

Empirically Derived Models of Strategic Decision-making Processes

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Summary

This paper reports on an empirical study of strategic decision-making processes and organizational learning in 32 business organizations facing complex environments. The decision processes were found to vary in four prototypical patterns described here as the strategic decision-making models. These models are proposed as an initial step towards the development of a taxonomy of strategic decision processes. The relationships between strategic decision-making models and organizational learning systems that support them are explored. These models may help researchers to conceptualize and practitioners to manage strategy formulation processes in organizations.

INTRODUCTION

The field of strategic management has been characterized by an overarching emphasis on normative models of strategy formulation. Several approaches to the formulation of strategies and the design of strategic planning systems have been suggested in the literature (Ackoff, 1970; Grant and King, 1982; Hofer and Schendel, 1978; Lorange and Vancil, 1977; Lorange, 1980; Mason and Mitroff, 1981). However, normative models have limited applicability and usefulness unless managers are able to select and use models which are suited for their given organizational decision-making process. Hence, we need to supplement these models with further understanding of different strategic decision-making processes.

The analysis of strategic decision-making processes has received relatively limited research attention, and most of it has been in the form of case studies of large resource allocation and policy decisions (Ackerman, 1970; Aharoni, 1966; Allison, 1970; Bower, 1970; Carter, 1971) or less structured research in small firms (Gilmore, 1971). Some researchers have attempted to develop descriptive conceptual models of the strategic decision-making process from studies of multiple decision situations (Fahey, 1981; Mazzolini, 1979; Mintzberg, Raisinghani and Theoret, 1976; Quinn, 1980). Broadly, they have viewed the strategic decision-making process in three steps of problem formulation and objective setting, identification and generation of alternative solutions, and the analysis and choice of a feasible alternative (Cyert and March, 1963; Mintzberg, Raisinghani and Theoret, 1976; Witte, 1972).

Although these steps describe the essential character of many strategic decision processes, they do not distinguish the critical variations in the processes followed by different organizations. These descriptions also do not examine the relationship of strategic decision processes to a critical related process, namely the organizational learning process. Organizational learning here refers to the autonomous capacity of organizations to create, share and use strategic information about themselves and their environments for decision-making (Argyris and Schon, 1978; Duncan and Weiss, 1978). Thus there exists a need to develop a taxonomical scheme for distinguishing different types of strategic decision processes (Galbraith and Schendel, 1983) and for examining how organizational learning supports each of them.

This paper describes a study of strategic decision-making processes in 32 business organizations. The decisions studied involved the development of computer-based information systems through the purchase of sophisticated computer systems. Four distinct patterns of the strategic decision-making processes reflected in the data are presented. In addition, six types of organizational learning systems that supported these decision processes are described. The relationships between the decision processes and learning systems are explored, and their implications for research and practice are discussed.

Strategic decision-making process and organizational learning

It will be useful to begin by clarifying what we mean by strategic decisions. For the purposes of this research, strategic decisions are ones that involve a commitment of large amounts of organizational resources for the fulfilment of organizational goals and purposes through appropriate means (Chandler, 1962). The top management usually plays a central role in making these decisions through its involvement in corporate long-range planning (Hofer and Schendel, 1978; Lorange and Vancil, 1977; King and Cleland, 1978). Strategic decisions have an impact on many aspects and functions of the organization, and influence its direction, administration and structure in fundamental ways (Christensen, *et al.* 1982). These decisions are impinged upon by environmental forces which create uncertainty about strategic issues (Bourgeois, 1980; Channon and Jalland, 1978; Lawrence and Lorsch, 1967; Anderson and Paine, 1975). Strategic decisions deal with novel, ill-structured, complex sets of interdependent problems facing the organization (Bower, 1970; Ackoff, 1970; Mason and Mitroff, 1981; Mintzberg, Raisinighani and Theoret, 1976).

Organization theorists have suggested that organizational decision-making processes are only quasi-rational because of the cognitive limits to information processing by individual managers and because of systemic barriers to learning. The decision-making process, when viewed as a disjointed and incremental response to pressing organizational problems, is moderated by organizational goals, expectations, choices and learning (Cyert and March, 1963). Decision making occurs in sequential phases, at multiple levels of the organizational hierarchy, and through bilateral bargaining among stakeholder groups, in an environment characterized by a high degree of uncertainty and complex goal structures (Bower, 1970; Carter, 1971; Cyert, Simon and Trow, 1956; March and Simon, 1958; Mintzberg, Raisinighani and Theoret, 1976). Decision makers cope with uncertainty by searching for, acquiring and then using relevant information. At the organizational level these activities are institutionalized in organizational learning processes (Hedberg, 1981).

