision structure. This section examines the three types of faculty flow models in terms of those nine categories to develop summary profiles of the models in terms of the structural elements of decision.
Control Variables

Variables manipulated in attempting to simulate faculty flow processes each focus on the transition rates as a means of controlling the flow.

In the percentage point increase model, Holmes and von Zur-Muehlen (1979) varied the percentage growth or decline of each rank proportion to project future faculty rank distributions. The three alternatives reported are identical conceptually, the differences among them being only the size of manipulation of the rate of growth or decline for each of the four rank proportions.

Equilibrium flow models have been the subject of work varying virtually all the transitions among equilibrium states. LaSalle (1972) varied the proportion awarded tenure, the rate of separation of tenured faculty, and reduced the number of new appointments. Pardasani (1972) investigated rates of promotion, and rates of resignation. Oliver (1969) controlled the rate of new appointments, the mixture of new appointments, the rate of award of tenure, rate of retirement for tenured faculty and rates of resignation for nontenured faculty.

Markov models also have been used basically to analyze transition rates. Hopkins (1974, 1975) examined different rates of promotion to tenure, different distributions of tenure among newly appointed faculty, early retirement, affirmative action policies, and possible reductions in overall faculty size. Bloomfield (1976) investigated promotion rates, rates of awarding tenure, separation rates, and the number of new faculty appointments.
State Variables

The state variables used to describe the outcomes of flow models have been reviewed and summarized in Table VII, A Summary of Faculty Flow Models. The variables used to categorize faculty constitute the state variables for faculty flow models, i.e. academic rank, tenure status, duration of term appointment, age, years of service.

Exogenous Variables

The universe of variables not included in the categories of control and state variables of faculty flow models is immense. The value of this category will be in the contrast between models of analysis and models of decision, when bias in the design of research for decision can be identified as leaving out variables relevant to decision making.

Observing Systems

As Fincher (1975) described, the source of information for virtually all faculty flow models is institutional records about faculty members. Bloomfield (1976) was able to acquire data for his model from the personnel information system at Oregon State University. That system contained all the data elements required for the model in machine-readable form. Higbee (1975) cites the existence of "relatively complete data bases" (p. 50) as one of four conditions necessary to implement a faculty flow model, although he does not report the exact data bases used in his research.

Oliver (1969) reports the use of three sources of information: (1) an internal university report titled "Promotion Schedules and Salary Scales"; (2) a report by Berkeley's president to the university's Committee on Finance and on Educational Policy; and, (3) the individual
data cards containing information about faculty members on the Berkeley campus. The first two reports supplied tables which themselves were based on data contained in the faculty data cards.

LaSalle (1972) used hypothetical data to examine the behavior of the faculty flow formulas from a mathematical point of view. While his cases may have been based in reality, he does not report that basis.

Von Zur-Muehlen (1977) and Holmes and von Zur-Muehlen (1979) based their analysis on information contained in the "University Full-time Teaching Staff System" maintained by the Post-secondary Education Section of the Education, Science and Culture Division of Statistics Canada. That system contains information submitted annually by universities and colleges across Canada; the reports submitted are copies of statistical data about faculty members in the institutions' own records offices.

**Value System**

With the exception of the goal-programming formulation used by Schroeder (1973), all the faculty flow models summarized in this study sought primarily to simulate the effects of one or another control variable change. In some cases (e.g. Oliver, 1969; Higbee, 1975) attempts were made to determine whether the outcomes of simulations could be feasible in terms of one or another constraint such as limited total faculty. However, in none of the reported applications is there a relative value attached to any alternative state.

Although the reported applications do not attach a value to any particular alternative state, they do value implicitly the basic notions of faculty rank, tenure and promotion. By adopting those terms as bases for analysis, an unstated assumption is made that those states and
processes are and will continue to be important.

Causal Relationships

The causal relationships in faculty flow models are crystallized mathematically in the relationships linking states across time. Those relationships are summarized in Table VII, "A Summary of Faculty Flow Models." They are: (1) proportional change in state size; (2) inter-state flow rates; and, (3) transition probabilities. The first technique uses a global curve-fitting approach, whereas the latter two incorporate more detailed expressions linking states through specific transitions.

Constraints

Constraints applied to faculty flow analyses typically have addressed the maximum and minimum range of control variables and some form of overall constraint on a summary state variable. Pardasani (1972) is typical in requiring that: (1) all rank populations be non-negative; (2) rates of separation be non-negative; (3) new appointments be non-negative; and, (4) promotion rates be non-negative. The equilibrium assumption used by Oliver (1969) and Higbee (1975) is typical in requiring that the total size of faculty population be fixed across time. This is the same requirement as imposed by Holmes and von Zur-Muehlen (1979) for the total of all faculty across Canada.

Therefore, the system of constraints in faculty flow models basically requires that control variables take on non-negative values and that some basic principle of conservation apply.
Time Horizon

The time horizons used in faculty flow models range from five to twenty years for projections, but are based on year-to-year calculations of annual rank or appointment-type distribution. Bloomfield (1976) lays out projections over a twenty year horizon; however, he notes that the second decade may be seen to include considerable uncertainty. Holmes and von Zur-Muehlen forecast the rank distribution at Canadian universities over the ten year period, 1975-76 to 1984-85. Hopkins (1974, 1975) made projections over the ten year horizon 1974 to 1984 in his work at Stanford University.

Uncertainty Structure

The majority of flow models under analysis assume very little uncertainty in their causal relationships and input data. Taylor and Scott (1973) report the use of a Markovian model which varies the transition probabilities randomly. They argue that the fixed rates of transition in equilibrium models and most Markov models may be unrealistically stable.

All the models assume that the state variables of tenure and rank are stable, even though various proponents call for an end to the tenure system (see, for example, Smith and Associates, 1973); in that regard, they may be said to "value" current state variables. That interpretation is not, however, consistent with the definition of value system used here.

Summary of Analysis

Applying the general decision paradigm to the three types of faculty flow models provides a profile of faculty flow models which indicates several things. (See Table VIII). Control variables in flow
<table>
<thead>
<tr>
<th>GENERAL DECISION PARADIGM ELEMENT</th>
<th>FACULTY FLOW MODELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Variables</td>
<td>Very Few: Net Distribution Size</td>
</tr>
<tr>
<td></td>
<td>Standard Personnel Transitions</td>
</tr>
<tr>
<td>State Variables</td>
<td>Few: Dependent on Standard Contracts</td>
</tr>
<tr>
<td></td>
<td>(e.g. Rank, Tenure, Duration, etc.)</td>
</tr>
<tr>
<td></td>
<td>All Internal</td>
</tr>
<tr>
<td>Exogenous Variables</td>
<td>Many Omitted</td>
</tr>
<tr>
<td></td>
<td>Stable</td>
</tr>
<tr>
<td>Observing Systems</td>
<td>Passive/Singular</td>
</tr>
<tr>
<td></td>
<td>Routinized</td>
</tr>
<tr>
<td></td>
<td>Based in Institutional Records</td>
</tr>
<tr>
<td></td>
<td>Historical Data</td>
</tr>
<tr>
<td></td>
<td>Silent on Centralization</td>
</tr>
<tr>
<td>Value Systems</td>
<td>None</td>
</tr>
<tr>
<td>Causal Linkages</td>
<td>Simple</td>
</tr>
<tr>
<td></td>
<td>Mathematical</td>
</tr>
<tr>
<td></td>
<td>(Pre-determined)</td>
</tr>
<tr>
<td>Constraints</td>
<td>Range of Standard Practice</td>
</tr>
<tr>
<td></td>
<td>(e.g. Positive Promotion Rates)</td>
</tr>
<tr>
<td></td>
<td>Conservation</td>
</tr>
<tr>
<td>Time Horizon</td>
<td>Arbitrary</td>
</tr>
<tr>
<td>Uncertainty</td>
<td>Dimensions Known</td>
</tr>
<tr>
<td></td>
<td>Deterministic</td>
</tr>
</tbody>
</table>
models focus implicitly (curve-fitting) or explicitly (causal mode) on transition rates or overall numbers as means of implementing policy changes. The states defined in flow models are simple, usually depending on a small number of variables. Flow models are based on institutional data and rarely incorporate goal criteria. The causal relationships in flow models are generally treated as being stable and are described in relatively simple mathematical terms of direct or deterministic form. The constraints on faculty flow models are simple requiring that control variables be non-negative (i.e. standard practices) and that some form of a principle of conservation apply.

SUMMARY

This chapter has introduced and examined the notions of faculty rank distribution and faculty flow with special reference to a family of analytical models used to project faculty rank distribution. The types and conditions of academic appointments were reviewed and a simple framework established for categorizing faculty on the basis of academic rank and the duration of appointment.

The relation of academic rank and the primary bases of a university were examined. The links between rank and university outputs were found to be weak, with little evidence, uncertain validity and contradictory findings. The relationship between rank and university inputs was examined from a fiscal viewpoint. In that regard, there is a moderately strong link between rank and fiscal requirements; a higher ranking group of faculty will require more money than a lower ranking group of comparable size.
Faculty flow models were identified as a class of mathematical creations used to examine and project the evolution of faculty rank distribution. Three types were discussed: Percentage Increase, Equilibrium, and Markov Chains. Applications of each were summarized and the three types analyzed in terms of the General Decision Paradigm to produce a summary profile. That profile shows faculty flow models, as a group, to be relatively simple, with stable relationships and little uncertainty. The summary profile will be the subject of further attention in Chapter Six when it will be compared to the summary profiles of decision processes pertaining to faculty rank distributions.
Chapter Five

FACULTY RANK DISTRIBUTION DECISIONS

This chapter extends the case analysis by reviewing support for alternative models concerning decisions about faculty rank distribution. Three main models are identified and elaborated in terms of the general decision paradigm. A typology of faculty rank distribution decisions is developed and used to organize a review of studies examining how such choices are or could be made, and the conditions under which each may hold. The review is summarized in an assessment of the support for each alternative decision model with respect to each type of faculty rank decision.

MODELS OF DECISION

In developing the general decision paradigm in Chapter Three, several competing theories were sketched briefly. This section will elaborate upon three particular exemplars which emphasize alternative elements in the general decision paradigm and have received considerable earlier attention: the rational model (e.g. Quade, 1975), the organizational process model (e.g. Allison, 1971) and the political or coalitional model (e.g. Baldridge, 1971). The rational model has served as a basis for development of the latter two as they overcome one or another deficiencies in the classical view.

The superior empirical support for the organizational process and coalitional models will be shown to enable their selection to meet the needs of the present study in two ways which stem from basic interest in limiting the effects on the research which may be caused by model bias.
First, Schmidtlein identifies two competing paradigms of the policy making decision process in education which he terms the "comprehensive/prescriptive" and "incremental/remedial" (1974:4). These terms are chosen to reflect emphasis on analysis, expertise and calculation in the former and negotiation, self-interest and uncertainty in the latter (Schmidtlein, 1974). More to the point, he observes a gap between the "comprehensive/prescriptive ideology and incremental/remedial practices of education" (1974:11).

The basic problem for this study is to assess the degree of congruence between models in aid of decision and models of decision. Schmidtlein cautions that differences may exist between prescriptive models for decision (i.e. the ideology) and the results of examining current practices as they support a model of decision. Hence, to avoid model bias, the cues provided direct our attention to both prescriptive and descriptive works.

The second way in which model bias may be avoided highlights useful distinctions among models in terms of their relationships between an organization and its environment. Support for models showing greater or lesser rationality has been developed in the literature and has been related to the influences of crisis or external pressure on the organization (e.g. Smart and Vertinsky, 1977). Two major treatments of decisions in organizations reflecting such conditions are the organizational process and coalitional or political models (e.g. Allison, 1971). Given the at least nominally critical (von Zur-Muehlen, 1977) nature of the problem of faculty rank distribution, the current research requires that both be used as exemplars of alternative models describing actual decision processes.
Descriptive vs. Normative Theories

It has been proposed that attention to the characteristics of decision making in an organization is an important feature in designing research in aid of organizational decision. The general decision paradigm provides for identifying the elements of decision which link the individual to the organizational setting. Therefore, the task in this chapter is to point out those linking elements as they relate to decision making in universities.

Attention has been directed to overcoming the problem of model bias in the research. With respect to models of decision making, it is important to acknowledge the existence of models which describe and prescribe. Argyris of Harvard University and Cohen of the University of Michigan respectively have articulated positions in support of conducting research which attends primarily to each form.

Argyris defines espoused theories of action as "those that people report as a basis for actions" (1976:367), and theories-in-use as "theories of action inferred from how people actually behave (1976:367). Argyris and Shon (1974) reported the observation of discrepancies between espoused theories and theories-in-use. Argyris (1976) proposes that effective decision making be sought by expanding research to do more than support "the status quo" (1976:374), in particular, by seeking to go beyond theories-in-use formulations to develop better normative statements.

