

Understanding Managers' Strategic Decision-Making Process

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Abstract

This goal of this paper is to establish a research agenda that will lead to a stream of research that closes the gap between actual and normative strategic managerial decision making. We start by distinguishing strategic managerial decision making (choices) from other choices. Next, we propose a conceptual model of how managers make strategic decisions that is consistent with the observed gap between actual and normative decision making. This framework suggests a series of interesting issues, both descriptive and prescriptive in nature, about the strategic decision-making process that define our proposed research agenda.

Is it possible for managers within organizations to have widely varying, and incorrect, beliefs about market facts? Is it possible that consumers' utility for a product and managers' perceptions (of consumer perceptions) of quality for that product are inversely related? Is it possible that managers react to competitors without considering customer behavior implications or competitors' subsequent reactions? Is it possible that increasing the frequency or quantity of available information to managers about customer response leads to increasingly bad decisions? According to empirical evidence, the answer to all these questions, at least in some instances, is yes.² It is these findings, along with other similarly puzzling examples of managerial behavior, that lead us to believe there is great value in better understanding managers' strategic decision making process.

The goal of this paper is to establish a research agenda that will ultimately lead to a stream of research that closes the gap between actual and normative managerial behavior. The core of this paper is a conceptual model of how managers

make strategic decisions that is consistent with the patterns of managerial decisions mentioned above. This framework suggests a series of interesting issues, both descriptive and prescriptive in nature, about the strategic decision making process that define our proposed research agenda.

1. What is strategic?

Our interest centers on the process of strategic managerial decision making. This process is distinct from the often studied consumer choice problem (e.g., selecting a particular brand of toothpaste) or a mundane managerial decision (e.g., where to hold the company picnic). Strategic managerial decisions are typically "messier," i.e., they occur in a more complex environment, are difficult or expensive to reverse, and the outcomes are, to a greater degree, contingent on other individuals' or organizations' behavior. Moreover, strategic decisions often substantially alter (and irrevocably so in the short run) the relationship between the manager's organization and that organization's customers or competitors.

One characteristic of a strategic managerial decision that differentiates it from other types of decision making is the particular setting or context. Figure 1 represents an abstraction of this context, in the form of the 3 Cs model. Managers make strategic decisions within an organizational context, i.e., the company, and these decisions affect a number of other players. Moreover, the reaction of these other players normally affects the final decision outcome. These other players include customers (with a further complicating factor that the company's customer is often a channel intermediary that resells to an end customer) and competitors (with a complicating distinction between current and potential competitors), as well as broader publics such as society, regulators, and investors (i.e., the "world"). Thus, the viability of managers' strategic decisions depends in large part on managers' knowledge about the current status and probable reactions of their company, competitors, customers, and broader publics.

2. Overall conceptual framework

Figure 2 provides our conceptualization of how a manager makes decisions within this strategic context. One should view the model in Figure 2 as completely nested within Figure 1. The key features of our model are (1) the decision trigger mechanism, (2) the manager's overall mental market model, which includes decision rules and mental models of market and context response, (3) the decision, (4) the actual market response function, (5) the recognition that context (i.e., the elements delineated in Figure 1) is pervasive in the decision-making process and can interact with any of the elements of Figure 2, and (6) that learning occurs from outcomes of the decision process. We briefly discuss these components to provide an overview of the model.