Organizational learning processes shape the organizational knowledge base about action-outcome relationships and the influence of the environment on these relationships (Duncan and Weiss, 1978). To the extent that strategy formulation draws upon this knowledge base, it is influenced by learning processes. Moreover, organizational learning processes also

provide a forum for exchanging strategic information and key assumptions necessary for interpreting this information (Argyris and Schon, 1978; Mason and Mitroff, 1981). Learning processes are institutionalized in the organization in the form of organizational learning systems. These learning systems create, acquire, communicate and interpret knowledge about the organization and its environment. They attempt to objectify the subjective personal knowledge of individual managers into an organizational knowledge base, by providing rules for accepting or rejecting information, legitimizing certain types of information, and providing heuristics to guide the use of information in decision-making (Shrivastava, 1983; Simon, 1979).

Both organizational learning systems and the resulting strategic decision-making processes are influenced by a number of interpersonal and organizational variables. Organizational structures and systems have been found to influence strategic decision-making processes. Vertically-integrated firms have greater centralization of the definition and impetus stages of the decision process (Ackerman, 1970), whereas conglomerate organizations have more centralized processes and use more sophisticated financial planning and control systems than related-product multi-divisional firms (Berg, 1969; Pitts, 1977). Mintzberg, Raisinghani and Theoret (1976) identified the critical role played by decision communications routines and decision control routines in strategic decision processes. These routines are determined by the organization's learning characteristics. Literature in policy sciences has illustrated the importance of people and politics on strategic decision processes in government organizations. The notion of 'disjointed incrementalism' has often been used to characterize these processes. Such public sector analyses are thus viewed as being limited to the evaluation of a few familiar policy alternatives aimed at remedying problems rather than achieving positive goals. The process is characterized by repeated trials and errors, fragmentation and execution by many partisan participants who are the repositories of strategic information (Braybrooke and Lindblom, 1963; Lindblom, 1979). Although limited by available space, we have reviewed the primary literature which serves to anchor the exploratory study of strategic decision processes described below.

METHODOLOGY

The major objectives of this study were (a) to examine strategic decision-making processes and identify the patterns of variation in these processes, and (b) to examine the relationship between the decision processes and organizational learning systems. At a general level, we addressed the following research questions.

How does the process of making a particular strategic decision involving a complex technology vary in different types of business organizations? What are the characteristics of organizational learning systems that support strategic decision-making? More specifically, we were interested in the following issues.

- (1) Who are the key decision makers, analysts and evaluators, and what roles do they play in the decision-making process?
- (2) What evaluation procedures do they adopt in making this decision?
- (3) What impact does the decision environment have on the decision-making process?
- (4) What are the roles of organizational learning systems in this type of strategic decision?

The strategic decisions studied involved the question of whether or not to develop or significantly modify a computer-based information system through the purchase of sophisticated computer systems (hereafter referred to as the 'computerization decision'). This decision typically involved the determination of present and future information needs of the organization, the search for alternative computer systems or data processing arrangements to fulfil the identified information needs, the technical and financial evaluation of the available alternatives and the choice of the most feasible alternative.

This type of decision is strategic because (a) it involves a commitment of a large amount of organizational resources, (b) it is technically complex and requires the diverse skills of technical experts, organizational experts and the top management, (c) it is influenced by a

