

## **Toward Understanding Strategic Issue Diagnosis**

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### **Summary**

*This paper calls attention to a central but neglected process in strategic decision making, i.e. strategic issue diagnosis (SID). A framework for discussing SID is presented in terms of three critical components: inputs, process characteristics and outputs. The framework is illustrated in the context of PIMS and BCG, two widely recognized strategy models. The major implications highlight the theoretical significance of SID for understanding strategic decision making.*

### **INTRODUCTION**

A large volume of prescriptive and descriptive literature exists on the phases (e.g. Simon, 1965; Witte, 1972; Mintzberg, Raisinghani and Theoret, 1976), organizational processes (e.g. March and Olsen, 1976; Quinn, 1980), socio-political behaviours (e.g. MacMillan, 1978; Guth, 1976) and analytical complexity (e.g. Lorange, 1980; Hofer and Schendel, 1978) involved in strategic decision making. Despite the increasing volume of theory and research on strategy formulation (cf. Butler *et al.* (1980) for a review), one area stands out as particularly fundamental, yet conspicuously neglected, i.e. how decision makers in organizational settings diagnose strategic issues. The purpose of this paper is to delineate the nature of strategic issue diagnosis (SID) in terms of its scope, importance and dominant characteristics and, in so doing, to establish its relevance to popular strategic decision making models.

The first section of the paper defines SID, illustrates its importance in strategic decision making and discusses its treatment in the strategic management literature. Next, a model of SID is presented in terms of three key elements; inputs, process characteristics and outputs. The prevalence, significance and dimensions of SID are then illustrated in the context of two well-known strategic decision making models, PIMS and the Boston Consulting Group's market growth-market share portfolio approach. Finally, a number of implications for strategic decision making theorists and practitioners are noted.

### **SID: ITS MEANING AND IMPORTANCE**

#### **What is SID?**

Strategic decision makers in organizations are continuously bombarded by an array of ambiguous data and vaguely felt stimuli which they must somehow order, explicate and imbue with meaning. SID refers to those activities and processes by which data and stimuli are

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translated into focused issues (i.e. attention organizing acts) and the issues explored (i.e. acts of interpretation).

We chose the term *issue diagnosis* to emphasize that the process is important to developments which have not yet achieved the status of a decision event, i.e. the decision alternatives which may emerge are still in the process of unfolding. Following Ansoff (1980) and King (1980), a strategic issue is defined as an emerging development which in the judgement of some strategic decision makers is likely to have a significant impact on the organization's present or future strategies. As such, the domain subsumed by an issue, especially in its early stages, is likely to be broad, diffuse and ill-specified.

The overriding characteristic of an issue is that the data, stimuli and perceptions of decision makers pertaining to it must be somehow gathered and organized. As such, diagnosis is an attention-organizing process (Simon, 1957). As an attention-organizing process, SID results in decision makers' attention frequently changing direction, focus and intensity. In short, SID is fluid, emergent and dynamic.

*Diagnosis* emphasizes the roles of interpretation and judgement which are an unavoidable part of decision makers' endeavours to comprehend an issue. In other words, data and stimuli must be infused with meaning by decision makers. Given the nature of issue related data and stimuli, participants in SID must resort to drawing inferences and hypotheses rather than cementing conclusions.

### **The importance of SID**

The importance of SID stems from its pervasiveness and centrality in the context of strategic decisions, its impact upon later decision phases and its potential for unfreezing decision makers from their many 'blindnesses'. As noted by Mintzberg, Raisinghani and Theoret (1976:254) 'it is difficult to imagine strategic decision making without some form of diagnosis'. Even where solutions precede problems (March and Olsen, 1976; Hewitt and Hall, 1973) some type of understanding and imposition of meaning upon an issue must occur before the two can be linked.

The dominant characteristics of strategic decisions suggest that SID is not only pervasive but central to strategic decision making. Strategic decisions, when compared with operating decisions, are indeed 'messes' (Ackoff, 1974): they are typically much more complex, novel and open-ended (Mintzberg, Raisinghani and Theoret, 1976) and are characterized by interdependent elements 'that by definition cannot be formulated, let alone solved, independently of one another' (Mitroff and Emshoff, 1979:1). In short, strategic decisions do not come preformulated. Furthermore, the inherent uncertainty of strategic decisions is compounded by organizations' inability to devise simple routines to deal with them (Mintzberg, Raisinghani and Theoret, 1976).

Strategic decisions are organizational phenomena—they require a variety of organizational members for their recognition, formulation, evaluation and implementation: thus organizational resources must be mobilized for their analysis. The complexity and uncertainty of strategic decisions, and the multiplicity of organizational factors influencing the decision process, suggest that there is considerable latitude in understanding a particular issue.

SID critically affects both the process and content of subsequent phases of strategic decision making. SID creates the momentum and direction for these subsequent decision phases by framing an issue in a particular way and thus defining the domain for subsequent strategic decision making activity. As will be discussed later, SID creates a variety of issue-specific outputs such as assumptions, cause-effect understandings, predictive judgements and language and labels for describing an issue. These outputs serve to structure the range of

alternatives considered as well as the criteria applied in their evaluation. For example, depending upon the nature of the outputs which evolve during SID, a drop in sales could be variously interpreted as a market share problem, a sales force management issue, a pricing strategy question or a cost and quality control problem. The selection of any one of these interpretations will necessarily include, as well as rule out, alternatives and criteria for their evaluation. Knowledge of how strategic issues are diagnosed is a necessary prerequisite for understanding strategic decision making.