In replying to Argyris, Cohen states his own preference "is to devote the bulk of my energy to understanding why the world is as it so persistently is, and then make available to all such action implications of my understanding as I can uncover" (1976:377). The exchange between
these two scholars sharpens a focus on the problem of choosing between descriptive and normative theories or models in this study.

Frank Schmidtlein reports "An Analysis of Decision Strategies Employed in the Governance of Higher Education" (1975) which elaborates upon a descriptive vs. normative controversy concerning the appropriate model for university decision making. Schmidtlein (1974) identified the presence of a gap between "ideology" and "practices" in higher education decisions. He describes the traditional ideology as associated with a "comprehensive/prescriptive paradigm" emphasizing analysis, rationality and the use of planning rhetoric. On the other hand, Schmidtlein observes "a high proportion of decisions in education are made on a disjointed, incremental, remedial basis" (1974:11) and summarizes decision making practice as associated with an "incremental/remedial paradigm" emphasizing political processes and reduction of risk.

To synthesize the positions of Cohen and Argyris in terms used by Schmidtlein, university decision making may use theories based in political models of action, but espouses theories based in models of rational analysis. Since, for the purposes of this study, it is essential to offset the biasing factors associated with a narrow view of decision, both descriptive and prescriptive theories must be analyzed. Therefore our attention is directed to both descriptive studies and the normative literature.

Normative Theory of University Decision: Collegium

The traditional model for decision making in a university is based in the concept of the university as an institution concerned with intellectual excellence and the development, scrutiny and evaluation of
ideas in an open forum. The reliance on individual scholarship is fundamental to the notion of a university "collegium" as the mode for university governance, including the making of policy decisions. The literature reveals three themes underpinning the concept of collegium.

One theme is based in the concept of community. John Millett has proposed that the model of community is superior to the common notion of hierarchy in an organization. Millett states:

I do not believe that the concept of hierarchy is a realistic representation of the interpersonal relationships which exist within a college or university. Nor do I believe that a structure of hierarchy is a desirable prescription for the organization of a college or university. ... I would argue that there is another concept of organization that is just as valuable a tool of analysis and perhaps even more useful as a generalized observation of group and interpersonal behavior. This is, the concept of community. The concept of community presupposes an organization in which functions are differentiated and in which specialization must be brought together, or the coordination, if you will, is achieved not through a structure of superordination and subordination of persons and groups but through a dynamic of consensus.

(1962:234-235)

A second concept used in the notion of collegium is the professional authority of faculty. Talcott Parsons (1947) highlighted the difference between "official competence" stemming from one's special knowledge and expertise in an area. Parsons also contrasts the collegium with a hierarchy, noting:

... there are strong tendencies for [professionals] to develop a different sort of structure from that characteristic of the administrative hierarchy. ... of bureaucracy. Instead of a rigid hierarchy of status and authority there tends to be what is roughly, in formal status, a company of equals. ... (1947:60)

Finally, a prescription for a university utopia is offered by Paul Goodman (1962) who urges the improvement of personal relationships
among faculty and students in an "academic community" as an antidote to impersonality in large institutions.

Baldridge, et al. (1978) review the three underpinning themes of collegium and note that discussion of collegium "are more a lament for paradise lost than a description of present reality. Indeed the collegial idea of round-table decision making does not accurately reflect the actual processes in most institutions . . ." (p. 33). In particular, Baldridge et al. argue that the collegial model "fails to deal adequately with the problem of conflict: When Millet emphasizes the 'dynamic of consensus,' he neglects the prolonged battles that precede consensus and the fact that the consensus actually represents the prevalence of one group over another" (1978:34).

Notwithstanding the failure of the collegium model to achieve substantial empirical support, it is a common and fundamental element in the normative literature (see, for example, Baldwin, 1979).

A number of studies support the notion of collegium as a concept shared widely among university members. Gross and Grambsch (1968) found that faculty members expressed goals which tended to be professionally oriented, scholarly, and elitist rather than institutionally oriented and practical, and that those goals were similar to those expressed by academic deans and department heads. Faculty members articulate preferences for participation in university governance, academic freedom, recognition based in professional accomplishment and maximum opportunities to extend their individual careers as professionals (see, for example, Milton and Shoben, 1968; Clark, 1970; Nichols, 1970).

Difficulties in achieving a collegium are noted by Zyskind and Sternfeld (1971) who argue that greater emphasis be given to reasoned
argument in university decision making, with less emphasis on voting strength. Another problem is identified by Dressel and Faricy (1972) who note an apparent inability on the part of faculty members to express a set of goals which may be achieved through their involvement in institutional decision making. Finally, Cleveland (1974) observed several flaws in the realization of norms of collegium, for example, apathy and discouragement of innovation. Possibly in frustration, Cleveland posed the rhetorical yet essential question, "How do you get everybody in on the act and still get any action?" (1974).

Collegium as classical rationality. The three themes identified as underpinning the concept of collegium may be interpreted as making it consistent with the classical model of rational analysis (Allison, 1971). The theme of consensus among a community implies agreement on both objectives and means, or in the terms used by Thompson and Tuden (1959), on outcomes and causations. Given agreement on these two items, the strategy of computation is appropriate, where computation may involve one or another or all of large amounts of data, electronic machinery and a highly trained specialist to perform the exercise; however, "the strategy for decision is straightforward analysis" (Thompson and Tuden, 1959).

Similarly the second theme of professional authority or expertise concerns the special knowledge in an area, including the linkages between alternatives and outcomes. Finally, the inclusion of personal relationships as a theme in collegium broadens the concept to include outcomes and alternatives beyond a discipline.

Given an emphasis on analysis and substantive expertise in conjunction with a wide scope of concern, the collegial model of decision is
consistent with the classical model of rationality. Classical rationality is summarized by Allison (1971), Quade (1975) and the present study (see Chapter Three).

The rational model directs attention to a set of defined objectives in terms of which a situation is interpreted, a spectrum of alternatives is identified and analyzed, and the consequences of each of the large set of alternatives are identified. The decision is taken by selecting that alternative whose consequences rank highest in terms of the decision maker's objectives. To quote Allison, "Rationality refers to consistent value-maximizing choice within specified constraints" (1971:30).

The failure of the collegial model to achieve empirical support or to act as an organizing concept for action has been examined in other research which has developed more elaborate conceptions of decision expanding upon the classical model. These developments stem from theorizing about failures to meet the classical model's requirements either for comprehensive analysis (e.g. Simon, 1958) or for agreement on objectives (e.g. Lindblom, 1965). The first line of development emphasizes the "bounded" (Simon, 1958) nature of human decision-making, and in an organizational setting has been elaborated in the "organizational process" (Allison, 1971) model of decision. The second class of developments emphasizing the inability to reach agreement on goals, or even the existence of competing goals has led to the political or coalitional view of decision making which highlights the negotiation of compromise positions in resolving decision problems (Lindblom, 1965).
Bounded Rationality: Organizational Process Model of Decision

The classical rational model of decision requires three tasks to be completed: "(1) the generation of all possible alternatives, (2) assessment of the probabilities of all consequences of each, and (3) evaluation of each set of consequences for all relevant goals" (Allison, 1971:71). These tasks require, as Simon puts it, "powers of prescience and capacities for computation resembling those we usually attribute to God" (1957:3). Simon developed the concept of "bounded rationality" to highlight the limits of human capacity to perform each of the three tasks with respect to the complexities of problems associated with organizations.

In particular, Simon identified five areas in which real decision makers deviate from the classical rational model as they make simplifications required by their bounded abilities: factored problems, satisficing, search behavior, uncertainty avoidance and repertoires of actions (1957). Cyert and March (1963) blended challenges to classical decision theory with a survey of the literature of organizations. They extended Simon's basic notion of boundedness in an effort which focused on "the effect of organizational structure and conventional practice upon the development of goals, the formulation of expectations and the execution of choice" (1963:1). Their development of a theoretical model of organizational decision is based on: quasi-resolution of conflict, uncertainty avoidance, problemistic search, and organizational learning.

In the Cyert and March treatment, conflict is never fully resolved in that there is no consensus within an organization at the level of operational goals. Conflicting pressure to meet the operational goals of organizational subunits is only partially resolved, typically
by first attending to one and then to another. The reliance on standard organizational activities leads organizations to attempt to avoid the uncertain or unknown. As a result, short term problems are solved, rather than long range strategies developed. Search for alternatives to solve problems is stimulated by particular cases and seeks only to solve that specific matter. Finally, organizational behaviour, while relatively stable, is seen to evolve as the result of experience; such organizational learning results in modifications to goals, techniques for identifying acceptable alternatives.

Allison states a view of organizational decision which uses Simon's five areas of limitation in an organizational setting defined by the attention to goals, expectations, and choice developed by Cyert and March:

1. FACTORED PROBLEMS. Problems are so complex that only a limited number of aspects of each problem can be attended to at a time. Thus individuals factor (split up) problems into quasi-independent parts and deal with the parts one by one. Organizations factor complex problems into a number of roughly independent parts which are parceled out to various organizational units. Ideally problems are factored by a means-end analysis, which assigns separable pieces to organizational sub-units as subgoals. The structure of an organization thus reflects the problems that its subunits factor (roles consist of specified subsets of premises that guide actions in a particular subunit).

2. SATISFICING. Maximization or optimization is replaced by satisficing. In choosing, human beings do not consider all the alternatives and pick the action with the best consequences. Instead, they find a course of action that is "good enough"--that satisfies. Organizations are happy to find a needle in the haystack rather than searching for the sharpest needle in the haystack.
3. SEARCH. Comprehensive rationality requires consideration of all alternatives, thus making the problem of search trivial. Where satisficing is the rule—stopping with the first alternative that is good enough—the order in which alternatives are turned up is critical. Organizations generate alternatives by relatively stable, sequential search processes. As a result, the menu is severely limited.

4. UNCERTAINTY AVOIDANCE. Comprehensively rational agents deal with alternate consequences of action by estimating probabilities of possible outcomes. People in organizations are quite reluctant to base actions on estimates of an uncertain future. Thus choice procedures that emphasize short-run feedback are developed. Organizations, like house thermostats, rely on relatively prompt corrective action to eliminate deviations between actual and desired temperatures, rather than accurate prediction of next month's temperature.

5. REPERTOIRES. Repertoires of action programs are developed by organizations and individuals. These constitute the range of effective choice in recurring situations.

(1971:72)

An elaborated model of decision which views organizational decisions as the outcomes of organizational processes has been proposed by Allison (1971). In particular, his organizational process view emphasizes the role of existing organizational routines as "constituting the range of effective choice open to government leaders confronted with any problem" (1971:79) and notes that "organizational outputs structure the situation within the narrow constraints of which leaders must take their 'decision' about an issue. Outputs raise the problem, provide the information and take the initial steps that color the face of the issue that is turned to the leaders (1971:79)."

Allison's work has been extended to other settings, such as school boards (Peterson, 1976), and municipal government (Kënt, 1975). For the
purpose of analyzing decisions concerning faculty rank decision in universities, it may be summarized using the general decision paradigm of the current study to produce a capsule profile (See Table IX).

**Control variables.** Control variables are defined as those that can be specified at a point in time. The organizational process model directs attention to the organizational unit and its standard repertoires, hence the controllable variables at a point in time are essentially the same as they were in the recent past. Control variables will relate to the standard tasks assigned to the unit, which pertain to the sub-problems with which it deals. Similarly, the extent to which those variables are controllable will be related to the subunit's authority since the authority structure parallels the organizational structure (e.g. Selznick, 1957).