Table 1. Characteristics of sample organizations

Code	Sales (million Rupees*)	Employ	Main products	Private or public	MNC†
Act	1696	28,060	Cement, Refractories	Private	No
Boot	975	14,000	Shoes	Private	Yes
Batik	100	5000	Shoes	Private	Yes
Bharat	120	1000	Steel	Private	No
Celt	30	2700	Electric equipment	Public	No
Troy	329	6000	Newspaper, Magazines	Private	No
Belle	6300	55,000	Heavy electrical equipment	Public	No
Cicoo	5	500	Financial consultancy, Stockbrokers	Private	No
Chlor	441	2600	Batteries	Private	Yes
Cereal	58		Food products	Private	Yes
Dinah	150	500	Financial services, Banking	Private	Yes
Asia	225	1000	Automotive parts, Tractors	Private	Yes
Scot	1880		Auto tractors, Motorcycles Automotive accessories	Private	No
Pilkin	98	2500	Fibreglass, Special chemicals	Private	Yes
Float	90	800	Pumps, Turbines	Private	No
Nest	460	2000	Foods, Drinks	Private	Yes
Galaxy	824		Pharmaceuticals, Foods	Private	Yes
Grapho	188		Carbon products	Private	No
Hindoo	60	400	Hand tools	Private	No
Smoke	4587	30,000	Tobacco, Marine products, Hotels	Private	Yes
Maderia	1040		Threads, Cloth, Wool	Private	Yes
Elektra	392	5000	Electrical equipment	Public	No
Nodder		2000	Real estate	Public	No
Organic	75	800	Pharmaceuticals	Private	Yes
Oracle	445		Cement, Refractories	Private	No
Simple	228		Cloth mills	Private	No
Seater	120	1200	Travel services	Private	No
Teller	150	500	Instrumentation	Private	Yes
Voltes	2200	15,000	Electrical equipment, Food marketing, Appliances	Private	No
Faust	80		Basic chemicals	Private	No
Zenus	30	1200	Pharmaceuticals	Private	No
Tree	237	3500	Special papers	Private	Yes

* 1 US\$ = 8 Rupees.

† MNC = Multinational corporation.

variety of external environmental agents, e.g. suppliers of computer systems, organized labour unions and rapidly changing technology, and (d) it influences many parts of the organization by restructuring the information flows, decision-making loci, and the informal distribution of power and authority. Such decisions thus satisfied our criteria for strategic decisions in the companies selected for the research.

Sample

The computerization decision was studied in 32 organizations in India which had either initiated or restructured their information systems and data processing function. This sample was selected from a set of 100 organizations taken from the *Dun and Bradstreet International Directory* of firms and it consisted of a group of firms to which the researchers had prior access. Of the 60 organizations that agreed to participate in the study, only 32 were found to have made a strategic computerization decision satisfying the criteria (a)-(d) listed above.

Personal interviews were conducted with 61 managers in these 32 organizations. These respondents were all top management personnel who had directly participated in making the decision. They were identified through prior telephone conversation with the Chief Executive of the company. Characteristics of the sample organizations and subject managers are summarized in Tables 1 and 2, respectively. Besides conducting personal interviews using semi-structured questionnaires, additional data were collected by studying the relevant organizational files, memoranda, computer vendor proposals, MIS/EDP department proposals and reports.

The data analyses involved both qualitative and quantitative methods. The methodological perspective that guided the qualitative analysis was the method of grounded theory and historical analysis (Glaser and Strauss, 1967). Descriptions of the decision-making process provided by subject managers were coded, compared and evaluated in a thematic analysis, to develop a generalized model of the decision process. Through repeated within-case evidence analyses and cross-case evidence comparisons, four dominant patterns of the strategic decision-making process reflected in the data were derived (Keidel, 1981; Narayanan and Fahey, 1982; Van Maanen, 1979; Yin, 1981). In addition, six types of organizational learning systems were identified.

These findings are presented in the form of a general model of strategic decision processes, and the variations in the process are described as the four strategic decision-making models. The quantitative analysis of data was restricted to the examination of the distribution of these models in different types of firms.

Table 2. Characteristics of subject managers

Manager position	Number	Percentage
Chief executives	6	10
Director/Vice presidents	16	26
Head of EDP/MIS department	13	21
Other departmental heads	10	16
Other managers	15	24
Consultants	1	2
Total	61	100*

* Does not add to 100 per cent due to rounding.

The observed characteristics of the strategic decision-making process can be described in terms of two types of organizational activities, the *problem familiarization* activity and the *solution building* activity, portrayed in a flow chart form as Figure 1.

Problem familiarization involved the generation of several separate and competing 'problem-solution sets' (p-s sets), each containing one view of the problem from the perspective of the person who identified the problem and one primary solution to the problem.

During problem familiarization, the important people in the organization were initiated to the existence of the problems and were given an opportunity to contribute to its formulation. This activity continued until certain 'conditions for action' arose. These conditions for action included such things as the emergence of one p-s set as a dominant view of the problem, support for a p-s set from a powerful decision maker, reaching a 'deadline' for action, the precipitation of a crisis due to escalation of one of the identified subproblems, the availability of resources for implementing one of the suggested solutions and occasionally other conditions peculiar to the particular organization. These action conditions precipitated active solution development and constituted mechanisms by which individual problem perceptions coalesced into an organizational problem.