Finally, SID is important for its potential to free decision makers from their cognitive, informational and ideological limits and constraints. As numerous authors have attested organizations and the decision makers within them frequently exhibit rigid and maladaptive decision making (Smart and Vertinsky, 1977; Janis and Mann, 1977; Staw, Sandelands and Dutton, 1981). These pathological behaviours are due, in part, to the bounding qualities of information, beliefs and values which restrict the potential actions considered by decision makers. SID provides one mechanism to escape this boundedness through its capacity to result in changes in decision processes and outputs.

### *SID in the strategic management literature*

Although the prescriptive and descriptive literature on strategic management and organizational decision making has largely ignored SID (Witte, 1972; Mintzberg, Raisinghani and Theoret, 1976; Nutt, 1979) some evidence of its prevalence, significance and nature is available from conceptual and empirical treatments of the making of strategic decisions, strategic assumption testing and strategic problem formulation. However, these pockets of literature have considered only limited dimensions of SID.

In one of the few studies to investigate diagnosis in the context of strategic decisions, Mintzberg, Raisinghani and Theoret (1976) found that information search, the first step in their diagnosis routine, was present in 18 of the 25 decisions they studied. Evidence of a formal diagnostic process was noted in 14 of the decisions. In other studies of strategic decision processes (Quinn, 1980; Murray, 1978; Fahey, 1981), SID behaviour such as information search, acquisition and appraisal of others' viewpoints, positing and testing cause-effect relations, identifying and assessing various individuals' political interests, etc. were clearly evident, although SID was not the major topic of interest in these studies. In a related area, strategic assumption analysis as developed by Mason and Mitroff (1981) adopts a predominantly analytical approach to diagnosis, but pays relatively little attention to behavioural and political phenomena (Beyer, 1981).

Although strategic problem formulation is the process which comes conceptually closest to SID, it is important to note that SID is much more embracing than the notion of strategic problem formulation as discussed by others (e.g. Sagasti and Mitroff, 1973; Lyles, 1981). SID applies to a broader class of stimuli—opportunities as well as problems; SID pays less attention to initial stimuli and more to how data and stimuli get interpreted and understood; the emphasis is upon extensive interaction among decision makers in addition to the individual level focus adopted by most students of problem formulation; and, a much greater range of outputs are seen as emanating from SID.

The absence of systematic attention to SID in the strategic management literature may be due to several factors. Most models of decision making treat diagnosis as an implicit process, one which occurs but which is difficult to make concrete and isolatable for study. Second, most analytical models of decision making typically take as their starting point a given set of options or alternatives. Diagnosis has not been incorporated into these models owing to their focus upon alternative evaluation and choice. Third, empirical investigation of diagnosis is most

productive in field settings and, as a consequence, places heavy demands on researchers' resources, time and energy. Fourth, the characteristics of strategic issue contexts permit a high degree of variability in comprehension and interpretation and are thus not easily modelled.

In short, SID has not been the focus of extensive conceptual consideration or empirical research. Given this theoretical and empirical vacuum, the next section of the paper develops a model which provides a basis to conceptualize and describe SID.

## SID: INPUTS, PROCESS AND OUTPUTS

Emerging literature in strategic management, cybernetics and organization theory provides some clues as to the nature of SID. Although these three streams of literature are different in focus and content, three themes can be noted. First, the impact of organizational context upon diagnosis is neglected in this literature and thus is poorly understood. Second, diagnosis is much more complex, if not disorderly, than portrayed in most decision making models. Third, the outputs of diagnosis are complex and varied and can potentially influence later phases of decision making such as alternative development, evaluation and choice.

These themes have informed the SID framework presented in Figure 1. The framework portrays the three distinct elements that are important in conceptualizing SID: inputs, process characteristics and outputs. Each of these elements is now discussed.

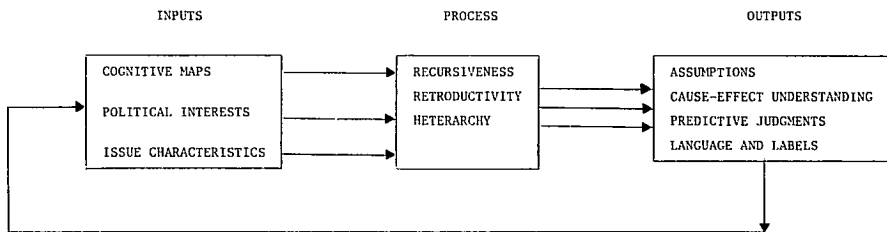


Figure 1. Inputs, process and outputs of strategic issue diagnosis

### Inputs

The task confronting decision makers in SID is to make sense out of the complex situation presented by a strategic issue so that they can begin to formulate alternative courses of action. Strategic issues are rarely initially clear to decision makers. Most strategic issues are triggered by threats and opportunities which originate outside the organization. Thus, decision makers need to seek out and interpret relevant data for understanding an issue (Aguilar, 1967). However, the uncertainty and ambiguity inherent in such data result in a dilemma for decision makers. Strategic issues generate disorderly and conflicting data but without the attendant interpretive schemes to transform them into information (Axelrod, 1976). Therefore, individuals have to use existing interpretive schemes or formulate new ones to transform data into information. Three factors are important in this process: *cognitive maps*, *political interests* of decision makers and *issue specific characteristics*.