The subunit will not always be engaged in dealing with the same task, but will devote its attention to the tasks related to those subunit goals which are threatened at particular times. Parochial interests of the subunit will make maintaining its control over assigned tasks part of its control problem (March and Simon, 1958). One subunit in the organization will be responsible for coordinating the efforts of the others, however, it may also develop parochial interests which make it common with all subunit in viewing problems for subunit perspectives, rather than global ones pertaining to the whole organization. The development of reliance on such parochial views will constrain the ability to devote properly subunit attention to pressing problems by biasing the perception of threat to goals in favor of the subunit. This will result in an emphasis on control variables which serve primarily to protect the subunit, e.g. failing to report errors to the coordinating
### Table IX

**SUMMARY PROFILE OF ORGANIZATIONAL PROCESS DECISION**

<table>
<thead>
<tr>
<th>GENERAL DECISION PARADIGM ELEMENT</th>
<th>ORGANIZATIONAL PROCESS DECISIONS RE: FACULTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Variables</td>
<td>Few:</td>
</tr>
<tr>
<td></td>
<td>Net Distribution Size</td>
</tr>
<tr>
<td></td>
<td>Standard Rank/Term Alternatives</td>
</tr>
<tr>
<td></td>
<td>Authority</td>
</tr>
<tr>
<td>State Variables</td>
<td>Few:</td>
</tr>
<tr>
<td></td>
<td>Dependent on Standard Contracts</td>
</tr>
<tr>
<td></td>
<td>(e.g. Rank, Term, Tenure)</td>
</tr>
<tr>
<td></td>
<td>All Internal (e.g. Workload)</td>
</tr>
<tr>
<td>Exogenous Variables</td>
<td>Many Omitted</td>
</tr>
<tr>
<td></td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td>Depend on Authority</td>
</tr>
<tr>
<td>Observing System</td>
<td>Passive/Singular</td>
</tr>
<tr>
<td></td>
<td>Routinized</td>
</tr>
<tr>
<td></td>
<td>Based on Institutional Records</td>
</tr>
<tr>
<td></td>
<td>Historical Data</td>
</tr>
<tr>
<td></td>
<td>Includes Peer Reviews</td>
</tr>
<tr>
<td></td>
<td>Decentralized; Based in Organizational</td>
</tr>
<tr>
<td></td>
<td>Structure</td>
</tr>
<tr>
<td>Value System</td>
<td>Subunit Goals Emphasized</td>
</tr>
<tr>
<td>Causal Linkages</td>
<td>Simple</td>
</tr>
<tr>
<td></td>
<td>Customary</td>
</tr>
<tr>
<td></td>
<td>(Routine)</td>
</tr>
<tr>
<td>Constraints</td>
<td>Range of Standard Practice</td>
</tr>
<tr>
<td></td>
<td>Policing of Due Process</td>
</tr>
<tr>
<td></td>
<td>Total Resources</td>
</tr>
<tr>
<td></td>
<td>Quotas</td>
</tr>
<tr>
<td>Time Horizon</td>
<td>Short</td>
</tr>
<tr>
<td></td>
<td>Distant Future, Near</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
</tr>
<tr>
<td>Uncertainty</td>
<td>Dimensions Known</td>
</tr>
<tr>
<td></td>
<td>Narrow Range of Outcomes,</td>
</tr>
<tr>
<td></td>
<td>Therefore Narrow Distribution</td>
</tr>
</tbody>
</table>
unit, at the expense of the organization (e.g. Simon, 1965).

**State variables.** State variables are defined as those that cannot be controlled, but can be influenced. The tasks set for an organizational sub-unit define the realm of its controllability, e.g. recommending an appointment be made. Many aspects of the tasks will not be part of the specific responsibility of the subunit, and may fall into the set upon which it is only able to exert some influence through some other unit, e.g. through a Dean to a President. Influence only is possible if there is a link between subunits which has its basis in their authorized tasks, e.g. hiring professors. In order to operate, that link must provide for routine exchange, and itself be part of a standard repertoire of activities undertaken by the units. Such links may be formed as successes and failures in communication or achieving subunit goals are experienced (Allison, 1971). For example, the task of maintaining employment contracts with faculty will be authorized in terms of standard conditions of rank and term or tenure. Similarly, reference to standard tasks emphasizes relation or absolute criteria of appropriate faculty workload.

**Exogenous variables.** Exogenous variables are those that are neither controllable nor influencable. In the organizational process view, most variables are exogenous and will remain so. The control and state variables available to a member of an organizational subunit are prescribed by the authority and responsibility structure of the organization in terms of the sub-tasks assigned to that unit; changes in those variables will come about slowly, with experience, and be developed on the basis of existing routines.
**Observing system.** The observing system is the means by which information on all variables is sought and collected. The organizational process view indicates that this function will be assigned to an organizational subunit, or will at least be performed on the basis of routine procedures developed in other units and may be performed by the units themselves, but always through routines. The standardized procedures developed will tend to neglect interdependencies of problems (Allison, 1971). For example, peer reviews of individual merit may be made without regard to the likely need for an individual in terms of overall faculty expertise. The fractionated nature of the organization will mean that the technical level will be buffered from the environment, thereby dealing with the least current (therefore historical) information while running the risk of interpreting the environment as static when it may in fact be very much in flux (Thompson, 1967). Attention to information will be biased towards the detection of threats to goals rather than equal attention to threats and opportunities (Crecine, 1969).

**Value system.** Value system refers to the value to the individual organizational member associated with achieving one or another current or future states. The organizational process view values highly the present state and sees it as the preferred state for the future. Any change will be made in a tentative and slow manner; if any problems arise, it is a simple matter to return to the status quo. This approach receives reinforcement from the use of historical data (Downs, 1967). Attention to subunit goals makes the preservation of organizational subunits and their procedures particularly highly valued.
Causal relationships. Causal relationships are the cause and effect relationships believed to link actions and consequences. The organizational process view relies heavily on standardized processes to perform all tasks. It follows, therefore, that the relatively simple, stable sets of variables towards which organizational attention is directed must be linked by customary relationships which are seen to be simple and stable as well.

Constraints. Constraints are those binding statements that interrelate all three classes of variables. In an organizational process view, the simple sets of control and state variables are tightly bound by fixed overall constraints such as quotas laid out in the organizational structure, and the associate fractionation of tasks and responsibilities. The constraints valued most highly in a subunit, and those which provide greatest direction, are those which are completely consistent with standard practice and protect the integrity of the subunit. By emphasizing standard responses and interpretations of situations, routine constraints produce a bias towards suboptimal choices and solutions to symptoms (March and Simon, 1958).

Time horizon. The organizational process view emphasizes current practices as the means by which the future will be managed. Therefore, while the usual horizon for decision making will be short (Allison, 1971) it may also be said that the horizon is virtually unlimited because the present is so highly valued that it is seen as continuing almost indefinitely. The distinctions lies in the difference between thirty years' experience and one year's experience thirty times.
Uncertainty structure. One of the most important features of the organizational process view is its treatment of uncertainty. Uncertainty structure refers to those elements of the decision paradigm which are uncertain. The organizational process view sees very few elements to be uncertain, and indeed the processes are predicated on uncertainty avoidance. The reliance on standard patterns of response assumes that the environment is stable and that the range of problems and decisions requiring attention is stable. Alternatives are discounted if they involve substantial deviation from current procedures and relationships. Information which supports existing practice is exaggerated and information to the contrary may be ignored (Festinger, 1964).

Goal Diversity: Coalitional Model of Decision

The classical rational model of decision emphasizes the presence and role of individual goals in making choices (e.g. Simon, 1955). The basic tasks of generating and testing alternatives are for the purpose of judging each alternative course of action as it provides for meeting an integrated set of goals. In an organizational setting, rational decision requires agreement on the set of organizational goals which are to be pursued.

It has been observed (e.g. Dressel and Faricy, 1972) that university members often encounter problems in articulating a set of goals. Moreover, considerable evidence exists (e.g. Almond, 1950; Neustadt, 1960) that different members of an organization will have different goals which preclude agreement of a strictly common set. An alternative model of decision has been developed which provides for negotiation of an acceptable set of goals, but only for the time being. It is assumed that on another day, the problem of redefining the
Collective mission will be addressed and at that time, the allies of today may or may not be primary in determining the outcomes.

Lindblom (1965) developed a model of "successive limited comparisons" which contrasts with the classical rational model:

1. The selection of values and goals is not distinct from empirical analysis of alternative actions for achieving the goals; rather the two processes are intermingled.

2. Since ends and means are not distinct, means-end analysis is often inappropriate or limited.

3. The test of a "good" policy is typically that various analysts find themselves directly agreeing on a policy (without agreement that it is the most appropriate means to an end).

4. Analysis is drastically limited. Important policy outcomes are neglected. Important alternative policies are neglected. Important affected values are neglected.

5. By proceeding incrementally and comparing results of each new policy with the old, actors reduce or eliminate reliance on theory.

(Allison, 1971:154)

The agreement on policies without agreement on a full set of comprehensive and consistent goals has been called a political or coalitional approach (e.g.: Dahl, 1961). In contrast to the organizational process model, the coalitional view focuses on the particular individuals in a decision making setting. The general decision paradigm may again be used to summarize the highlights of other work to develop a capsule profile for analyzing decisions concerning faculty rank decisions in universities (See Table X).

Control variables. Control variables are those that can be controlled at a given point in time. In the coalitional decision model,
### Table X

**SUMMARY PROFILE OF COALITIONAL DECISIONS**

<table>
<thead>
<tr>
<th>GENERAL DECISION PARADIGM ELEMENT</th>
<th>COALITIONAL DECISIONS RE: FACULTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Variables</td>
<td>Few:</td>
</tr>
<tr>
<td></td>
<td>Role of Individual</td>
</tr>
<tr>
<td></td>
<td>Power</td>
</tr>
<tr>
<td>State Variables</td>
<td>Many:</td>
</tr>
<tr>
<td></td>
<td>Dependent on Issue</td>
</tr>
<tr>
<td></td>
<td>Agenda Building</td>
</tr>
<tr>
<td></td>
<td>Many External Participants</td>
</tr>
<tr>
<td>Exogenous Variables</td>
<td>Fewer</td>
</tr>
<tr>
<td></td>
<td>Unstable</td>
</tr>
<tr>
<td>Observing System</td>
<td>Competing/Multiple</td>
</tr>
<tr>
<td></td>
<td>Issue Specific</td>
</tr>
<tr>
<td></td>
<td>Some External</td>
</tr>
<tr>
<td></td>
<td>Unorthodox</td>
</tr>
<tr>
<td></td>
<td>Centralized for Each Actor</td>
</tr>
<tr>
<td>Value System</td>
<td>Maintain Group Membership</td>
</tr>
<tr>
<td></td>
<td>and/or Winning Emphasized</td>
</tr>
<tr>
<td></td>
<td>Future Support</td>
</tr>
<tr>
<td>Causal Linkages</td>
<td>Complex</td>
</tr>
<tr>
<td></td>
<td>Ambiguous</td>
</tr>
<tr>
<td></td>
<td>Discovered Iteratively</td>
</tr>
<tr>
<td></td>
<td>(Ignored <em>a priori</em>)</td>
</tr>
<tr>
<td>Constraints</td>
<td>Range of Acceptable Practice</td>
</tr>
<tr>
<td></td>
<td>Process Must be Legitimate in</td>
</tr>
<tr>
<td></td>
<td>Participants' View</td>
</tr>
<tr>
<td></td>
<td>Competition</td>
</tr>
<tr>
<td>Time Horizon</td>
<td>Short</td>
</tr>
<tr>
<td></td>
<td>Issue Recycling Expected</td>
</tr>
<tr>
<td>Uncertainty</td>
<td>Some Dimensions Known</td>
</tr>
<tr>
<td></td>
<td>Many Surprises</td>
</tr>
</tbody>
</table>
the individual member of the organization is highlighted as making a personal decision to join in the coalitional activity. Therefore, a basic control variable will be the role played by the individual. One may join a coalitional enterprise as a part of the ruling elite (Dye, 1972) or as a member of a special interest or pressure group (Easton, 1957). The coalitional model is important in its emphasis of the issue-specific nature of negotiations; therefore, it is important to focus on the avenues by which issues arrive on the agenda for decision (Dahl, 1961). These two interact in that the relative power of a coalition or pressure group will be an indicator in assessing who is able to control the construction of agendas, i.e. which issues come up for decision. Similarly, the outcome on an issue will depend on whose position is able to command greatest support. Therefore, a control variable will be the ability to bring together support in the coalition and to influence agendas. On the other hand, individuals may decide to support others in their efforts to shape either the agenda or a position of another.

Beyond the decisions to join, to support, to oppose or to abstain, the control variables available to an individual or collectively to a group are limited. The major avenue of operation in a coalitional process is therefore, through the exercise of influence.

State variables. State variables are those open to influence, but not control. In the coalitional model, a large range of variables fall into this class. That influence may focus on the issue itself, for example in determining the scope or definition of the issue; on the membership of the deciding group, either in its constitution or power relative to external pressure groups; or on individual subgroups within
the deciding group as a position of compromise is negotiated.

State variables will include the resources of pressure groups and their interest in or ability to form coalitions themselves; the political structure of the organization, i.e. the power channels and sources of influence within the official organization; and the interdependencies among members of the deciding group, for example, the past outcomes of earlier issues. The set of issue-specific and organization-specific variables that form the substance of a particular decision problem will vary even as the problem unfolds and one or another task is attempted.

An important feature of the coalitional model is its relative conceptual richness, as compared with other models. In terms of the general decision paradigm, that richness highlights the state variables which will include a wider range than is commonly treated in decision models.