Problem familiarization ended with a broad statement of the problems, and the decision-making focus then shifted to the development of a solution. In most cases the solution

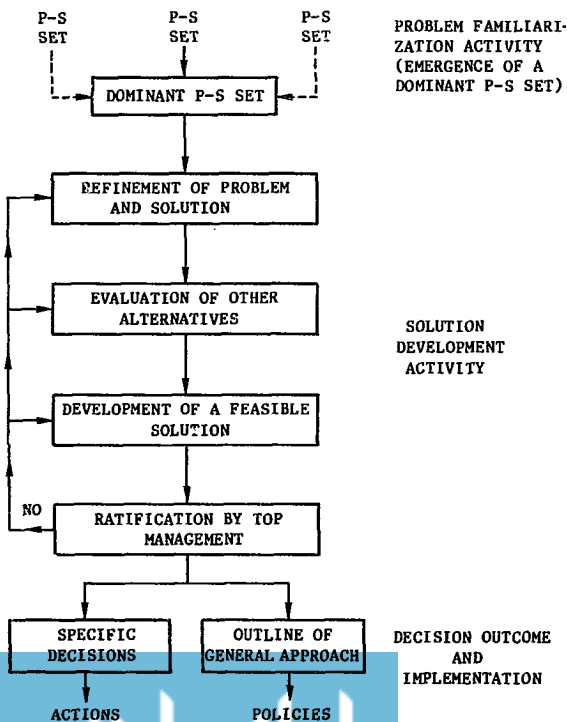


Figure 1. Strategic decision-making process

generation was delegated to a specific group of people, usually comprised of individuals who had initially defined the p-s set, and other technical, financial and organizational experts. Several solution alternatives which were not a part of the original p-s set adopted were now generated and evaluated. The evaluation of alternatives was done through technical, financial and cost-benefit analyses and implementation planning. This process of evaluation screened out some alternatives and left the decision makers with a set of 'almost equally good' alternatives. Choice between these alternatives was made on the basis of political and interpersonal conditions, or organizational constraints on resources (e.g. budgets or technical personnel), or constraints on internal procedures (e.g. budgets, sanctions, plans), or environmental constraints (e.g. available computers).

The solution chosen was ratified by a high level authority, such as the chief executive officer, the board of directors, or a top management committee. This ratification was usually a token gesture for legitimizing the decision. It gave the executives the authority to start implementing the solution by securing the necessary resources. In situations where top management did not sanction the solution, the decision proposal was withdrawn to lower levels for further analysis, review and refinement.

Strategic decision-making models (SDMM)

In making strategic computerization decisions, the individual organizations followed different variations of the general process described above. Four prototypical patterns in which the decision-making process varied in the sample organizations are identified below as 'strategic decision-making models'. These models are:

- (i) Managerial Autocracy Model (MAM)
- (ii) Systemic Bureaucracy Model (SBM)
- (iii) Adaptive Planning Model (APM)
- (iv) Political Expediency Model (PEM).

These models, as summarized in Table 3, vary on a number of important characteristics such as the problem familiarization activity, the solution development activity, the number, level and roles of decision makers, the types of analyses conducted, the role of organizational learning systems and the environmental influences on the decision.

In the *Managerial Autocracy Model* a single key manager was the primary decision making agent. The entire decision process revolved around his preferences and actions. Very few p-s sets were generated because the key manager's problem perceptions were uncritically adopted by other members. A few people (usually subordinates) participated in solution development by providing technical and financial information solicited by the key manager. The main motivation of the decision makers was to improve the organizational efficiency through computerization. They used personal intuitive, judgemental evaluation procedures, and very few management systems to evaluate the alternatives. The choice of final solutions was made by the key manager who also bore full responsibility for its implementation. Organizational learning systems used catered to the needs of the key decision maker. The MAM's characteristics stood in marked contrast to those found in the SBM model.

The *Systemic Bureaucracy Model* refers to situations in which organizational systems and official rules and regulations largely determined the activities, information flows and interactions that constituted the strategic decision-making process. Multiple p-s sets were generated and officially documented during the problem familiarization phase. These were