### Cognitive maps

Cognitive maps are a representation of concepts and beliefs held by individuals (Axelrod, 1976). They provide the lens through which individuals view the world. At least two elements of

Cognitive maps can be identified: concepts and cause-effect relationships. Concepts represent variables which can take different values. They enable individuals to categorize and aggregate data. Cause-effect relationships link various concepts together and indicate the direction of their linkages.

Cognitive maps are important in the context of SID because of their focusing and organizing impact. The interpretive lens of a cognitive map selects certain aspects of an issue as important, ignores others, and links them to certain actions or consequences. The interpretive role of cognitive maps is evident when various organizational members converge to diagnose a particular issue. Even when provided with identical data, participants will view different issue aspects as important, different factors as controllable and different factors as variable or fixed. These differences arise because of the screening and organizing impact of cognitive maps when they are applied to a specific issue context.

### *Political interests*

Strategic issues are important as a forum in which the concerns of individual participants are expressed, policy precedents are set and organizational resources are allocated. The consequentiality of issue diagnosis awakens the *political interests* of diagnosis participants. As participants become cognizant of these implications, they attempt to influence the process to suit their own needs (Narayanan and Fahey, 1982). These influence attempts are manifest in the distortion and/or selective control of data in order to create a particular focus and direction in the diagnosis. Thus, diagnosis becomes an area where individual self-interests are projected.

Strategic issues activate many pockets of participants within the organization. The multiplicity of individuals involved suggests that SID is likely to be characterized by bargaining and negotiation. These processes occur because individuals with conflicting cognitive maps and political interests vie to determine diagnosis outputs. Thus, SID processes and outputs are influenced by political as well as cognitive factors.

### *Issue characteristics*

A strategic issue represents the domain in which cognitive maps are applied and upon which political interests are focused. The issue can vary along a number of dimensions which affect the information needs and motivation levels of issue participants. For example, strategic issues may vary in the extent to which information is available for understanding the issue as well as in the degree of consistency of that information. Where information availability and consistency are low, the issue context is highly uncertain and ambiguous. The uncertainty of an issue is likely to direct the efforts of participants toward more extensive information search (MacCrimmon and Taylor, 1976) and to restrict the involvement of participants in the resolution process (Nathanson, 1979). Strategic issues also vary in the extent to which there are time pressures associated with resolution. When the pressure to resolve the issue is more intense, participants may be more motivated to act quickly, and information search may be shortened.

The three inputs—cognitive maps, political interests and issue-specific characteristics— influence the form and pattern of SID. Cognitive maps influence individuals' interpretation of the issue diagnosis whereas political interests determine their degree of interest and stakes in the process. The issue context acts as the arena in which individuals' cognitive maps and political interests come to life, serving to motivate participants in different directions. The resulting process of diagnosis is complex. Despite this complexity, certain key characteristics of the process can be isolated.

## Process characteristics

The few conceptual and empirical treatments of diagnosis to date have failed to provide an adequate description of how organizational actors, individually or collectively, diagnose an issue. Mintzberg, Raisinghani and Theoret (1976) and Quinn (1980), although acknowledging the importance of diagnosis, do not provide a characterization of how diagnosis unfolds over time at the individual and collective levels. The dynamic nature of the SID process can be captured by three process characteristics: *recursiveness*, *retroductivity* and *heterarchy*. The first two characteristics describe the process as it occurs at the level of the individual. The third describes the process at the collective level where various individuals interact with each other.

### *Recursiveness*

As the data set involved in SID unfolds over time, decision makers form a sequence of impressions and interpretations. Earlier interpretations and judgements are superseded by newer ones as different data emerge, old data are reinterpreted and former judgements are revised. New interpretations, in turn, alter perceptions about the issue, raising new questions and triggering the search for new data. The process of SID is thus marked by the successive revisions of judgements on the part of the individuals involved.

These revisions in judgements are likely to be intermittently divergent (i.e. they may move further apart from each other) and convergent (i.e. they move closer to each other). The successive revisions of judgement which occur at the individual level will be called recursiveness. Recursiveness is illustrated by the tendency for the same issue to be defined and redefined several times throughout the course of SID. For example, an issue which begins as a major market share problem may be defined as a technological opportunity and later redefined as a market penetration problem. Such revisions in definition and interpretation reflect the fluidity of participants and available data during SID. The influx of data and participants stimulates the revision of judgements reinforcing the recursive character of the process.

The recursive character of SID has two important implications for data interpretation. First, the process of data interpretation is not as systematic, sequential and unidirectional as might be inferred from purely rational, analytical descriptions of decision making, whether at the individual or collective level. Data search does not unambiguously precede evaluation or interpretation; interpretations influence further search activities. In short, interpretation and search are interactive. This relationship is consistent with the findings of Mintzberg, Raisinghani and Theoret (1976); Quinn (1980) and Cyert and March (1963). Second, the temporal ordering of data in the SID process assumes significance as the relative importance attached to data is affected by the sequence in which it is encountered by issue participants. Data which emerge early in the issue comprehension process can bias individuals in their perception of the issue (e.g. reinforce their cognitive maps) and influence the direction of their search processes. For example, if on the basis of initial data participants overestimate the extent to which a competitor is augmenting its R and D budget, the result may be an extensive appraisal and revision of the firm's own R and D strategy. As a consequence, participants may underemphasize later data indicating that the competitor is committed to a redirection of its marketing strategy.