**Exogenous variables.** Exogenous variables are those that cannot be controlled or influenced. In a coalitional model, these will be fewer in number than in other models. Those variables treated as exogenous at one time may not be at another, similarly, the exogenous variables in one issue are not a definitive set.

**Observing system.** Given the large number of relevant control and state variables, the observing system in a coalition is more complex than, for example, in an organizational process view. Whereas organizational process highlights the organizational subunit and the operation of standardized procedures, the observing system in a coalitional view may be highly unorthodox and inventive. The importance of the position
taken by individuals on one or another issue and of the relative power of those individuals makes it essential that information reside throughout the organization and the deciding group. It is, however, highly likely that a number of competing information collecting systems will operate, each seeking to increase the bargaining advantage of its representative in the decision group. The observing system may then have internal checks for validity of its data since poor information could be embarrassing to its principal. Maintaining each observing system will be part of the various self-interests of coalition members, and the characteristics of another's may be the subject of some influence.

Value system. The value to individuals of achieving one or another outcome is related to both the outcome itself and their future ability to affect other outcomes. It may be that an unacceptable or suboptimal plan will be supported at one time on the basis of promised support in the future. The dominant value is maintaining membership in the deciding group, along with a reasonable probability of meeting some personally preferable objectives on some of the issues that will come up. Therefore, there will be support for continuance of the coalitional system rather than major reform or replacement.

Causal relationships. The cause and effect relationships between actions and consequences are not needed before decisions are taken, since the effects are discovered through the actual results of decisions (Schmidtlein, 1974). Similarly, since change emerges from remedial adaptation, i.e. recycling issues, and may include surprises it is necessary to understand the linkages involved in making change before
taking the decision.

**Constraints.** The overriding constraint binding the coalitional model variables is that the process be legitimate. This is in contrast to the rational model which emphasizes expertise and calculation in terms of known goals. The negotiation mechanism in coalitional decision can touch upon almost any variable and will be subject to some limitations of resources, however, its primary requirement is for legitimacy (Schmidtlein, 1974). Indeed, the coalitional model comes into play when resources are scarce, and it is competition for them that must be controlled in this view.

**Time horizon.** Coalitional decision emphasizes issues which, typically, are being dealt with in some particular time-frame. The need for "maintaining options and a flexible bargaining position causes decision makers to resist committing themselves to courses of action much in advance of deadlines" (Schmidtlein, 1974:6). At the same time, the possibility of recycling an issue if something is wrong with its resolution, or if it is reassessed as being inappropriate in the future, gives the long range implications of decisions a very low priority in present debates.

**Uncertainty structure.** The large number of variables subject only to influence, and the small number of control variables makes the coalitional model sensitive to the uncertainty of those variables. Failure to attend to matters of causal relationships makes unexpected outcomes likely, however, the ability and even propensity for reviewing issues in the future offsets the perceived effects of uncertainty. As a hedge against chaos, however, decisions take action which only
marginally differs from the practice at present (Lindblom, 1965). At the same time, uncertainty in the process and in understanding the implications of actions increases ambiguity in bargaining which "aids consensus and bargaining positions" (Schmidtlein, 1974:8).

FACULTY RANK DISTRIBUTION DECISIONS

There are a variety of decisions which can affect the faculty rank distribution of a university. They may be divided into two basic classes using a framework for categorizing academic appointments on the basis of academic rank and duration of appointment to describe faculty rank distribution. This framework was used in Chapter Four to organize a review of faculty flow models. The purpose of this section is to organize a review of faculty rank distribution decisions.

The basic division of faculty rank distribution decisions can be made in terms of how the distribution itself is to be treated. One class of decisions concerns the terms used in the framework, i.e. rank and duration. The second class concerns additions to, subtractions from, and changes within a given distribution framework.

Changing the Frame of Reference

The two basic elements defining a faculty rank distribution are the nominal ranks by which positions are identified and the nature of the time commitment to it, i.e. rank and duration or tenure status. The academic ranks included in the conventional distribution are the traditional professorial grades and another rank, e.g. Instructor, which is usually immediately below Assistant Professor (von Zur-Muehlen, 1977). In each case, the incumbent holds a full-time appointment, whose duration is at least twelve months (Statistics Canada, 1977). However,
the full complement of academic or teaching staff at a university includes other ranks and types of appointment, for example, sessional instructors, visiting professors, and part-time professors (CAUT, 1979).

The duration of an appointment, and in particular the practice of awarding tenure is reflected in the other dimension of faculty rank distribution. The concept of tenure has come under scrutiny at various times (e.g. Smith and associates, 1973) and is the subject of current attention in the literature (e.g. Oi, 1979). The general thrust of such attention is to point out the failings of the tenure system and propose alternatives such as abolition of tenure (O'toole, 1978), or periodic tenure review with the option of re-tenuring (Mayr, 1978).

Since there are, or could be, other elements included in a faculty rank distribution it may be observed that there is evidence of a need to analyze possible changes in the terms defining faculty rank distribution. To a large degree, interest in changing tenure practices or academic ranks included in analysis is linked to other measures of university management, such as salary expenses (e.g. Oi, 1979) or teaching resources. It has been shown that linkages to input or output indicators are unclear (see Chapter Four), and may also be observed that without some guidance as to the managerial focus that changes to faculty rank distribution would try to serve, it is doubly difficult to develop further the basic framework established in the present study. In fact, there are no examples in Canada of a university abandoning the tenure system, and recent evidence (e.g. Statistics Canada, 1979) indicates that the number of faculty not holding professorial rank is decreasing, however those data do not pertain to sessional or part-time appointments.
In summary, there may be value in changing the frame of reference for faculty rank distributions. However, it is not evident that significant decisions in that direction are being made in Canada and, therefore, the topic will not be pursued further in the present study.

Changing the Size and Composition of Faculty Rank Distributions

Decisions to change a given faculty rank distribution may involve two basic types of change. First, the size of a distribution may be modified by adding members to it, or deleting some from it. Additions or deletions may, of course, be net resultants and do not necessarily involve only the removal of existing personnel or the addition of new ones. The other basic change can be in the way members of a faculty distribution are actually distributed among its various states. The first type of decision involves hiring or removing faculty; the second involves promotion and granting of tenure.

Hiring and removal decisions. The decision to add or delete members of faculty necessarily involve matters of resources, particularly money for salaries (Mortimer and Tierney, 1979). Looking at the ability to maintain or attract a new member of faculty is an exercise in looking at the ability to maintain or acquire funds to pay his or her salary. In this light, the personnel decisions are linked to budget decisions concerning the maintenance or acquisition of a budget increment for salary purposes.

The means by which faculty members are removed from a faculty distribution are clearly linked to the question of funds. In Table XI, eight prevailing methods of reducing staff are listed in rank order of
application in over 160 American institutions. Mortimer and Tierney state that "staff reduction is only one way to accomplish significant expenditure reduction," but cite a combination of reductions and slower growth in the salaries paid to faculty as an alternative (1979:37). Clearly, the emphasis on faculty numbers is a continuing concern in times of financial exigency (Small, 1979) however, the incremental budgeting problem is a generic one. Although other models have been proposed (e.g. zero-base budgeting) the incremental approach is though to be in most common use in contemporary universities (Adams, Hankins and Schroeder, 1978:54).

TABLE XI
METHODS OF REDUCING UNIVERSITY STAFF

<table>
<thead>
<tr>
<th>METHOD</th>
<th>CASES</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not filling vacancies</td>
<td>277</td>
<td>31</td>
</tr>
<tr>
<td>Terminating nontenured faculty</td>
<td>201</td>
<td>23</td>
</tr>
<tr>
<td>Terminating part-time faculty</td>
<td>125</td>
<td>14</td>
</tr>
<tr>
<td>Terminating teaching assistants</td>
<td>118</td>
<td>13</td>
</tr>
<tr>
<td>Early retirements</td>
<td>51</td>
<td>6</td>
</tr>
<tr>
<td>Seniority of tenured faculty</td>
<td>48</td>
<td>5</td>
</tr>
<tr>
<td>Reassignment</td>
<td>35</td>
<td>4</td>
</tr>
<tr>
<td>Performance</td>
<td>34</td>
<td>4</td>
</tr>
</tbody>
</table>

(Sprenger and Schultz, 1974)

Budgeting behaviour in university departments has been analyzed by several studies, under conditions of both scarce and less scarce resources. Of particular interest is a series of studies started by
Pfeffer and Salancik (1974) and extended by Hills and Mahoney (1978). Pfeffer and Salancik posed a bureaucratic model and a coalitional model of budget decision making as providing alternative explanations for resource allocations. They found that the coalitional model was supported in cases involving the allocation of scarce resources in that power indicators were found to be more predictive of scarce resource allocations (Salancik and Pfeffer, 1974).

Hills and Mahoney sought to test the linkages to conditions of greater or lesser scarcity that led to support for either the bureaucratic or the coalitional model. They report that "the relative abundance or scarcity of resources available for allocation is a significant influence in the budgeting process" (1978:464). In particular, they found that a bureaucratic criterion, "relative workload, was influential in the allocation of resources during the period of abundant resources and of little influence during the period of scarce resources" (1978:464). On the other hand, "the predominant influence in the allocation of incremental discretionary resources during the period of scarce resources was externally based power as represented by the existence of advisory boards, an influence not as readily apparent during periods of abundant resources" (1978:464).

Allocations during the period of scarce resources followed the proportionate decrease method that Cyert and March (1963) propose will be used as an arbitrary rule. However, on the basis of their evidence, Hills and Mahoney conclude that "while all subunits were faced with a loss in resources, the powerful subunits were able to get them back" (1978:464).

The decision models used by Salancik and Pfeffer (1974) and by
Hills and Mahoney (1978) are consistent with the organizational process and coalitional models summarized in this chapter. For example, the "bureaucratic" model used by Hills and Mahoney builds specifically on the bounded rationality of Simon (1957) and uses historical year-to-year data as predictors of future criteria, e.g. workload. Similarly, the coalitional model they use is based in the power studies of political science and uses the existence of an external pressure group as an ally in internal decisions as a point of reference.

Since the budget of a university subunit is composed of several items, the implications of budgeting studies are multi-faceted and do not relate exclusively to personnel matters. However, it is typical for seventy to eighty percent of a departmental or faculty budget to be devoted to faculty salaries (Mortimer and Tierney, 1979), therefore it is likely that the impact of changes in incremental budgeting will affect the size of a unit's complement of faculty members and the findings related to conditions of scarcity may be said to relate to the addition to or reduction of faculty rank distribution. Provided that the links between conditions of greater and lesser scarcity and mode of budgeting hold (there is no evidence to test further the particular role of faculty salaries as part of budgeting) then the implications for the making of hire or fire decisions are profound.

In summary, the Hills and Mahoney findings in particular indicate that the decision to add faculty may be based on organizational criteria, notably relative workload, if the university is in a period of relatively low scarcity of resources. On the other hand, during times of fiscal restraint, pressure to reduce all units proportionately will be reduced in the case of those who have strong bases of power. Briefly, it is
possible that organizational process decision making may prevail during periods of abundance, and coalitional decision making may supplant it during times of scarcity, at least so far as the addition and deletion of positions is concerned.

Promotion and tenure decisions. Decisions to promote or grant tenure to a faculty member will cause the distribution of faculty among the ranks and with respect to duration of appointment to change. The decisions affecting a member of faculty are subject to a different level and intensity of scrutiny than those concerning the opening of a position or failure to replace a post vacated by a faculty member who leaves (e.g. Corson, 1979).

The requirements for awarding tenure and for awarding a higher rank are commonly laid out in considerable detail in faculty handbooks and policy or procedures manuals of individual universities, in addition national associations of professors in both the United States of America and Canada provide detailed statements of academic freedom (AAUP, 1971; CAUT, 1979). The criteria for awards of tenure and promotion and the process by which judgments are to be made are part of those detailed statements. In several cases where individual faculty members have contested a decision made by an academic body, e.g. failure to award tenure, the only basis on which an outside agency has made assessments of the justice of the decision is whether due process was afforded the individual. Therefore, it has been noted that "a normal nonrenewal or nonreappointment of a limited or indeterminate appointment does not give rise to the legal necessity of a hearing" (Holloway, 1979:146). The substance of these observations and statements by academic organizations is to emphasize that decisions about tenure and promotion are
academic decisions that must be made in accordance with the processes prescribed for the situation in university policy and agreements with the faculty.

An exception to the general requirement for due process in reviewing promotion and tenure decisions involves the imposition of an arbitrary quota on the number of individuals who may hold senior rank or tenured positions (Dill, 1974). A quota system would override the normal academic criteria in considering individuals for promotion or tenure. If, for example, a rank or tenure quota had been met previously, no further appointments to senior rank or awards of tenure would be entertained. Therefore, individuals affected by quota would not enter into a promotion or tenure review process because the overriding criterion, i.e. quota, had precluded that option.