Table 3. Summary of strategic decision-making models

Models characteristics	Managerial autocracy model (MAM)	Systemic bureaucracy model (SBM)	Adaptive planning model (APM)	Political expediency model (PEM)
Decision-making process	Restricted number of p-s sets generated	Proliferation of p-s sets generated in different parts of the organization		
Problem familiarization	Apparent dominance of one p-s set from the beginning	Procedures for disseminating and communicating p-s sets are well developed	Problem familiarization is almost non-existent The plan is presumed to have incorporated the problem formulation activities	Multiple p-s sets are generated but one set is championed by the vested interest group
Solution development	Limited amount of participation in solution development One key manager develops the solution with aid from his assistants	Solution development procedure is also pre-defined	Solution development revolves around modification of plans to accommodate changed conditions	Solution development is influenced by individuals or vested interests
Decision makers				
Number of people	Usually one	Several groups of people	Single groups of people usually MIS/DP Department	A coalition of individuals or a single individual
Hierarchical levels	Top management	Middle and top management Several department or functional areas are involved	Middle or top management Usually data processing experts are involved	Top management
Decision-making	To improve efficiency	To satisfy procedural rationality	Fulfilment of plans	To satisfy vested interests
Orientation/motivation	Result oriented process	Process is oriented to fulfilling organizational procedures	Implementation is emphasized over decision making	Decision-making process is manipulated to meet desired decisions
Types of analysis	Judgemental or intuitive	Primarily computational Cost-benefit analysis is emphasized	Computational Technical analysis and implementation planning are emphasized	Bargaining and negotiation among members Analysis done depends on what the organization will accept as legitimate
Roles of management and learning systems	Few management systems are used, decision-making is highly personalized	Every activity is guided by some learning system (usually a bureaucratic system)	Many types of formal learning systems are used Strategic planning system, and MIS play a central role	Learning systems are side stepped and personal knowledge of individual members is used extensively
Environmental influences on decision-making	Restricted communication with environmental agencies. Attempt is made to define the problem in terms of variables in control of the management	Environmental influences shape the problem and play an active role in development of the solution	Open negotiations with environmental agencies	Environmental agents may be co-opted to join coalitions

combined to develop a consensual view of the problems facing the organization. Often environmental agents (such as government officials, bankers, computer system vendors, labour union officials) participated in, and provided information necessary for, problem formulation as well as solution development. Solution development was guided by the existing operating procedures, despite the inadequacy of these procedures to provide optimal and innovative solutions. These procedures usually involved technical, financial, and cost-benefit analysis of each alternative, implementation planning and ratification of choice by the top management. The SBM model often occurred in large and old private sector firms in mature or regulated industries, and in state-owned enterprises. Learning systems (usually formal and bureaucratic ones) supported the decision process by providing both technical expertise on computerization and accumulated organizational knowledge about systems development. Less structured than the SBM firms were those which adapted their planning process for making the computerization decision.

Organizations following the *Adaptive Planning Model* used their long range strategic plans as the guide for making the computerization decision. These plans usually suggested a phased development of the MIS function. Problem familiarization and solution development were a part of the planning cycle usually performed by a professional planning staff or data processing/MIS experts. Information needs of the organization were carefully assessed, and thorough analyses of options were developed for the computerization plans. However, these plans were modified to accommodate changed organizational and environmental conditions. Decision-making was supported by well developed organizational learning systems. Organizations in which APM commonly occurred were either divisions of multinational corporations or progressive, large and prosperous local firms.

The fourth strategic decision-making process model was labelled the *Political Expediency Model*. In these situations, groups of decision-makers formed coalitions around the computerization issue. They 'managed' the decision-making process in such a way that their group's interests were protected and maximized. They jointly championed and promoted their group's p-s set as the only legitimate and accurate view of the computerization problem. The solution building activity proceeded at two levels—at one level a small group of insiders made the critical choices, whereas at the surface level these choices were rationalized to the organization through the use of computational analyses, bureaucratic rules, committee decisions and planning. Intergroup and intragroup conflicts were resolved through negotiations among the middle and top level managers who were the primary decision makers. The role of individuals (especially key MIS/EDP personnel) was pivotal in coalition formation and in the development of solutions. These individuals brought their critical expertise, knowledge and experience to bear on the decision. They served an important information input function, while the existing organizational learning systems were circumvented or used in indirect ways. From these descriptions of the four SDMMs, we now move to an examination of the organizations which exhibited these processes.