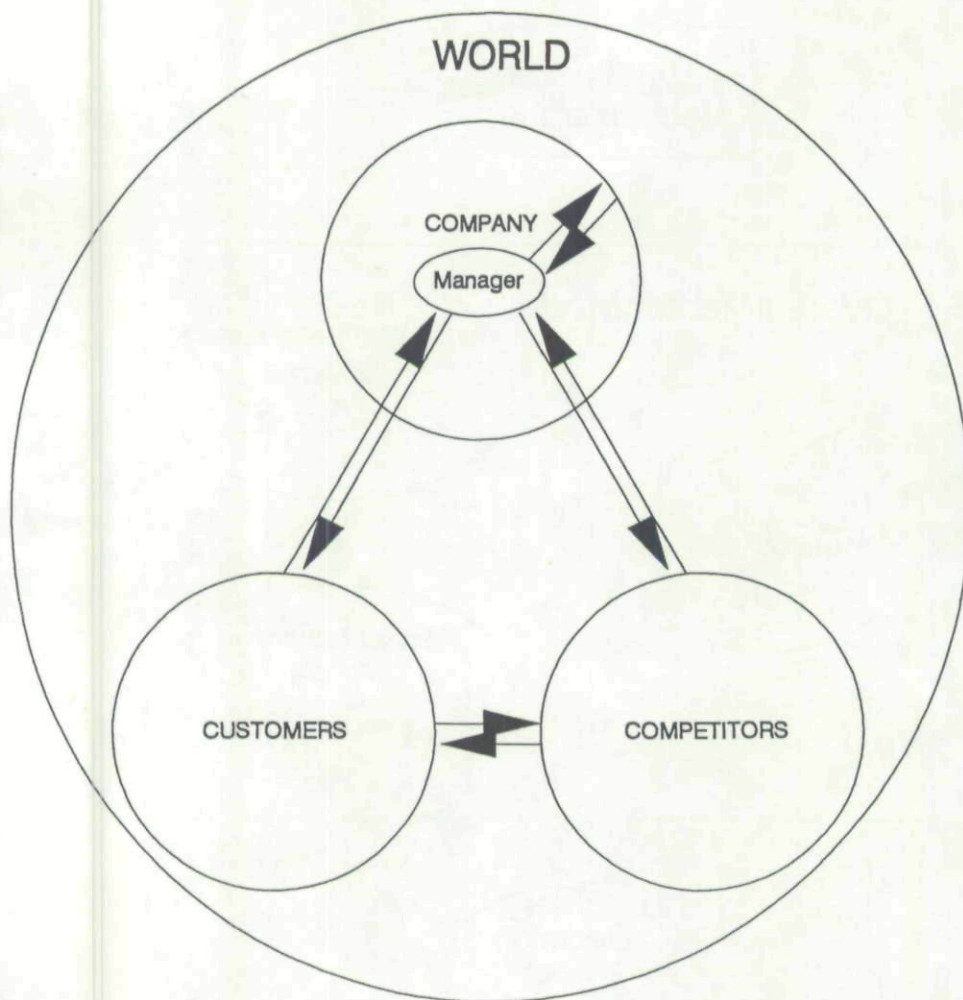


Figure 1. The strategic context for managerial decision making

2.1. Elements of the framework

Strategic decision making requires a trigger to start the process. There are many possible triggers, such as an observed decrease in sales, a new product entry by a competitor, a request for action from a higher level manager, or simply a regular planning cycle. In addition, the outcome of a prior decision could itself trigger a new decision making process.

The heart of our framework is the individual manager's mental model of the context and market responses, represented by the functions $\hat{Z}_{t+1} = \hat{h}(X_t, \hat{Z}_t)$ and