### *Retroductivity*

The process of issue comprehension involves the focusing and filtering of data, organizing them into concepts meaningful to the individuals involved, and ordering these concepts into cause-effect relations. The process is characterized by both deductive *and* inductive modes of

thinking (1981), the coexistence and interplay of these two modes will be termed retroductivity.

A deductive mode of thinking begins with a set of explicit assumptions from which conclusions flow as logical extensions. For example, if one assumes that competitors are committed to continuance of their current strategies and that other environmental changes are unlikely, a logical deduction may be that the firm's current performance may be maintained by a continuation of its strategy. What frequently goes unnoticed is that the choice of assumptions in deduction is always to some extent arbitrary and that the realism of assumptions cannot be resolved within a deductive frame of thinking. In other words, individuals rarely know for certain that their assumptions accord with reality and this relationship cannot be tested within a deductive frame of thinking alone.

These tendencies can be illustrated with a familiar example. If one views the recent large losses suffered by U.S. automobile manufacturers as a consequence of fundamental and enduring changes in the structure of the industry, one would predict a continuance of their poor performance. However, if these losses are seen as a result of poor management decisions and a temporary down-turn in the economy, one would predict an up-turn in their performance at some future date. Thus, the deductive element in SID translates an individual's initial assumptions into specific judgements or predictions about an issue. However, the appropriateness of the assumptions is an empirical question which lies outside the bounds of deduction.

The deductive mode of reasoning has traditionally been highlighted in treatments of organizational decision making, and it has enjoyed the stamp of scientific approval. However, the characteristics of strategic issues previously noted leave individuals with little option but to invoke inductive modes of thinking. The conflicting, ambiguous and incomplete nature of a strategic issue forces individuals to draw conclusions and inferences from disparate and diffuse data. Furthermore, the assumptions which individuals rely upon are themselves built inductively through past experience and learning (Churchman, 1971). Such assumptions are critical in the inductive process as they enable individuals to fill in gaps in the existing data and to draw inferences beyond the existing evidence.

The inductive character of SID is further illustrated by the processes by which decision makers identify concepts and cause-effect relations which are used in this decision activity. First, ordering of experience and data into concepts in SID is quasi-inductive. A typical description of market share, for example, implies a definition of a market. Most writers recognize the problem of definition of market boundaries (cf. Porter, 1980) but very few guidelines exist for decision makers to use. Thus, the definition of market at the diagnosis stage necessitates the exercise of judgement. Second, deriving cause-effect relationships from conceptual categories is rarely, if ever, completely justified by the available evidence. Discovery of linkages and patterns calls for or requires reasoning by analogy. As Axelrod (1976) points out, the process resembles closest point approximation: individuals are often forced to reach cause-effect relationships by approximating the data to the closest similar situation they have experienced.

Two implications of retroductivity warrant attention. First, the interaction of induction and deduction highlights the role that cognitive maps play in determining diagnosis outputs. Variations in interpretations of issue-related data among individuals are brought about, in part, by differences in their cognitive maps, not solely by differences in data available to them or by failures in being logically consistent, though this often happens. Second, it is impossible to predict diagnosis outputs from cognitive maps or data alone: the persistent interplay of deduction and induction indicate that both are necessary.

## *Heterarchy*

For a variety of reasons, strategic issues in organizations are rarely, if ever, diagnosed by a single individual. First, as different individuals have access to various data and interpret the data differently, each possesses only a part of the 'jigsaw puzzle' (Quinn, 1980). Second, interdependencies among organizational subunits mean that the implications of how issues are resolved are not likely to remain localized. Third, the potential to affect resource allocation results in issues activating organizational members' political interests. Individuals, therefore, must interact to acquire data, test their validity, determine the interests and preferences of others, and assess the issue's significance to themselves. In short, SID outputs emerge from the interaction of multiple organizational actors with differing cognitive maps, political interests and issue related data.

At the analytical level, this process of interaction results in successive revisions of judgement by the various participants. Armed with supporting data, participants attempt to influence each other by promoting and defending their own interpretations, positions and interests. The focus of this interaction centres upon the appropriateness of specific concepts, the advocacy and rejection of cause-effect relations and the merit or demerit of data. Each of these foci may trigger the search for new data, reinterpretation of existing data, recognition of new facets of the issue, and awaken or sharpen individuals' political interests. Revisions in judgement have been characterized as recursive at the individual level. At the collective level the process is analogous to an array of recursive procedures cyclically calling on each other, yet rarely having a single highest level. Following cyberneticians, this cycling back and forth between individuals during SID will be termed heterarchy (Hofstadter, 1979).