Characteristics of organizations following different SDMMs

The decision making process followed by each organization was classified into the four models described above. The characteristics shown in Table 3 were used as the dimensions for rater judgement. Two rounds of independent rater judgements were undertaken to classify each organizational situation into an appropriate model. Table 4 summarizes some of the variables that characterize organizations following the different SDMMs. These variables were measured by asking subject managers to score several items pertaining to

Table 4. Descriptive statistics characterizing organizations following different SDMM

Variables	Models			
	MAM	SBM	APM	PEM
Number of decision situations following each model	10	6	12	4
Average number of people involved in the decision process	7.1(A)	6.65(A)	8.8(P)	6.3
Average time taken for decision-making (months)	5.2(S,A,P)	9.0	9.4	10.0
Average payback period in years*	3.5(S,P)	4.2(A)	3.5(P)	4.2
Average data processing experience of organizations (years)	5.5(S,A,P)	13.8(A)	9.3	10.5
Average size of data processing department (number of people)	7.0(S,A,P)	31.1	21.1	19.5
Perceived success of the decision (score†)‡	1.7(A)	1.5	1.3	1.7
Perceived uncertainty§ facing decision makers	2.2(P)	2.4	2.2(P)	2.8

* Payback period was the estimated payback period calculated as a part of the decision evaluation procedures.

† Measured on a 3-point scale with 1 = very successful to 3 = unsuccessful.

‡ Last two items in the table were directly scored by subject managers during the interview.

§ Measured on a 5-point scale with 1 = very low to 5 = very high.

Note: Letters in parentheses indicate that the value is significantly different (at $p=0.15$) from the corresponding value in S = SBM, A = APM, P = PEM columns.

each variable on a verbally anchored scale on the semi-structured questionnaire used for data collection.

It can be seen from Table 4 that the organizations in which these four models occur differ from each other in important respects, although statistical significance on *t*-tests is modest due to the nature of the sample and the limited sample size. The average number of people involved in decision-making varied from six to nine. The time taken to make the decision was least in the MAM situations and greatest in the PEM situations. The average payback period was between 3.5 and 4.2 years, suggesting that all the four models may have similar economic impacts. The perceived decision success scores for SBM and APM organizations are lower, signifying a higher degree of success than MAM and PEM models. However, the payback period for organizations following the PEM is the longest, which is consistent with low success. The SBM organizations also show a long estimated payback period, but this is inconsistent with a high degree of perceived success. This apparent discrepancy could be attributed to the tendency of SBM managers to give 'safe' answers to questions regarding their individual perceptions. The distribution of these models across different types of organizations was examined.

Organizations were classified based (a) on their structural characteristics, as entrepreneurial, functional, divisionalized and conglomerate organizations (Greiner, 1972), and (b) on the locations of their head offices, i.e. as divisions of a multinational corporate or as a wholly Indian firm. The distribution of SDMMs in these types of organizations is shown in Table 5.

Table 5. SDM model frequencies in different types of organizations

Model	Organization					Headquarters and ownership		
	Structure			Conglomerate	Total	Wholly Indian	Multinational	Total
	Entrepreneurial	Functional	Divisional					
MAM	8	2	—	—	10	7	3	10
SBM	—	1	2	3	6	6	—	6
APM	—	6	2	4	12	3	9	12
PEM	—	—	1	3	4	2	2	4
Total	8	9	5	10	32	18	14	32

The clustering of organizations in specific model cells shows some very interesting relationships between organizational structure and decision-making process. The concentration of *all* entrepreneurial organizations in the MAM cells suggests that entrepreneurial firms tend to favour 'single-person' managerial decision processes as epitomized by the MAM. They are unlikely to promote the participative, planned or systematic decision-making processes which characterize the APM and SBM. Functionally organized firms were more prone to follow the APM than either the MAM or SBM. This seems logical because planning is relatively easy and can be made effective at this stage of organizational growth. When the organization structures evolve to divisionalized or conglomerate forms, the problems associated with planning become more acute. Organizations in these stages resort to more structured ways of decision making, as reflected in the SBM and APM. Four out of five divisionally organized companies and seven out of ten conglomerates employed the SBM or APM.

Conglomerate organizations in the sample followed the SBM, APM and PEM models in almost equal proportions. This suggests that in the divisions of conglomerate corporations there is flexibility to follow any particular decision making model (except the MAM) to suit the conditions of the division.

The predominant use of the APM in multinational corporations (9 out of 14) stands out in contrast to indigenous Indian firms who predominantly used the MAM and SBM. Most of the multinational firms interviewed had access to modern management systems, technical expertise, and techniques of planning and control, through their parent or sister companies overseas. This may be one of the reasons why the APM was so popular in divisions of multinational corporations. Since the APM involves decision making through a planned approach, it finds a greater acceptance in organizations where planning systems have been implemented and where there is an organizational tradition which supports the planning activity.