Setting of quotas as a constraint of faculty staffing may be made on financial or academic grounds (e.g. Belanger, 1979). The primary vehicle for exercising constraint on numbers of faculty has been financial (e.g. Peterson, 1979), and little attention has been devoted to academic criteria, e.g. preserving the structural integrity of a discipline (Belanger, 1979). It has been shown that financial constraints may be linked to budgeting decisions and, particularly in times of relatively scarce resources, there is evidence that such decisions are made on the basis of a coalitional decision model.

Another class of decisions concerns the termination of faculty who hold tenure, but the requirement for due process has been upheld here as well (Holloway, 1979) and the requirement for a university to show either "cause" relating to inadequate performance of a faculty member, or financial exigency, wherein it is able to default on a
contract for continued employment.

In summary, the literature indicates that a set of detailed processes for making tenure and promotion decisions exists and that universities are bound to abide by them. It may be concluded therefore, that the model for such decisions is the organizational process model, since those prescribed procedures involve the operation of specific organizational subunits and require particular kinds of input to produce one of a very limited set of possible outcomes (e.g. CAUT, 1979). However, if for reasons of a primarily financial nature quotas are applied to the senior ranks and tenured population, the operation of those processes may be precluded.

SUMMARY

This chapter has developed summary profiles of two models of university decision; the organizational process and coalitional models and identified support for each with respect to faculty rank distribution decisions. The two profiles have been developed in terms of the general decision paradigm to provide a conceptual grid for comparison with the characteristic profile of analytical models dealing with faculty rank distribution. The final section of the chapter attempts to identify support for one or another model as each relates to a set of decisions dealing with faculty rank distribution.

The support for particular decisions dealing with faculty rank matters is limited to inferences from budgetary studies and observations of the requirements for due process in dealing with particular faculty members. On the basis of those items, one may hypothesize that the organizational process model is descriptive of decisions concerning
promotion and tenure, and decisions to add faculty during times of relatively abundant resources. Similarly, decisions to add or delete faculty members or to affect promotion and tenure decisions through the imposition of quotas may be made on the basis of power in a coalition decision making process under conditions of relatively scarce resources. Supporting that view, Peterson observes that, in a state of decline "decisions on important policy matters, including faculty staffing and academic priorities, focus more on external concerns, have a tendency to become more centralized, and are expressed as formal directives with analytical justifications" (1979:151).

Implied in Peterson's observation is a failure of analysis to influence important faculty staffing policy matters under conditions of decline. That apparent failure underscores the importance of the faculty rank distribution as a policy concern as well as the problem of enhancing university decision making through analysis. The following chapter compares the summary profiles of university decision making with the profile of analytical models to identify possible factors which contribute to or detract from the link between analysis and decision.
Chapter Six

ANALYSIS

This chapter compares two summary profiles of organizational decision processes in universities to the profile of faculty flow models. Drawing on the example of faculty rank distribution, the summary of faculty flow models is compared first to a profile of organizational process decision making and then to a profile of coaltional decision making. Support for the models of decision as they have been shown to apply to faculty rank distribution decisions is incorporated in a review of the degree of fit between faculty flow models and faculty rank distribution decisions. That review draws attention to the assumptions about decision making that are identified in the design of the analytical models, and some observations are made on the apparent gap between normative and descriptive theories for faculty rank distribution decisions.

The general decision paradigm is reviewed as an analytical construct with attention to its application in the present study and its possible role in the future development of theory. Similarly, the "two-world" concept is reviewed as an aid to future inquiry.

COMPARING MODEL PROFILES

This study focused on the question of conceptual congruence between the design of analysis in aid of decision and the actual making of decisions. The case study provides a summary profile of a class of analytical models and two alternative models of organizational decision as they are supported for decisions concerning
the case problem. The profiles have been developed in terms of a common over-arching paradigm of decision and may, therefore, be compared directly in terms of the elements of that paradigm.

Table XII assembles the profile of analytical models of faculty flow and the profiles of organizational decision processes. The comparisons among them first examine the congruence between faculty flow models and the coalitional model of decision. This section then concludes with some observations about faculty flow models and faculty rank distribution decisions.

Faculty Flow Models Compared to Organizational Process Decision

The profile of faculty flow models in terms of the general decision paradigm is closely congruent with the profile of organizational process decisions concerning faculty rank distribution. Both types of models use a few control variables and state variables, e.g. net distribution size, which depend on standard contracts and alternatives for their definition. Both models include so few control and state variables that most variables are and continue to be omitted. The observing systems are very similar in the two models, with single sources of data pertaining to internal organizational matters being used to the exclusion of external variables. The institutional records used in faculty flow models relate to routine organizational matters, with emphasis on historical data.

The value systems highlighted in faculty flow models and organizational process decision differ in degree, rather than in kind. The faculty flow models do not place any particular value on a particular
**TABLE XII**

**SUMMARY PROFILES OF ANALYTICAL MODELS OF FACULTY FLOW AND DESCRIPTIVE MODELS OF UNIVERSITY DECISION PROCESSES**

[Based on Weathersby's (1975) General Decision Paradigm]

<table>
<thead>
<tr>
<th>GENERAL DECISION PARADIGM ELEMENT</th>
<th>FACULTY FLOW MODELS</th>
<th>ORGANIZATIONAL PROCESS DECISIONS RE: FACULTY</th>
<th>COALITIONAL DECISIONS RE: FACULTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Variables</td>
<td>Very Few:</td>
<td>Few:</td>
<td>Few:</td>
</tr>
<tr>
<td></td>
<td>Net Distribution Size</td>
<td>Net Distribution Size</td>
<td>Role of Individual Power</td>
</tr>
<tr>
<td></td>
<td>Standard Personnel Transitions</td>
<td>Standard Rank/Term Alternatives Authority</td>
<td></td>
</tr>
<tr>
<td>State Variables</td>
<td>Few: Dependent on Standard Contracts (e.g. Rank, Tenure, Duration, etc.</td>
<td>Few: Dependent on Standard Contracts (e.g. Rank, Term, Tenure)</td>
<td>Many: Dependent on Issue</td>
</tr>
<tr>
<td></td>
<td>All Internal</td>
<td>All Internal (e.g. Workload)</td>
<td>Agenda Building</td>
</tr>
<tr>
<td>Exogenous Variables</td>
<td>Many Omitted Stable</td>
<td>Many Omitted Stable</td>
<td>Fewer Omitted Unstable</td>
</tr>
<tr>
<td>GENERAL DECISION PARADIGM ELEMENT</td>
<td>FACULTY FLOW MODELS</td>
<td>ORGANIZATIONAL PROCESS DECISIONS RE: FACULTY</td>
<td>COALITIONAL DECISIONS RE: FACULTY</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------</td>
<td>---------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Observing Systems</td>
<td>Passive/Singular</td>
<td>Passive/Singular</td>
<td>Competing/Multiple</td>
</tr>
<tr>
<td></td>
<td>Routinized</td>
<td>Routinized</td>
<td>Issue Specific</td>
</tr>
<tr>
<td></td>
<td>Based in Institutional Records</td>
<td>Based on Institutional Records</td>
<td>Some External</td>
</tr>
<tr>
<td></td>
<td>Historical Data</td>
<td>Historical Data</td>
<td>Unorthodox</td>
</tr>
<tr>
<td></td>
<td>Silent on Centralization</td>
<td>Includes Peer Reviews</td>
<td>Centralized for Each Actor</td>
</tr>
<tr>
<td>Value Systems</td>
<td>None</td>
<td>Subunit Goals Emphasized</td>
<td>Maintain Group Membership</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and/or Winning Emphasized</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Future Support</td>
</tr>
<tr>
<td>Causal Linkages</td>
<td>Simple</td>
<td>Simple</td>
<td>Complex</td>
</tr>
<tr>
<td></td>
<td>Mathematical</td>
<td>Customary</td>
<td>Ambiguous</td>
</tr>
<tr>
<td></td>
<td>(Pre-determined)</td>
<td>(Routine)</td>
<td>Discovered Iteratively</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Ignored a priori)</td>
</tr>
<tr>
<td>Constraints</td>
<td>Range of Standard Practice</td>
<td>Range of Standard Practice</td>
<td>Range of Acceptable Practice</td>
</tr>
<tr>
<td></td>
<td>(e.g. Positive Promo-</td>
<td>Policing of Due Process</td>
<td>Process Must be Legitimate in</td>
</tr>
<tr>
<td></td>
<td>tion Rates)</td>
<td>Total Resources</td>
<td>Participants' View</td>
</tr>
<tr>
<td></td>
<td>Conservation</td>
<td>Quotas</td>
<td>Competition</td>
</tr>
</tbody>
</table>
### TABLE XII

**SUMMARY PROFILES OF ANALYTICAL MODELS OF FACULTY FLOW AND DESCRIPTIVE MODELS OF UNIVERSITY DECISION PROCESSES**

(Continued)

<table>
<thead>
<tr>
<th>GENERAL DECISION PARADIGM ELEMENT</th>
<th>FACULTY FLOW MODELS</th>
<th>ORGANIZATIONAL PROCESS DECISIONS RE: FACULTY</th>
<th>COALITIONAL DECISIONS RE: FACULTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Horizon</td>
<td>Arbitrary</td>
<td>Short Distant Future, Near Extension</td>
<td>Short Issue Recycling Expected</td>
</tr>
<tr>
<td>Uncertainty</td>
<td>Dimensions Known</td>
<td>Dimensions Known Narrow Range of Outcomes,</td>
<td>Some Dimensions Known Many Surprises</td>
</tr>
<tr>
<td></td>
<td>Deterministic</td>
<td>Therefore Narrow Distribution</td>
<td></td>
</tr>
</tbody>
</table>


state, but they do maintain their constituent state variables, hence may be said to assume that the state variables should be maintained and are, therefore, valuable. Organizational process decision making clearly values the status quo and emphasizes the present organizational structure of subunit goals.

Faculty flow models and the organizational process model of decision are congruent in that they both assume simple, stable causal relationships among the variables to which they direct attention. It may also be stated that the small number of variables incorporated into those simple causal relationships are a classic example of the "bounded" nature of organizational decision.

Constraints on faculty flow models are similar to, but not exactly congruent with those in organizational process decision. The constraints of faculty flow models merely require that transition rates among the states be non-negative, and that the total number of transitions, additions and deletions balance to some total establishment census, i.e. that a principle of mathematical conservation reflect the range of standard practice. The organizational process model requires that standard practice be maintained, and devotes attention to policing adherence to standards of due process. A pair of constraints paralleling the conservation limit concern standard reliance on a total, fixed pool of resources and the possibility of imposing quotas. Overall, organizational process constraints would seem to be similar to those in faculty flow models since the transitions and states are dictated by existing structure and practices.

The time horizon used in faculty flow models is at once similar to and different from that in organizational process decision. The
method of calculating future faculty rank distributions in a faculty flow model uses year-to-year transition rates among states, or Markov probabilities to link one annual faculty rank distribution to the next. Projections are then made by repeating the process using the results of one set of flows as input to the next set for as many times as the model is required to step years into the future. Hence, faculty flow models extend the present into the future in an arbitrary number of deterministic steps. The organizational process model of decision has a short time horizon because the middle to distant future is discounted. However, the short term view of the future is only a simple extension of the present, and it is not a conceptually distinct process to relax the short horizon constraint and let the short term method extend the view farther. Such is not typically the case in organizational process decision, however, so while it is consistent with faculty flow models in the short term, it differs in not continuing farther.

The reason that organizational process does not continue an indefinite number of simple incremental steps into the future is that the future is largely avoided. Hence, rather than let the present be systematically projected into the future, the organizational process model avoids dealing with the future even though its simple, deterministic causal linkages make a future projection relatively simple, with a narrow range of outcomes.

Faculty Flow Models Compared to Coalitional Decision

In contrast to the organizational process model of decision, the coalitional model is almost completely incongruent with faculty flow models as represented in the general decision paradigm profiles.
Coalitional model decision making incorporates few control variables, as do faculty flow models; however, the variables themselves differ completely. Where the coalitional decision model highlights the decisions and power of the individual to join or participate in a coalition, the faculty flow model uses the rates of transition and number of added or lost members of faculty.

State variables in the coalitional decision model may be numerous and depend on the issue under debate or review. Rank, tenure, duration of appointment and so on are integral parts of faculty flow models yet may or may not be part of an issue as it arises or evolves in a coalitional decision forum. The individuals participating in the decision, their stakes in the issue, and their former stands on it or related matters are the kind of variables on which the coalitional decision will depend.