Characterization of SID as heterarchic thus captures the collision which occurs among assumptions, interpretations and judgements posited by individuals. This is reminiscent of scientific communities (cf. Betz, 1971). SID is, however, not isomorphic to the popular<sup>1</sup> conception of the scientific process as it is time-bounded and involves individuals who are spurred by political interests and not circumscribed in their conclusions by norms of objectivity. This suggests that 'guarantors' (Churchman, 1971) typical of scientific communities such as logical consistency (Popper, 1959), correlation with experience (Capra, 1980) or even consensus are inadequate in and of themselves to explain when termination of the SID process is likely to occur.

Temporal boundaries surrounding SID, fluidity of participants and the distribution of power among individuals are possible mechanisms which contribute to termination of the SID process. First, time pressures internally imposed (e.g. planning cycles) or externally generated (e.g. moves of competitors) are pervasive forces on organizational processes. When time is of the essence, individuals may abandon the task of comprehension in favour of action (Connolly, 1980) or may compromise their positions as long as diagnosis outputs reach some minimal levels of acceptability (Carter, 1971). Second, there is variation in the degree of participation among individuals activated during SID. The flow of individuals in and out of the issue arena suggests that certain data, cause-effect relations and political interests may be under-represented, fade in importance or may be totally ignored as the flow changes. For example, the exit of an issue advocate may provide a quick termination to the issue. Third, in most organizations some individuals are more influential than others. Differences in political interests suggest that individuals are likely to bring power and influence resources to bear on the process to skew the outputs of diagnosis in their preferred direction.

A number of implications flow from this characterization of SID. First, heterarchy

<sup>1</sup> We use the term 'popular' in order to distinguish it from alternative conceptions presented by Mitroff (1974) and Kuhn (1962).



highlights the analytical indeterminacy inherent in the process, as SID is not driven solely by data or logic, but is susceptible to the actions of individual participants. The process bears resemblance to game theoretic situations, involving a set of actors (players) with political interests (utilities) playing to get their interpretations (outcomes) accepted. This analogy suggests that individuals can influence the outputs of diagnosis even in the presence of restrictive organizational routines (Cyert and March, 1963), programmes (Huber, 1980) and procedures (cf. Satterthwaite, 1975). Second, termination of SID may trigger a certain degree of co-operation, but does not imply consensus among participants. Disagreements around various facets of the issue are likely to persist which may influence the later phases of the decision process.

## Outputs

The processes involved in diagnosis are not ends in themselves; they result in specifiable outputs. At least four types of *issue-specific* outputs can be identified. Three of these outputs are content-related: (1) assumptions; (2) cause-effect understandings; (3) predictive judgements. The final output is symbolic in nature: language and labels. These outputs occur at both the individual and collective levels. At the individual level, each participant in SID produces some type of understanding of an issue which is reflected in these outputs. At the same time, these outputs are the end products of a social process—the interaction of decision participants—and thus can be viewed as collective level phenomena.

### Assumptions

It was noted in the discussion of retroductivity that individuals, implicitly or explicitly, make assumptions when interpreting data and developing linkages (e.g. cause-effect relations) among data, events, etc. Assumptions become necessary owing to data insufficiency and ambiguity and the absence of interpretive schemes.

Following Mitroff and Emshoff (1979), assumptions may be defined as premises, conditions, events or attributes that are or must be taken as 'given' or true by any individual or group in exploring an issue. Thus, assumptions are those data points, facts or beliefs which in the view of individuals represent elements of the world around them. The more complex and uncertain a strategic issue, the greater the number and variety of assumptions which must be made.

Not all SID participants need hold the same set of assumptions to be considered SID outputs. Thus, assumptions need not receive an organizational stamp of approval or be the result of intense or systematic analyses to be accepted or legitimized by some segment of issue participants: assumption adoption may be as much an implicit as an explicit process. Assumptions are likely to be most readily accepted when they coincide with or reinforce individuals' *a priori* cognitive maps and political interests.

Three implications of assumptions as SID outputs are especially important. First, since issues are laden with ambiguity and information insufficiency, assumptions act as uncertainty absorption mechanisms, a major purpose of analytical aids and tools in strategic decision making is to surface and explore assumptions, assess their arbitrariness and identify their consequences (cf. Mason and Mitroff, 1981). Third, assumptions not only influence how issues are perceived and understood but they also affect the range of alternatives considered and developed through their impact on information collection and interpretation.

### Cause-effect understandings

In the course of issue resolution, individuals generate understandings that relate various events or concepts together in a causal manner. These beliefs are like the causal links which comprise

cognitive maps except that they are specific to a particular issue. Thus, cause-effect understandings represent relational statements which allow diagnosis participants to impose a logic for understanding an issue as well as a logic for resolving it if necessary. For example, understandings about the causes of a particular performance drop may help to interpret the urgency of the decline as well as assist in the generation of alternatives for alleviating it. This is one means by which cause-effect understandings affect subsequent decision phases.

Like assumptions, cause-effect understandings are critical outputs of SID, as they frame an issue in a particular way thus affecting subsequent interpretations and actions. For example, different interpretations of the cause-effect relations which underlie the decline in profits for automobile manufacturers imply different types of corrective action. If one adopts various views about the cause of the problem, e.g. excessive regulatory pressures, high labour costs, high cost of capital or technological inferiority, each alternative implies that a different type of corrective action is appropriate.