RELATIONSHIP BETWEEN STRATEGIC DECISION-MAKING AND ORGANIZATIONAL LEARNING

Organizational learning systems

Six types of organizational learning systems were found to be supporting strategic decision-making by providing strategic information and a forum for exchange of assumptions. These systems and their conceptual basis have been explored elsewhere (Shrivastava, 1983). They

are briefly summarized in Table 6 in terms of (1) their constitution within the organization, (2) their means of screening, filtering, and disseminating information and (3) the type of knowledge generated in the system.

Each learning system represents a mechanism for managing the process of knowledge sharing within organizations. These systems differ in the degree of formality, explicitness, structuredness, sophistication and importance to decision-making. In order to explore the relationship between strategic decision-making process models and organizational learning systems, the matrix shown in Table 7 was developed. This matrix is based on our

Table 6. Organizational learning systems

Organizational learning system	Descriptions
One person institution	<ul style="list-style-type: none"> (1) Single person who is knowledgeable about all aspects of the business is the key information source (2) (S)he uses personal filters to screen, evaluate and disseminate critical information (3) Knowledge is current, broad, general and subjective, and is communicated through memos or verbal orders
Mythological learning system	<ul style="list-style-type: none"> (1) Informal personal networks of selected groups of organizational members (2) Screening and dissemination of information is guided by the existing organizational norms of knowledge sharing (3) Knowledge is embedded in myths, stories and rumours. It is historical, specific, descriptive, qualitative and focused on persons or events; it is communicated through word of mouth
Information seeking culture	<ul style="list-style-type: none"> (1) Shared values, cognitive frameworks, and cultural norms constitute the learning system (2) Traditions and social values act as filters and determinants of who gets what information (3) Knowledge is in the form of a 'tacit understanding' of things. It is intersubjective, general as well as specific, communicated orally and in organizational policies
Participative learning system	<ul style="list-style-type: none"> (1) Network of organizational working groups, committees or task forces comprise the system (2) Individual members' knowledge and group decision-making norms act as filters for information acquisition, screening and dissemination (3) Knowledge is specific, problem focused, descriptive, current and historical, and is communicated through official memos, group discussions and meetings
Formal management system	<ul style="list-style-type: none"> (1) Divisional and departmental systems and procedures constitute the system (2) Analytical and scientific rules are used for screening and disseminating information (3) Knowledge generated is objective, current and future oriented, problem specific and general. It is communicated through periodic reports and studies
Bureaucratic learning system	<ul style="list-style-type: none"> (1) Elaborate system of operating procedures and regulations regarding the flow of information from the system (2) Organizational policies and impersonal rules determine the format, type, sources and recipients of information (3) Knowledge is objective, historical, decision/task or problem specific, and is communicated through written documents

Table 7. Relationships between strategic decision process models and organizational learning

OL systems	SDM models			Political expediency model
	Managerial autocracy model	Systemic bureaucracy model	Adaptive planning model	
One person institution	Key decision maker's needs are catered to by the learning system Good match; occurs frequently	Learning system (person) clashes with bureaucratic rules and attempts to interpret them favourably Poor match; rarely occurs	'Experts' or 'advisors' provide the information necessary for decision-making Poor match because of individual's cognitive limits to acquiring and providing information	One powerful decision maker controls both the organizational politics and strategic information Good match if key decision maker is also the information broker
Mythological learning system	Learning system mythologizes and builds up the key decision maker into a 'hero' Good match; occurs often	System provides a social network that supplements the official rules Poor match because learning provided by the system cannot be used officially	Information from the system is ignored by decision makers Poor match; the decision process works toward negating the learning system	Interest groups and coalitions use the system to legitimize and communicate their interest Good match because system carries a lot of 'political' information
Information seeking culture	Patriarchal decision makers use the system to disseminate their values and ideas to organization Could be a good match if managed well	Learning system does not support the decision process Poor match; rarely occurs	Learning system supports search for new opportunities and information Good match; provides a professional work environment	Learning system provides resources for the fragmentation of political interests Poor match; rarely occurs
Participative learning system	Learning system may be a facade for building support of organizational members Poor match; key decision maker often overrules system	Learning system is used to share 'unofficial' information Good match in most situations	Learning system is especially useful in planning for complex, technical issues Good match because it allows a wide spectrum of information to be input into the decisions	Learning system provides a forum for negotiation between interest groups Good match in most situations
Formal management system	Key decision makers sometimes use the system to generate scientifically validated information Match may be good but the system is often ignored	Learning system provides objective and scientific information for decision-making Good match, but does not occur frequently	Groups of planning staff use the system for information and analysis Ideal match, usually by design	Interest groups use the system to generate partisan information Poor match because system is not used effectively