Since the sum of state and control variables is related to the set of exogenous variables, the differences between faculty flow models and coalitional decision models with respect to the variables not included are great. For the most part, the state and control variables in faculty flow models are exogenous to coalitional decision, and vice versa. However, the issue-specific nature of the coalitional decision process may include elements of faculty flow models.

The observing systems in faculty flow models are one area in which there may be some congruence with coalitional decision. While the coalition model includes a wide range of potential actors, it is likely that at least some of the actors concerned with faculty rank distribution will be organizational members. Part of the observing system of an organizational member will include attention to organizational variables,
even though those particular variables may not be involved in a particular issue. The importance of information in maintaining or improving a bargaining position makes it important to the actor, or potential actor, that his or her information not exclude potentially important categories. In the terms of the general decision paradigm, those categories may include state or control variables, but need not be limited to them. It is possible, therefore, that the institutional record system used in faculty flow models may be one of a larger set of observing systems used in coalitional decision.

Where faculty flow models rely on clear, simple causal linkages to operate, coalitional decision making ignores the complex causal linkages among the variables relating to the substance of the issue. On the other hand, there are very strong process linkages assumed to be operating in a coalitional setting. Those linkages are, however, of a different form than those in faculty flow models, therefore, the model of coalitional decision may be said to be incongruent with faculty flow models in the matter of causal linkages.

The constraints operating on a system relate to the linkages that are in operation. Faculty flow models use constraints on the substance of the faculty rank distribution problem. In contrast, coalitional decision making is constrained only insofar as the process meets norms of fairness or legitimacy as defined by the participants. The solution to the problem of determining a future faculty rank distribution may bear no resemblance to current practice, i.e. to the current substance of faculty rank distribution. Indeed, the coalitional solution may be to discontinue a university and its faculty.

The time horizon associated with coalitional decision making is
short. The lack of attention to causal linkages among the substantive
elements of an issue makes it important that an opportunity exist for
review of the outcomes of a coalitional decision. The future is
therefore discounted and the assumption of recycling problems operates
as an alternative to a priori analysis. Again in contrast, the
faculty flow model may use a long time horizon, based on the assumption
that the causal linkages in the model are adequate for projecting the
future. In this respect, the faculty flow model profile is incongruent
with that for coalitional decision.

Uncertainty is common with respect to dimensions of outcomes, but
diametrically opposed with respect to the distribution of outcomes
between the models of faculty flow and coalitional decision. Both pay
little attention to matters of uncertainty. However, faculty flow
ignores it because to do otherwise would complicate the mathematics
relating specified variables. Coalitional decision ignores the
uncertainty in the definition of the issue and the linkages among
variables. Moreover, the imprecision that is associated with such large
degrees of uncertainty aids the appearance of agreement by letting
different views and expectations remain superficially consistent.
Reducing uncertainty would simplify the issue, but possibly polarize
the process.

Relating Faculty Flow Models to
Faculty Rank Distribution Decisions

Summarizing the preceding two sections, it may be concluded that
models of faculty flow are closely congruent with an organizational
process model of organizational decision and that faculty flow models
are virtually incongruent with a coalitional model of organizational
decision and that faculty flow models are virtually incongruent with a coalitional model of organizational decision. In an earlier section of the study (see Chapter Five), support for the two models of decision was sought with special reference to the substance of faculty rank distribution decisions. This section relates the support for the models of process to the congruence of those models to the models of faculty flow.

The organizational process model of decision was found to have support in faculty rank distribution decisions when the decisions concern matters of promotion and tenure in the absence of quota constraints, and when the decisions concern the adding of faculty during times of relatively abundant resources. The comparison of model profiles indicates that the organizational process model is congruent with faculty flow models. Hence, it may be said that the family of faculty flow models appears congruent with the process of making faculty rank distribution decisions when there are no quotas on senior rank or tenure, and when there are relatively abundant resources.

The coalitional model of decision was found to have support in faculty rank distribution decisions when conditions of relatively scarce resources prevail. Those decisions involve the imposition of quotas on senior ranks and tenured populations, and the reduction of faculty numbers in inverse relation to the power of the faculty subunit. The comparison of model profiles indicates that the coalitional model of decision is not congruent with faculty flow models. Hence, it may be said that the family of faculty flow models appears not to be congruent with the process of making faculty rank distribution decisions when there are relatively scarce resources.

At this point, it may be useful to recall that the organizational
process model is a "bounded" version of what has been called classical rationality and that it has been argued that classical rationality is an appropriate term for the model of decision making broadly proposed to be ideal for university decision making. Finding that decisions concerning faculty rank distributions are congruent with a version of the normative model under certain conditions may be interpreted to be an appropriate, if less than ideal, state of affairs.

On the other hand, on the basis of a lack of congruence between faculty flow models and the coalitional model of decision it may be observed that under conditions of relatively scarce resources, the supported model of how faculty rank distribution decisions are made is not congruent with even a relaxed version of the normative model of university decision.

Based on the above observations, there would appear to be some support for Schmidtlein's (1975) notion of a "gap" between ideology and practice. From the viewpoint of university management, that gap may be reduced by changing either or both of the ideology and practice. To change the ideology would be to make a fundamental modification to the premises upon which universities are based, i.e. the "encouragement and development of intellectual excellence" (Porter, et. al., 1977:1). On the other hand, to change practice would be to overcome limitations and problems which are legion and which have been the subject of extended discussion and research.

With particular reference to the design of faculty flow models, it may be observed that current models are congruent with a process model of decision making which is roughly congruent with the normative view of university decision making. However, the prevalence of that
style of decision making under conditions of scarce resources is not apparent. Therefore, the design of faculty flow models may be enhanced by making them more congruent with organizational process decision making, provided that decision makers adhere more closely to the espoused norms for their activity. Conversely, faculty flow models may be made more congruent with the current practices of decision making under conditions of scarce resources by adopting elements of coalitional decision making as part of a class of models which would be distinct from existing versions. The problem of designing more congruent models of faculty flow will be examined further in the section dealing with implications for further research.

REVIEWING THE CONCEPTUAL FRAMEWORK

The General Decision Paradigm

The general decision paradigm developed by Weathersby (1975) has been applied to several bodies of literature in the present study in an attempt to assess the congruence of a class of analytical models designed to inform decision with two competing models of the process of organizational decision making. The Weathersby framework was adopted because it promised to provide a framework for comparison which, in itself, did not incorporate a biasing effect on the research. The criterion of conceptual congruence was selected because the full determination of cause and effect among all the variables and elements of the general decision paradigm as they relate to the interface of analysis and decision could not proceed without a prior test of the applicability of the framework as a profiling device.

The Weathersby (1975) paradigm provided a nine part checklist
for examining models of faculty flow and models of university decision. As a checklist for developing profiles of models in terms of a common set of elements, the Weathersby paradigm may be said to be satisfactory. Profiles of the analytical models and decision process models were developed in terms of the nine elements of the general decision paradigm and those nine elements constituted a sufficient set to summarize substantial and diverse bodies of literature without missing important aspects of previous research.

The present interest in testing for congruence among static profiles of analytical and decision process models does not address the full dynamics of decision making or the process of developing and using analytical models. It has not been possible, therefore, to test the Weathersby paradigm for its ability to incorporate those dynamics. For the purposes of the study, however, the matter of assessing congruence was adequately achieved using the Weathersby paradigm since it did provide a method for discriminating among the types of models under review. Not only did the paradigm provide for discrimination, but the comparison of faculty flow models to decision process models successfully illustrated cases of both close congruence and virtual incongruence on an element by element basis.

It must be remembered, however, that the organizational process decision model and the coalitional decision model each emphasize different variables within the general decision paradigm. In that sense, therefore, the distinction between the two is artificial. A full dynamic theory of decision would incorporate both, using the nine elements of the general decision paradigm as a comprehensive framework. Taken together, the distinctions between organizational process decision and
coalitional decision, and the exclusion of the dynamics of both analysis are areas in need of further development.

The general decision paradigm was used in the present study to test its applicability for providing static summaries. The further development of descriptive and predictive theory requires that the process models of decision be integrated into a larger theory using the full range of elements in the general decision paradigm, which may then be examined for their implications for the design of analysis in support of decisions in that full and comprehensive context. Allison (1971) identified possible avenues for integrating organizational process and political or coalitional models of decision, however, his tentative scheme for accomplishing that task has yet to be achieved (Murphy, 1977). Therefore, a full and comprehensive theory of decision is a product of research towards which it is necessary still to strive.

The Two-World Concept

A second construct which underlies the present application of the general decision paradigm in this study is the "two-world concept." The two-world concept identifies a distinction between the world of analysis and the world of action. Since the general decision paradigm has successfully been applied to research based in each of those two worlds, it may be concluded that the concept was of value in the present study. Furthermore, the next steps in developing a theory require the integration of elements in the general decision paradigm and the inclusion of dynamic linkages among them.

While the two-world concept has been essential to the present exercise, it is not immediately apparent that it would be required in
the further development. That is because the definition of the two world concept includes attention to the norms of research and the norms of decision, and to their respective constraints in time and resources as critical variables. However, the general decision paradigm includes in it the values attached to the process and analytical models, therefore, may subsume the two world concept in a fully articulated theory. However, for a static comparison such as the present study, the two world concept was valuable for its Janus-like function as an organizing construct emphasizing the role of decision as the interface between the worlds of research and action.

SUMMARY

This chapter has provided a comparison between two pairs of summary profiles developed using the general decision paradigm. The comparison of faculty flow models and organizational process decision making showed them to be closely congruent. Adherence to standard practices, routinized organizational records, simple assumptions of causal linkage in an environment of low uncertainty with a simple view of the future characterized both organizational process decision making and the flow models.

In contrast, the comparison of faculty flow models and coalitional decision making showed them to be largely incongruent. On almost every element of the general decision paradigm, the two differ substantially, and the relative instability of the mix of variables and relationships characterizing coalitional decision making compounds their apparent incongruence.

Relating faculty rank distribution decisions to conditions of
resource supply, it was noted that the family of faculty flow models appears congruent with the process of making faculty rank distribution decisions when there are no quotas and when there are relatively abundant resources. On the other hand, it was also noted that the family of faculty flow models appear not to be congruent with the process of making faculty rank distribution decisions when there are relatively scarce resources. On the basis of those and noting the closer fit between organizational process decision and the normative theory of university decision, support for Schmidtlein's (1975) "gap" between ideology and practice in university decision making was noted.

The conceptual framework for the study was reviewed with special emphasis on the general decision paradigm. As a checklist for developing profiles of diverse literature it was found to be satisfactory. Similarly, it was found to discriminate between groups of studies and provide a means for testing for congruence. Finally, the two-world concept was noted as an important factor in operationalizing the current static comparison of profiles, however its necessary use in a fully articulated theory is unclear since it likely would be subsumed within the set of elements involved in a dynamic application of the general decision paradigm.
Chapter Seven

SUMMARY, CONCLUSIONS AND IMPLICATIONS

This chapter provides a three-part conclusion to the study. First, a comprehensive review of the preceding chapters provides a summary of the research. Second, the principal conclusions of the study are drawn together in a brief discussion of its findings. Finally, implications of the study are drawn for both further research and administrative practice.

SUMMARY OF THE STUDY

Purpose of the Study

The concept of policy as a class of important, far reaching decisions has been discussed by various authors who identify its salience and its problematic nature. As major features of contemporary organizations, policy and policy-related activity have drawn considerable attention to both the substance of policy and the processes by which it is made. Inquiry concerning the former may be called policy analysis as distinct from inquiry concerning the latter, which may be called policy research (Downey, 1977).

The notions of policy analysis and policy research are both part of a larger conception called policy science. While policy science was proposed some years ago as an integrating concept intended to improve government problem solving and decision making (Lasswell, 1970), the limited success of that integration is apparent (e.g. Lindblom and Cohen, 1979). Therefore it becomes important to attempt to identify and examine techniques by which the integration of policy analysis
policy research can be enhanced. It was the purpose of this study to identify and test a technique which may, ultimately, serve that purpose.

**A Strategy for Integration**

Central to the concepts of policy analysis and policy research and, therefore, to their integration, is the concept of decision. (Coleman, 1972) identifies two "worlds" which connect at the point of decision. In the terms developed here, those worlds are the realms of policy analysis, designed to inform decision through the scrutiny of alternatives, and policy research, designed to describe and improve the process of decision.

Linking those two worlds, a focus on communication between analyst and decision maker was provided by Sabatier (1978) in his synthesis of variables shown to affect the influence of technical information on policy decisions. The importance of messages between analyst and decision maker was identified by Mason and Mitroff (1973) who stress the importance of congruence between a user of research or inquiry and the philosophy of evidence, inquiry and knowledge in an inquiring system. Therefore, it may be that consistency between an analyst's system of inquiry and that of a decision maker is a necessary condition for integrating policy analysis and policy research, i.e. for linking analysis to decision.