### *Predictive judgements*

Assumptions and cause-effect understandings, tacitly accepted or consciously explicated, are crystallized in the form of predictive judgements. In contrast to cause-effect understandings, these judgements involve assessments about future events surrounding an issue. Predictive judgements usually involve the specification of various events which are issue related, e.g. the timing of events, their magnitude, implications of the issue.

To return to the example of the automobile industry, under the premise that a structural change occurred in the industry, one individual may predict the continued decline in profits of an automaker, whereas another, working from the premise of a temporary down-turn in the economy, may predict just the opposite. Even when premises are shared, there is likely to be variation in the predictions made by different individuals.

The occurrence of divergent predictive judgements may account, in part, for the heterarchic character of the diagnosis process. Heterarchy reflects the dynamic sorting process which takes place when certain judgements are retained as legitimate and others are excluded from further consideration.

### *Language and labels*

Although assumptions, cause-effect understandings and predictive judgements have received some attention in the strategic decision making literature, the implications of the language and labels employed to express understandings of decision situations have been markedly neglected. At one level, language and labels reflect the understanding of a strategic issue from the perspective of the participants in SID. At another level, these labels serve to communicate understandings to the rest of the organization. The impact of these labels upon understanding and communication in SID implies that they have action consequences: labels mobilize action in a particular direction. Pfeffer (1981) cites a telling example of the action effects of labelling. He describes the 'Windfall Profits Tax' as a deliberate linguistic manipulation which has served to rally support for its passage.

In the context of strategic issues, this same effect is demonstrated by considering the action consequences of labelling an issue as a 'problem' as opposed to an 'opportunity'. First, the problem-opportunity label may influence who gets involved in an issue's resolution. Where potential issue participants believe they have much to gain from an association with an issue, they are likely to increase efforts to become involved. These efforts are likely to be more pronounced when an issue is labelled an opportunity as opposed to a problem. Problem situations are associated with blame-laying and pressures for justification (Staw, 1980) which

could tarnish the reputations of those associated with an issue. At the same time, these labels may intensify or diminish the level of commitment of issue participants.

Second, the labelling of an issue as a problem or opportunity may serve to encourage or discourage the exploration of issue parameters. For example, King (1980) has noted that when decision makers are dealing with a 'problem' they tend to stay within the defined parameters of the issue (convergent thinking). In contrast, where an issue is treated as an opportunity, more divergent thinking takes place as participants readily explore options outside the parameters of the issue.

Finally, issue labels and language may affect the level of risk-taking. Researchers have found that risk-taking preferences can be substantially altered by changing the framing of a particular problem as a gain or a loss (Tversky and Kahneman, 1981). One might expect the labelling of a strategic issue as a problem or an opportunity to have similar action consequences. In sum, the labelling of a strategic issue is likely to affect subsequent considerations of the issue through its effect upon action outcomes such as involvement, commitment, divergent or convergent thinking and risk-taking behaviour.

### *Consequences of outputs*

The outputs of diagnosis discussed earlier have two classes of consequences. First, the outputs affect ensuing phases in strategic decision making. Second, the outputs may also have significance for other strategic issues through their potential impact on the cognitive maps and political interests of issue participants.

The issue-specific outputs of SID have a potentially significant impact upon ensuing phases in strategic decision making: the outputs of SID serve as inputs to later phases. For example, SID outputs have a pronounced impact on the alternative development phase. Changes in cause-effect understandings, assumptions or language and labels affect the probability of inclusion (or exclusion) of options for resolving the issue. In this way, SID represents the first iteration of the sorting process where the universe of alternatives and criteria for their evaluation is moulded and limited.

All three issue-specific outputs of SID may bring about changes in the cognitive maps and political interests of issue participants. Cause-effect understandings developed for a particular issue may become crystallized in the form of cognitive maps of participants. Similarly, language and labels may become part of the folklore of the organization. Political interests and alignments touched off during diagnosis serve as catalysts for further political activity. Through the impact of SID on the political interests and cognitive maps of issue participants the effect of a diagnosis is often felt beyond the domain of a specific issue.

## STRATEGY MODELS AND SID

The intent of this section is to illustrate the SID elements in the context of two well-known approaches to strategic decision making, the PIMS (Profit Impact of Market Strategies) project and the Boston Consulting Group's (BCG) market share-market growth model. As aids to strategic decision making, these models can be viewed in two ways: as techniques to arrive at decisions and as methods to trigger and better understand decision contexts. It is primarily within the latter perspective that the models can be considered as diagnostic tools.

These two models were chosen because of the wide prominence they have received both in the academic strategic management literature (Steiner and Miner, 1977; Lorange, 1980; King and Cleland, 1978) and business circles (*Fortune*, 1979). The PIMS project contains data on about

2000 'businesses' supplied by over 500 corporations, and its findings are widely published and frequently referenced (Buzzell and Wiersema, 1981; Buzzell, Gale and Sultan, 1975). BCG's portfolio matrices and their attendant language—cash cows, dogs, stars, problem children—are now part of the standard language of the strategic management field.