(continued)

Table 7. (continued)

OL systems	SDM models			Political expediency model
	Managerial autocracy model	Systemic bureaucracy model	Adaptive planning model	
Bureaucratic learning system	Learning system is used infrequently to provide routine information to key decision maker. Other information is ignored Poor match. Constant pressure by decision maker to change the system	Bureaucratic rules govern both <i>learning and use</i> of information Match is good if the official rules are consistent, which is often true	Learning system often constrains the planning processes Match depends on how supportive bureaucratic rules are of planning activities	Decision-making may circumvent the learning system Impersonal rules are used as a political resource

observations of the roles played by the learning systems in the decision process. Some learning systems are more suited than others for supporting each of the decision-making models. However, very often learning systems are neither initially designed nor continually modified to match strategic decision-making process requirements. Hence, it is possible to find all the six learning systems being used, albeit in different ways, under each of the four decision-making process models. These uses and some of the matches and mismatches between learning systems and decision process are explored in Table 7.

It is clear from Table 7 that there is no 'perfect' organizational learning system. Each system serves different objectives, and may be functional or not, depending on the decision process being followed. Similarly each decision-making process can be served well by more than one type of organizational learning system. The MAM situations are flexible enough to be able to use most of the learning systems (except perhaps the Bureaucratic Learning System). SBM situations, on the other hand, are best served by Bureaucratic Learning Systems and Formal Management Systems. These processes conflict with the One Person Institution, the Mythological Learning System and the Information Seeking Culture. In the APM situation, information needs are most clearly identifiable and are best fulfilled by the Information Seeking Culture, the Participative Learning System, and the Formal Management System.

The 'ideal' matches between decision-making processes and learning systems occur when MAM is supported by the One Person Institution, the SBM is supported by a Bureaucratic Learning System, the APM is supported by the Formal Management System, and the PEM by the Participative Learning System.

IMPLICATIONS FOR RESEARCH AND MANAGEMENT

The four models described here are reasonably consistent with the findings of other researchers (Allison, 1970; Blau and Scott, 1962; Mintzberg, 1973), and are suggested as an initial taxonomical scheme for classifying strategic decision-making processes. Although

this scheme does not describe perfectly exhaustive or mutually exclusive variations in decision processes, it can be used as a basis for developing a more comprehensive scheme. The model descriptions and the set of characteristic variables (Table 3) provided here could also be used as a diagnostic tool for identifying and classifying different types of strategic decision processes in organizations. The development of a comprehensive taxonomical scheme would require additional research in at least two directions.

Further research is needed to refine these models to reduce overlaps among them, and extend them to include other possible variations in strategic decision processes. We also need to examine whether some of these models have a propensity for occurring together. For example, Allison (1970) found political and bureaucratic models to be overlaid on each other. Such combinations or compounding of decision processes are a major source of complexity and ambiguity in strategic decision-making, which need further examination.

Research is also needed on the ways in which strategic decision-making processes affect the choice of organization structures, and the content of organizational strategies. Each of the four decision models requires different kinds of supporting organizational structures. Similarly the choice of strategies (content) may be affected by the decision process. It may be hypothesized that the MAM situation would lead to short-term oriented strategies aimed at exploiting temporary opportunities through the local optimization of resources. The APM model, on the other hand, would lead to the adoption of long-range strategies aimed at exploiting stable opportunities and global (organization wide) optimization of resources.

Although these empirical issues need further investigation, managers may benefit from analyses of this preliminary work. Strategic decision makers can rationalize decision processes in their own organization by reducing the effects of some of the undesirable influences that plague decision-making in each of the four models. For example, one way of improving decision processes in the SBM and APM situations is by encouraging systematic participation by relevant and knowledgeable members. To handle the technical complexity, financial risks, organizational preparation and environmental negotiations inherent in strategic decisions, it is important to use relevant organizational expertise in making such decisions. Since expert personnel are usually located in different departments, divisions or hierarchical levels, they need to be brought together in a systematic and regular fashion. However, participation should be consciously controlled and restricted in the MAM or PEM models to reduce decision-making costs, to reduce time for making the decision, and to restrict the flow of strategic information.

Managers also need to design and develop organizational learning systems that support strategic decision process within their organizations. The quality, quantity and type of information required under each decision-making model is different and can be provided by a variety of learning systems. A systematic approach to the collection, interpretation and consensual validation of strategic information is both possible and desirable.

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