Noting the importance of models in perceiving the world (e.g. Polanyi, 1968; Kuhn, 1970), it may be posited that if the models or technologies of policy analysis are not congruent with the models or characteristics of decision making, the linkages between them will be poor or non-existant. Hence enhancing the integration of policy analysis and policy research may be approached through achieving congruence
between their underlying models. Before that task can be undertaken, it is necessary to have at hand a method for analyzing policy analysis models and policy decision models on some common basis and to determine whether the method can illustrate or test for points of similarity and difference, i.e. test for congruence. In the absence of such a method, it falls to the present exercise to identify and test a candidate, but leave to another time the challenge of aligning analysis and decision in a particular situation.

As a focus for analyzing models and testing for congruence, the Janus-like role of decision may be used. That is, a model of decision may serve as a common framework or checklist to examine both analyses meant to inform decision and descriptions of decision processes. Noting that a number of apparently competing conceptions of decision are in the literature, it is proposed that a comprehensive conception of decision may provide a broad framework for categorizing and describing both the technologies of policy analysis and descriptions of policy decision making. That framework will be discussed in a later section. However, to provide a specific point of reference for examination of the proposition, a case problem will help to sharpen the study.

Selecting a Case

Selecting a case problem to test the notion of conceptual congruence involves three factors. First, the case problem should exhibit sufficient complexity and long term importance that it qualifies as a policy problem. Second, there must be a body of analysis concerning the substance of the case problem. Third, there must be a body of research describing decision processes concerning the case problem.

Scanning the literature in an attempt to meet those three cri-
teria, it is useful to note that universities as a type of institution have been examined considerably; in particular, their problems and processes are the subject of a fairly extensive literature. Moreover, as a class of organizations within which policy processes operate, universities are especially interesting because of their concurrent complexity and emphasis on scientific rationality. It may be observed that an adequate body of research exists concerning university decision making and indicates that a university setting for the case problem may be particularly interesting.

Within the university setting, a contemporary problem is the matter of faculty rank distribution. The fundamental excellence of a university is seen to be embodied in its faculty. Moreover, the number and rank distribution of faculty members in Canadian and other universities have been cited as a possible structural flaw with important implications; therefore, the matter of faculty rank distribution would appear to meet the first criterion of being a policy problem (Fortier, 1979).

Second, the literature of policy analysis includes a variety of techniques for projecting the distribution of personnel across a graded or ranked set of categories. In particular, that literature has been developed in the matter of faculty rank distributions in universities. There are three "faculty flow" techniques: Percentage Increase Models, Equilibrium models and Markov Chains. Together, there is sufficient analytical work reported to enable secondary analysis of the technologies involved.

Finally, within the general research literature about decision making in universities, there is sufficient work reported to enable secondary analysis of the processes for making decisions affecting faculty
rank distributions.

The three factors needed for an exploratory study of conceptual congruence between technologies of analysis and processes of decision are, then, present in the case problem of faculty rank distribution. The next sections describe the technique being assessed and the analysis of the case problem.

The General Decision Paradigm

The central role of decision in testing for congruence between analytical technologies or models and process models of decision has been identified. However, a major problem in past research concerning decision processes has been the theoretical or conceptual framework used to organize the inquiry. Variations of the experimenter effect (Rosenthal, 1966) lead to unintentional bias by identifying and using only those data specified in the conceptual framework. To offset such bias, a framework of sufficient scope to encompass the full range of variables is necessary.

The literature of decision making contains a variety of conceptions, for example, collegium, bureaucracy, rationality and organized anarchy (Cohen and March, 1974). Weathersby (1975) shows them to be subsumed by a comprehensive framework, the general decision paradigm, which incorporates the range of models and identifies nine elements in whose terms decision making may be analyzed parsimoniously while avoiding model bias.

The general decision paradigm uses three classes of variables, four linking structures, a time horizon and the treatment of uncertainty to describe decision. The notion of testing for congruence involves a comparison of descriptions, therefore the general decision paradigm provides a common set of criteria for static scrutiny and comparison of
the technologies used for projecting faculty rank distribution to the processes used for making faculty rank distribution decisions.

The general decision paradigm directs attention to the role of the individual in deciding and treats group decision making as an extension of the individual through his or her decision to join or participate in a group.

The general decision paradigm uses three basic classes of variables. Control variables are those which can be manipulated or specified by the decision maker (e.g. the matter of joining a group). State variables are those which can be influenced but not controlled by the decision maker (e.g. his or her acceptance by a group). Exogenous variables simply include all those that are neither control nor state variables.

Linking structures provide relationships among the variables and to the world at large. An observing system includes bases on information concerning the three classes of variables and the methods of inquiry used to collect it. A value system links the individual to each variable by stating the relative value of the status of each variable and of alternative future conditions of each. Causal relationships link control and state variables across time through if-then statements. Constraints in linking structures limit the total variance among the three kinds of variables.

The time horizon in a decision is the distance into the future over which variables are examined and linking structures assumed to operate. Finally, there may be both matters of complete uncertainty, i.e. total surprise, and matters which are uncertain only in degree, i.e. relative likelihood of occurrence.

The general decision paradigm can be thought of as providing a
checklist to summarize a complex set of information about different phenomena into a limited set of categories based on the notion of decision. The first task for this case study is to perform that summarization on the technologies for projecting faculty rank distribution and on the descriptions of decisions affecting those distributions.

Summarizing Policy Analysis and Policy Research

The policy analysis technologies applied to the problem of faculty rank distributions have been labelled "faculty flow" models. Analyzing faculty flow models in terms of the general decision paradigm indicates several things.

Control variables in flow models are few in number and concern overall additions to or losses from a distribution, or transitions among various states, e.g. promotion and the granting of tenure. The state variables are also few, and depend on standard contracts for definition, e.g. rank and duration of appointment, thereby being institutionally determined. With small numbers of variables in both control and state categories, the number of exogenous variables is very large. Also, since flow models are typically fixed, the members of each class of variable are stable.

The observing systems used in faculty flow models are based in institutional records, routinely maintained and including historical and current information. The presence of a single database is common, although it is not clear whether that is a centralized resource. Flow models typically do not seek to optimize a distribution, hence no value is attached to any particular projected distribution. Perhaps consistent
with the use of few control or state variables, faculty flow models use simple mathematical linkages and are constrained by the range of standard practice (e.g. no demotions) and simple rules of conservation.

The faculty flow models reviewed use an arbitrary time horizon in the sense that the projections can be run for any number of annual cycles into the future. However, the view of the future is very simple, assuming that its dimensions are known, i.e. that there are no surprises, and that it is fully deterministic as laid out in the model's mathematics.

Policy Research: Faculty Rank Distribution Decisions

Research into the processes by which faculty rank distribution decisions are made is less briefly summarized. Competing descriptions of decision are identifiable in the literature and support for each can be found under one or more sets of circumstances. The general decision paradigm provides a method for summarizing both bodies of policy research and for contrasting them directly since each may be shown to emphasize different elements in the paradigm.

Organizational Process Decision. The first body of descriptive research uses what has been called the "organizational process model" of decision. With regard to faculty rank distribution decisions, the organizational process view as analyzed with the general decision paradigm has several characteristic features.

The control variables are few in number and concern overall additions to or losses from a distribution, or transitions between states. The organizational process view also notes that the extent of controllability depends on the organization's authority structure and that, in some cases, the ability to delegate authority will be a
control variable. State variables are few in number and depend on standard contracts for definition. With the small number of state and control variables, there are many omitted variables which are, in the main, stable.

The linking structures involved in the organizational process view of decision rely heavily on standardized views of a simple world. The observing systems are based in institutional data bases which are maintained under routinized procedures in various organizational sub-units. The value system under an organizational process view lays heavy emphasis on subunit goals and the preservation of their integrity. Linkages among control and state variables are simple and based largely in routine or custom. Constraints on the process include the narrow range of standard practice, the requirement of due process, i.e. attention to routinized procedures including peer review, and attention to balancing resources and commitments. A particular constraint that may be applied to faculty rank distribution decisions may be the use of quotas on one or more states.

The time horizon in organizational process decision is short. However, it is assumed that present procedures and relationships will extend indefinitely into the future, therefore the distant future is treated as a linear extension of the present. That view reflects an uncertainty structure in which very few elements are not pre-determined; indeed the organizational process model of decision is described as avoiding uncertainty.

Support for the organizational process view is found in inferences from budgeting studies and observations of the requirements for due process in dealing with individuals. It would appear that, under conditions
of relatively abundant resources, decisions to add faculty and decisions concerning promotion and tenure are well described by the organizational process view.

Coalitional Decision. The second body of descriptive research concerning faculty rank distribution decisions uses what has been called the "coalitional model" of decision. The coalitional or political model has several characteristics, as revealed by the general decision paradigm.

Control variables in coalitional decision are few in number, notable among them being the individual choice to join one or another coalition or power group. Similarly, the ability to bring together support and influence agendas are examples of individual power which may be exercised in varying degree. In contrast, a large range of variables is subject only to influence and may be called state variables. The state variables involved in a decision will vary with the actors involved, their history, and their resources. They are not, therefore, stable over the life of a decision problem. In the dynamic coalitional setting, with many state variables, fewer variables are exogenous. However, the sets of state, control and exogenous variables are not stable, with shifts among them paralleling the evolution of a decision.

The linking structures are also more complex in a coalitional setting. Observing systems may emerge or operate in parallel as actors compete for advantage. The unique and changing nature of the decision problem may require unorthodox bases of information, some external to the institution. The principal value system of a coalitional decision process also relates to the role of individual actors or groups since maintaining the group and winning over other groups will be emphasized. Trade-offs across time may be made with promises of future support being
included in the resolution of a current problem in a way that will preserve the coalition into the future.

The causal relationships among variables are largely ignored before decisions are made since the effects are often discovered through actual results. Errors are tolerated on the provision that issues may be recycled to develop a solution iteratively, rather than avoided on the assumption of optimization as a decision is made.

The constraints on coalitional decision making focus on the process used. Practices must be within a range which the participants acknowledge to be acceptable and the process must also be legitimate in their view. These highlight the role of competing interests in determining decision outcomes since present allies may be future adversaries.

The time horizon employed in coalitional decision is short, and the necessity of flexible bargaining positions makes commitment to specific courses of action in advance of deadlines unlikely. Concurrently, the possibility of "recycling" an issue makes it feasible to discount the long range implications of decisions. Uncertainty is very important in coalitional decision since the opportunity for surprise is substantial, causal linkages being largely ignored. However, the ambiguity in bargaining which stems from large amount of uncertainty makes it feasible for coalitional decisions to be made.

Support for the coalitional model of decision also is limited to inferences from budgeting studies. From such research, it would appear that decisions to add or, more likely, delate faculty members or to affect promotion or tenure decisions through the imposition of quotas may be made in a coalitional mode under conditions of relatively scarce
resources. Under those conditions, the ability to resist arbitrary across-the-board cuts in resources is greater for those who are able to exercise bases of influence not available to their competitors. Similarly, an arbitrary quota system overrides the routine reviews for promotion and tenure by precluding all such transitions if a quota has already been met.

Testing for Congruence

The purpose of this study is to take a step toward the integration of policy analysis and policy research by identifying and applying a technique for testing for congruence between analysis and decision. The preceding section has provided three profiles or checklists of characteristics; one relates to policy analysis technology and two to policy research findings. The test for congruence involves paired comparisons between the first and each of the latter.

Making the first test for congruence, it may be observed that the profile of faculty flow models is closely congruent with the profile of organizational process decisions. Both use a few common control and state variables. Their observing systems are very similar, being based in institutional records and routines.

The value systems identified differ in degree, rather than in kind. Flow models at most only value implicitly the states which they identify, whereas organizational process decision clearly emphasizes the status quo and may change to state definitions as threatening.

Flow models and organizational process decisions are closely congruent in that they assume simple, stable causal relationships. They differ somewhat in that flow models are constrained by their mathematics to reflect the range of standard practice, whereas organizational process
decision goes further to devote attention to policing adherence to standards of due process.

The time horizons for organizational process decision and faculty flow models are similar in that they use short-run views. However, where organizational process will ignore the middle to distant future, faculty flow models can generate an arbitrary number of steps into the future and produce long-range projections. In both cases, however, the uncertainty structure is very similar in that the future is viewed deterministically and with virtually no surprises.

The second test for congruence shows faculty flow models to be almost totally incongruent with coalitional decision. Their control and state variables differ almost completely, coalitional decision involving more state variables, but not maintaining a stable set. Up to a limit, there may be congruence in the matter of observing systems, however, once information is required beyond that contained in an institution's data base, that limit is exceeded.