These strategy models can be used to investigate a select set of strategic *issues* such as product–market choices, preferred competitive weapons and competitors' likely strategies. They provide a framework or structure within which to explore strategic decision contexts or issues; they are mechanisms which can be used by decision makers to sift through, simplify and synthesize (i.e. diagnose) a large body of data pertaining to firms' products, markets, strategies and goals and those of its competitors. In short, they are diagnostic tools. However, despite frequent reference to their diagnostic uses and purposes (Anderson and Paine, 1975; Abell and Hammond, 1979), the utility of these models for issue diagnosis has not received serious attention in the strategic management literature. Thus, these models are discussed here in the context of the SID framework presented above.

### Inputs

Use of the models is dependent upon the collection, ordering and interpretation of data by model users. Because individuals play this critical role in data collection and organization, their *a priori* understandings, i.e. their cognitive maps, influence what data they see as relevant to the issue (e.g. in BCG, which competitors merit close scrutiny) and what cause–effect relationships they are likely to explore (e.g. in PIMS, whether increases in market share always lead to gains in profitability). Individuals' political interests become charged as they recognize how the use of the models may be turned to their own advantage or may adversely affect their own interests. Individuals may use the models to impress others, defend their own 'position', question the arguments of others or support their own arguments. For example, division managers may use BCG concepts to portray themselves as 'stars'. In summary, the inputs to these models are not only the data used, but also the cognitive maps and political interests which users bring to bear upon the models.

### Process characteristics

How these models are used reveals the process characteristics described previously: successive revisions of judgements (recursiveness); inductive and deductive modes of reasoning (retroductivity); and involvement of individuals at multiple levels (heterarchy).

Recursiveness arises through the sequencing of analytical routines or steps in each model. The 'PAR', 'strategy' and 'optimum strategy' reports represent successive refinements in the PIMS analysis. These reports provide the focus for more specific analysis of relationships in the PIMS data. In the BCG approach, a variety of charts or displays are developed for analysis. Each step in this analysis may provide new insights or raise 'what if' questions; both may lead to revisions of individuals' judgements.

Analytically, the models require that individuals invoke both inductive and deductive modes of reasoning. In the use of these models, several key tasks require an inductive frame of mind. These tasks include: (1) delineating central constructs such as 'product–market' and 'business' definition; (2) choosing relationships among constructs for investigation; (3) incorporating non-model data such as regulatory trends which are absent from the PIMS data base; and (4) translating general model conclusions into specific action programmes (e.g. a desired product portfolio needs to be transformed into action plans to achieve it). The models do not provide clear guidelines on how these tasks can be performed. Consequently, individuals are forced to draw upon their own knowledge, intuition and background to complete these tasks.

The use of deduction in these models has attracted considerable attention. Within the PIMS model, strategy implications are derived from the 'PAR', 'strategy' and 'optimum strategy' reports which relate critical strategic variables. Within the BCG framework, significant movement within the basic grid signals specific strategy implications, e.g. a decrease in market growth in the 'cash cow' quadrant suggests a 'milking' strategy. It is the interplay of the insights, experience and judgements of individuals and deduced implications which leads to model outputs.

Heterarchy is evident in the use of these models, as multiple individuals are involved in the sequencing of analytical routines, and the cycling and questioning of data, interpretations and constructs. For instance, the multiple interpretations which may be accorded individual and successive PIMS reports and BCG displays may result in prolonged and intense interaction among the models' users. The interpretations are fuelled by the differing political interests and cognitive maps which exist at different management levels and functions. Heterarchy in the use of these models implies that the models do not contain within them any 'guarantors' for the resolution of issue specific conflicts which surface among individuals.

## Outputs

The use of the models results in the types of outputs previously discussed—assumptions, cause-effect understandings, predictive judgements and language and labels. First, a number of assumptions underly the content of each model. For example, users of PIMS make several critical assumptions: (1) that all profitable 'businesses' share some general characteristics which can be empirically identified; (2) that historical relationships are likely to hold in the future; and (3) that complex rather than simplistic models are more likely to lead to 'correct' strategy determination. These assumptions in PIMS are largely implicit, although many researchers have argued the need to explicate and test these assumptions (cf. Anderson and Paine, 1978, p. 609). In contrast, the BCG model has evolved from more explicit assumptions: costs are presumed to be a function of cumulative outputs (i.e. experience effects) and cash flow is presumed to be a function of relative market share and industry growth rate, etc. (Allan, 1975). Although each of these assumptions within PIMS and BCG may be viewed as prerequisites to model use, they become SID outputs if they are accepted, implicitly or explicitly, by the models' users as a reflection of reality.

Second, individuals who use the models typically imbue relationships among variables with cause-effect understandings. The models serve as the means by which individuals posit and test the plausibility of cause-effect relationships among a specified set of variables. This process is easier in the case of PIMS because cause-effect relationships can be inferred from the correlations between variables and the regression equations which predict performance. Although explicit cause-effect relationships are less tractable in BCG, portfolio charts and other displays may be modified to explore such relationships. Reference to cause-effect understandings is intended to emphasize that these relationships are the output of individuals' deductive and/or inductive reasoning and not necessarily reflective of absolute causal reality.

Third, assumptions and cause-effect understandings form the basis for predictive judgements. Within PIMS, predictive judgements might include estimates of the likely effects of changes in such variables such as marketing expenditures, R and D expenses and investment intensity on performance in ROI, cash flow or market share. Predictive judgements in BCG could take the form of cash flow projections based upon the current or some desired portfolio. Predictive judgements are important as they serve to facilitate or constrain action alternatives.