While faculty flow models depend on simple causal linkages, coalitional decision may ignore such relationships. Constraints operate on linkages and the incongruence between faculty flow models and coalitional decision with respect to relationships is carried through to their constraints. Where flow models are constrained by the substance of the faculty rank distribution problem and its mathematical representation, organizational process decision is constrained primarily by highly valued norms of fairness or legitimacy.

The time horizon in coalitional decision emphasizes a deadline for decision, assuming the opportunity to recycle issues. This is not congruent with flow models which address neither the timing of real decisions nor
the taking of new decisions on the basic issue.

Finally, faculty flow models and coalitional decisions are congruent in that they pay little attention to uncertainty. However, flow models do not incorporate uncertainty because it would complicate the mathematics while coalitional decision ignores uncertainty in the definition of the issue and the linkages among variables because certainty could disable the process.

Assessing the Test

At the outset, it was posited that congruence between analysis and decision may be important in increasing the influence of policy analysis on the solution of policy problems. The test for congruence made in the preceding section does not address actual influence or solutions, and cannot be evaluated on such a level.

This exercise sought to determine whether a comprehensive conception of decision could be used to analyze consistently both a body of analysis in aid of decision and a body of research concerning decision processes for the purpose of identifying similarities and differences between them. Such a set of categorizations seems to have been achieved using the general decision paradigm. Moreover, a criterion by criterion comparison was possible, showing examples of both relatively congruent and incongruent profiles.

The comparisons between profiles were, however, necessarily static. Comparison of nine-part lists provided little insight into the promise that integration may hold. However, that the profiling task was feasible and that reasonable distinctions between profiles could be made would indicate that the exploratory static test was satisfactory.
In particular, the key role of decision in structuring the study seems valid.

CONCLUSIONS

The study suggests three principal conclusions. First, the notion of conceptual congruence is a practical tool. The study was able to conduct profile building and to identify similarities and differences among profiles of analytical models and models of decision processes.

Second, the faculty flow models identified are closely congruent, in terms of the general decision paradigm, with the organizational process model of decision. The seven points of close congruence identified illustrate how an image of deciding can be incorporated into an analytic treatment. It is not possible to say whether such congruence in the case problem was intentional or accidental.

Third, the faculty flow models identified are almost completely non-congruent, in terms of the general decision paradigm, with the Coalitional model of decision. On almost all criteria, they differ in kind or degree, making it clear how the general decision paradigm helps to differentiate among models.

As a corollary to the principal conclusions, it may be noted that some evidence may support the notion of a "gap" (Schmidtlein, 1975) between ideology and practice in university decision making, at least as it relates to faculty rank distribution under conditions of relatively scarce resources.

The conclusions support the basic tenet of the study, i.e. that characteristics of decision are implicit in the design of research in
aid of decision. The study suggested decision as a key conceptual feature in policy analysis and policy research. The conclusions indicate that the proposal to apply a comprehensive conception of decision as an exploratory test for congruence was useful in that profiles could be developed, compared and contrasted. Further extension of that line of research is among the implications of this study.

IMPLICATIONS

Theory-building from the General Decision Paradigm

It has been noted that the static profiles developed and used in this study are only a first step towards a larger synthesis. The elements in the general decision paradigm provide a framework upon which it may be possible to build an integrating theory of decision which can include a theory of analysis.

The decision making process may be conceived of a distinct from the analytic process, but that really assumes a division of labor that may be entirely artificial. Clearly, the coalitional decision maker is performing many analytical tasks as the dynamics and drama of negotiations unfold. The simple schema that an analyst develops may never be congruent with that rich and creative process.

Yet, the possibilities for extending existing research are also clear in their promise for improvement and integration. The coalitional model highlights actors, but those actors may in large measure be part of organizational subunits with subunits' goals and priorities on their minds. Moreover, the organization is acknowledge to evolve and to learn, therefore, any comprehensive treatment of organizational process must be framed in a larger context of the organization's stage of
development, and conditions of its environment. Similarly, an actor is a human and will have particular personal attributes, experiences and priorities coming to bear on his or her actions. Humans also are acknowledged to mature, evolve and change, and a comprehensive theory would address those variables as well.

Therefore, the apparent and facile differences between organizational process models and coalitional models diminish and blur over when a larger view is taken. The task for further development of decision theory is to complete a blending which has meaning for both the conduct of analysis and the process of deciding. This study has shown a common set of elements, yet has relied to a degree on artificial simplifications. Further efforts might push farther on that line of blending, to achieve an integration which can both serve the disciplines and the practice of institutional decision making.

Improvements in Faculty Flow Modelling and Related University Research

It has been observed that the present family of faculty flow models is closely congruent to the organizational process model of decision, but almost completely incongruent with the coalitional model. Insofar as the coalitional model differs substantially from the normative models of university decision, the design of existing faculty flow models may therefore be seen as appropriate, but somewhat limited. On the other hand, if it is seen as important to have analytical models which are conceptually congruent with the decision process with which they are to articulate, current designs for faculty flow models are not appropriate. It may be concluded, therefore, that there is room for
improvement in existing faculty flow models to make them more congruent with organizational process decision making. Similarly, it may be concluded that there is need for development for a new type of faculty rank distribution analytic model to complement coalitional decision making.

Improving the fit of existing faculty flow models to organizational process decision making may focus primarily on the three elements of the general decision paradigm that comprise what may be called the design variables: the control variables, the state variables and the causal linkages among them.

The two basic types of control variables are the transition rates, and the total additions and/or deletions from a given faculty rank distribution. Standard practice does emphasize the promotion and tenure-award transitions, but those decisions made concerning individual transitions are based in such organizationally compiled information as the publication record of the individual, and the workload of teaching and service that has been carried. While those are state variables, i.e. not open to control by the decision maker, they have linkages in practice to the control variables in faculty flow modelling. For example, therefore, it may be important to incorporate links between workload and standard control variables.

To enable the linking of state variables of publication record and workload to the control variables in a model, they must be added to the set of state variables. Other state variables which might well be added to meet better the criterion of congruence concern a possible substructure for faculty flow models. In particular, it may be important to reflect standard practice which differentiates among groups of
disciplines in determining the role and expectations of faculty members. For example, the health professions may usefully be differentiated from the applied sciences and both of those from the pure sciences and humanities. Hence, a substructure in a faculty flow model which allowed a threefold disaggregation of rank and appointment type subgroups by discipline would improve the congruence with standard practice which recognized such distinctions.

By splitting the standard monolith faculty model into three parallel segments along disciplinary lines, the problem of including a measure of balance among them is raised. Even assuming that total faculty size must meet some particular value, it is necessary to determine how the three subunits relate and will relate to that total. To ignore the problem of how they might grow or diminish relative to one another is to split the modelling problem completely along disciplinary lines and have three unconnected models. The literature of decision making under an organizational process model provided an organizational link among the three parts of a full model in the form of workload data.

Workload could include the teaching effort and service load carried by the subunits. Of course, this complicates the model considerably since it raises the requirement of workload projections to enable future scenarios to be built. However, simple assumptions about the relative rate of change in workload could be accommodated readily and would be consistent with the organizational model of decision which avoids uncertainty.

Attending to the causal linkages among the enlarged set of state and control variables would require more mathematical statements, but
not a great many more. Overall, the causal relationships in existing faculty flow models are congruent with organizational decision and adding a few would not change that for the worse. However, to incorporate no stochastic terms in a model is probably unwise. Therefore while simple, deterministic relationships may be used, their sensitivity to change should at least be examined. That examination may be argued as an attempt to come closer to the ideal of classical rationality by relaxing the bounded nature of the analysis, or simply as a check to confirm that standard practice has been properly incorporated.

In other respects, the existing family of faculty flow models is not in need of modification to become more congruent with organizational process decision. There are implications of the increase in number of state and control variables which will affect the observing system, if data concerning publication and so forth are not adequately collected or maintained. Otherwise, the implementation of improvements to the models should be relatively straightforward.

The task of developing new types of analytic models for examining the problem of faculty rank distribution from the viewpoint of coalitional decision making is a novel one. While it may be inappropriate to attempt such an enterprise at this point in the present study, some preliminary observations and requirements may be sketched.

Coalitional decision highlights the individuals participating in the making of decisions about the particular issue. If one assumes that the faculty rank distribution of a university will arise as an issue, in what way may that issue be coloured? The interested parties may or may not be university members, the issue may involve the basic notions of rank or tenure, or may focus on transitions or the total size of the faculty rank distribution.
The great amount of uncertainty associated with a coalitional view, from the perspective of attempting to provide analytical support through modelling, makes it necessary that some initial assumptions be made. Of the wide range of possibilities concerning actors, interests and aspects of the issue, some organizing set must be chosen. Standard actors would probably come from the organization's executive and administrative hierarchy, plus those other identifiable groups, such as faculty associations, that are likely to have an interest in a faculty rank distribution issue.

Data concerning past performances of those actors with respect to faculty rank or related issues, for example resource allocations, could be compiled and reviewed to determine likely coalitions and positions. However, the issue-specific nature of the coalitional model makes it risky to attend only to those actors. For example, the matter of student visa status suddenly became an issue in Canada following a particular television documentary (e.g. Tausig, 1979). Therefore, the role of outside parties, such as the media, must not be overlooked. From this brief example, the importance of looking to other institutions as possible allies or adversaries also emerges, since the matter of student visas, or faculty citizenship, or tenure is a common organizational matter which could become important in disputes or alliances among universities.

Attention to other institutions, and the actors who may be seen to have interests affecting one's own university leads one easily across national boundaries. That exercise must be left to another time and context, however, it is clearly identified from this exercise as an important piece of applied research for the future.
This study has attempted to draw on earlier work examining the process by which decisions affecting faculty rank distributions are or have been made. Only two areas of relevant literature were identified, dealing first with incremental budgeting among university departments under conditions of scarce and relatively abundant resources and secondly with requirements for and adherence to specified procedures for tenure and promotion reviews.

Other institutional bodies, such as city councils and school boards in the public or not-for-profit sector, as well as corporate boards in other parts of society, have been researched more extensively than have university boards. University Boards of Governors and particularly university administration as it relates to Boards has not been extensively examined, and there are virtually no studies of such decision making groups and processes in Canada.

It must be concluded, therefore, that an important area for further study is the decision making structure in university governance in Canada. That research should use multiple conceptualizations of decision to relax the constraints of model bias. If a full and comprehensive integration of dynamics with the elements of Weathersby's general decision paradigm were available, that project could be done much more directly.

University Administration

It has been noted that support may exist for the notion of a gap between ideology and practice in university decision making. If present conditions of restraint are causing coalitional processes to supplant organizational processes in decisions affecting universities, then a
normative question arises, "Upon what model should university decisions be based."

Existing literature indicates clearly that the ideal of rationality is highly esteemed in universities. For practical purposes, the organizational process model as an approximation of classical rationality may therefore be preferable to coalitional decision. That possibility raises an issue that must be dealt with by those involved in or influential upon university decision. A major shortcoming in attempting to add more substantial support to these observations is the paucity of research describing university decision making in Canada.

If, for the sake of argument, one adopts the view that coalitional decision is supplanting organizational process in university decision making, what are the implications for university administration? It would appear that one of two alternatives could prevail, one which would seek to restore past virtues, and one which would involve yet more erosion of tradition. However, that apparent dichotomy is over-simple.

One of the major features of coalitional decision is that the "problem" can be redefined at will, if sufficient participants agree. Therefore, analysis of the implications for university practice must include scenarios where the current notion of "university" is not assumed. That is, it is not sufficient to think in terms of more or less of this or that trend in deciding, but essential to examine alternatives which do include fundamental changes in definition. Recall that a coalitional process may include outsiders and newly powerful members of the past organization. For example, student activist groups, campus unions and special interest groups have brought forward non-traditional issues and decisions whose consequences are still being unveiled.
What should a university administrator do under conditions, such as scarce resources, which precipitate decision processes that threaten to erode the fundamental nature of the institution? The first response must be replace the simple image of the unitary decision maker implied in the question.

The exercise of leadership could involve the building of a dominant coalition whose norms emphasize reason and analysis. Similarly, appeals to a wider audience could offset the power of a disruptive adversary. In contrast, there could be a steadfast refusal to participate in any process which does not meet traditional standards of propriety.

There is no answer to the deceptively simple, yet pressing, question. This study has arisen from widely acknowledged problems with achieving the superior solutions to such questions that Harold Lasswell foresaw as a fruit of policy science. That bodies of analysis and research exist is evidence of the appeal of the notion. That success in their integration remains elusive is evidence of the difficulty of the task. This study has attempted to grapple with one aspect of the problem; hopefully a vital aspect. That no easy answer arises perhaps could be a catalyst to the extension of that effort.
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