A fourth output of the models is the language and labels relevant to the comprehension of strategic issues. Attention to linguistic considerations is evident in such terms as 'PAR values'

and 'optimum strategy' in PIMS and categories such as 'stars', 'dogs', 'problem children' and 'cash cows' developed by BCG. Such language and labels facilitate the communication of a gestalt of meanings developed during SID from a morass of conflicting and ambiguous data: the symbolism invoked by this language and labels has consequences which extend beyond the communication of substantive content. For example, above-average PAR values in PIMS may be interpreted as evidence for superior management capability and may hinder exploration of organizational and management weaknesses. Similarly, in BCG, labelling a division or product group as a prospective 'star' may implicitly establish a standard by which managers may be evaluated.

In summary, attention to inputs, process characteristics and outputs in the use of the models in diagnosis extends the understanding of these models beyond their typical analytical treatments. Not only the models, but also the interaction of the model and users, assume central importance in describing how strategic issues are diagnosed in organizations. Such interaction may induce individuals to rethink widely-held assumptions and cause-effect understandings. Strategy models assume significance as diagnostic tools if they are viewed as mechanisms to trigger fresh strategic thinking.

## IMPLICATIONS

In this paper, we have argued that diagnosis is a crucial phase in strategic decision making—a position that has other adherents (Mintzberg, Raisinghani and Theoret, 1976; Witte, 1972). How issues are diagnosed determines in large part, however implicitly, the subsequent course of action in decision making. Specifically, outputs of diagnosis constrain the domain of strategic alternatives, serve to facilitate or mobilize behavioural and political forces toward action and have potential impact on the course of future diagnoses. The major implication of these observations for theorists and practitioners is that a full appreciation of SID is required if we are to develop a valid understanding of strategic decision making.

The input-process-output model of SID provides a convenient framework to recapitulate and emphasize some implications. On the input side, we have noted the impact of enduring cognitive maps and political interests of participants, in addition to issue related characteristics on the process and outputs of diagnosis. The critical inputs serve to influence the involvement and motivation of SID participants and their interpretations of issue related data. Therefore, any attempt to explain why an organization has made a particular diagnosis or why certain diagnosis outputs exist is incomplete unless it addresses these individual level forces in addition to issue-specific factors.

The SID model suggests that issue diagnosis involves complex processes. The model visualizes these processes as emergent, dynamic and fluid at both the individual and collective levels. The incessant interplay between these two levels is captured by the characterization of SID as recursive, retroductive and heterarchic. This, in turn, implies that there is a high degree of indeterminacy and non-linearity inherent in SID. Such a view contrasts sharply with the one frequently found in the normative literature on strategic management (e.g. Glueck, 1980). We suspect that despite their normative value these latter models—which are predominantly linear descriptions of decision making—misconstrue conceptual clarity for a complex reality.

Our description of the outputs of SID highlights two implications. First, diagnosis outputs need to be characterized not only by their substantive elements (assumptions, cause-effect understanding, predictive judgements) but also by their symbolic elements (language and labels). Second, these outputs constrain or facilitate ensuing phases of decision making such as

alternative generation, evaluation, choice and implementation. Although the relevance of diagnosis outputs for later decision phases has received general recognition (e.g. Mintzberg, Raisinghani and Theoret, 1976), the absence of a clear depiction of output elements has hindered systematic exploration of the impact of diagnosis on these later decision phases.

Some implications from a pragmatic point of view may also be suggested. Issue diagnosis needs to be carefully managed. If an organization is to escape the boundedness of decision making that typically leads to pathological behaviours the inputs, process and outputs of diagnosis need to be continually monitored and assessed. Hunsicker (1980) underscores this point when he argues that top management occasionally needs to step back, appraise and possibly redesign the diagnosis *process*, rather than attempt to merely refine decision alternatives.

We have illustrated these pragmatic implications in the discussion of the strategy models as diagnosis tools. The models can be used to induce fresh strategic thinking or broaden the scope of strategic diagnosis. Assumptions can be surfaced and possibly tested, cause-effect understandings can be sharpened, predictive judgements can be refined and language and labels can be explored for their representation of reality. The models, thus, can be employed as one mechanism to manage diagnosis processes. This view—using the models as a means to manage diagnosis processes—is in sharp contrast to the current perspective which depicts these models as primarily instruments for alternative generation and choice.

Finally, the process characteristics and input/output elements discussed in the SID model point to a view of diagnosis as patterned complexity which can be subjected to systematic scrutiny provided one adopts a *wider-than-decision focus*. Typically, strategic decisions have been defined by the action outcomes that mark the end of the choice process. In contrast, strategic issues are defined by the stimuli which trigger the process of data structuring and comprehension. By its focus on the beginning (stimuli and data) rather than the end (action outcomes) of strategic decisions, SID requires researchers to explore how and why certain stimuli and data are searched out and selected, how they are synthesized into concepts and cause-effect understandings, and how they influence the domain of future courses of action (or inaction). This mandate, in turn, necessitates focusing upon the context under which SID participants are operating. By using a wider-than-decision lens for comprehending SID, the constrictive and action-biased decision focus is avoided and the emergent nature of SID can be appreciated.

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