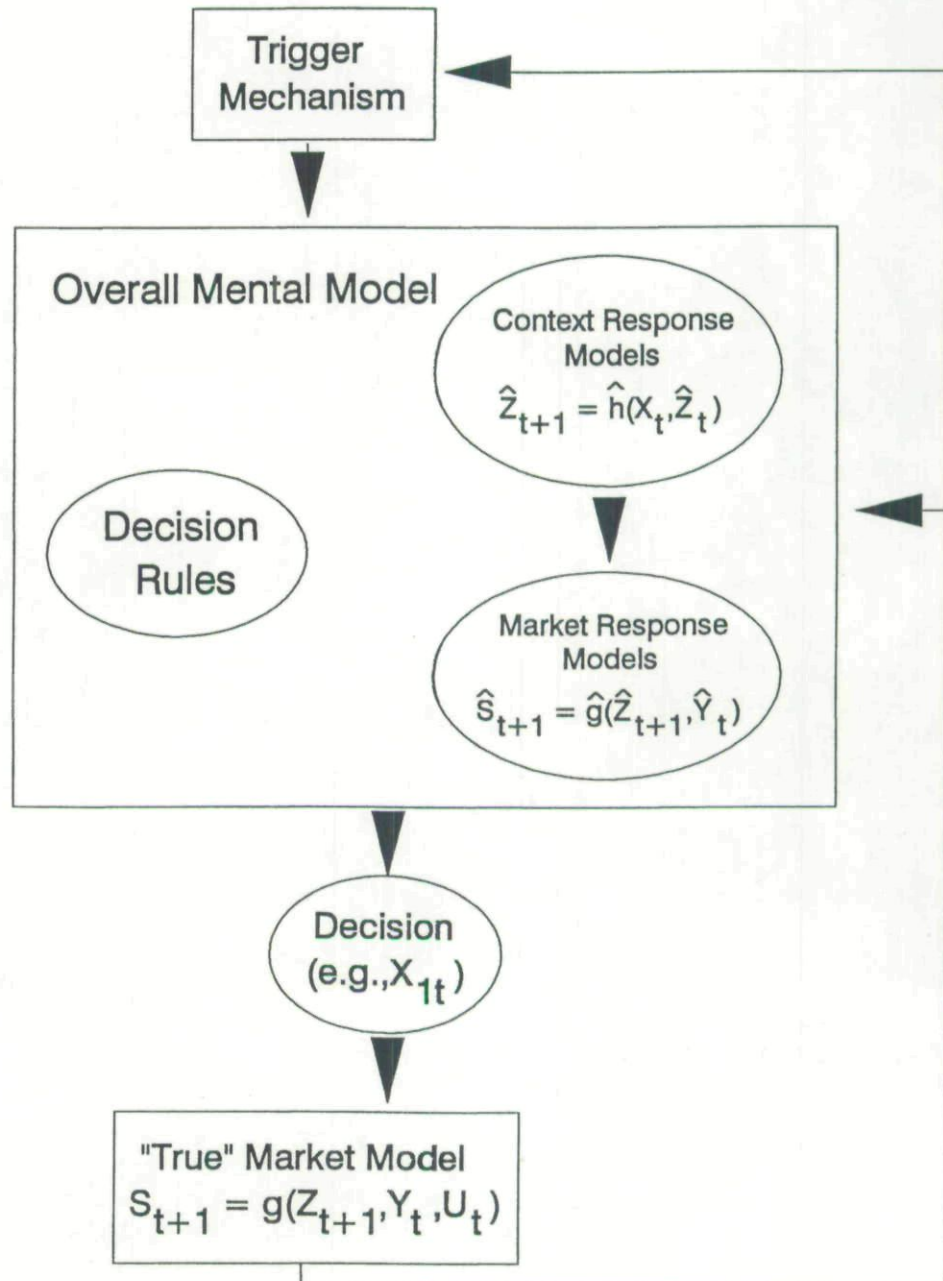


Figure 2. A conceptual model of managerial decision making

$\hat{S}_{t+1} = \hat{g}(\hat{Z}_{t+1}, \hat{Y}_t)$, respectively. In this formulation \hat{S}_{t+1} represents a vector of anticipated outcome measures (e.g., sales, profits, etc., at time $t + 1$); X_t is a vector of possible actions that the manager can take (e.g., setting a new *actual* price); \hat{Z}_t is a vector of the manager's estimates of factors that the manager believes are affected by his actions (e.g., customer *perceptions* of own-price, competitors' prices, etc.), which in turn affect the outcome measures; and \hat{Y}_t are all other factors that might affect S_{t+1} . Finally, $\hat{h}(\bullet)$ and $\hat{g}(\bullet)$ represent the manager's mapping of the context and market response functions, respectively. Implicit in this mental market response model is what we label "what" and "how" knowledge. "What" knowledge determines the values that managers assign the vectors within the mental market response model, i.e., market facts. The "how" knowledge determines the manager's mapping function, $\hat{g}(\bullet)$, and describes how the manager believes the market behaves. This "how" knowledge constitutes the choice of relevant variables, (e.g., the Z 's and the Y 's), the functional form of the relationship (e.g., linear, multiplicative, etc.), and the coefficients (e.g., price sensitivity, etc.).

"What" and "how" knowledge is also implicit in the context response model. The "what" knowledge consists of managers' beliefs about current levels of Z_t , while the "how" knowledge is reflected by the mapping function $\hat{h}(\bullet)$. Presumably, the "what" and "how" knowledge embedded in the context and market response models is generated from managers' prior experiences.

When faced with the task of making a strategic decision, the manager may use these mental response models in concert with a set of decision rules to arrive at a particular decision. For example, a manager may observe a price change by a competitor. In some instances, a manager may invoke a decision rule that requires that the manager have some concept linking the firm's actions with possible outcomes. An example of such a decision rule is "choose the optimal values from the set of possible actions found in X_t , conditional on the new competitor price." Alternatively, the manager's decision rule may be of the type "if the competitor changes price, then we will match it," which can be executed without ever referring to the mental response model. The former decision process requires considerably more cognitive effort and requires the manager to know the *how's* and *what's* of a situation (e.g., the manner in which X_t "causes" \hat{Z}_{t+1} , which in turn affects \hat{S}_{t+1}). The latter decision rule, however, only requires that the manager knows to react. We refer to this latter knowledge as "if-then" knowledge. Note, however, that this if-then knowledge is not immaculately conceived. If-then knowledge must be at least implicitly generated by some manager's "how" knowledge.

Following the flow in Figure 2, a decision is then made. The results of the decision, S_{t+1} , are due to the "true" market response model, $g(\bullet)$, which may not match the manager's mental market model, $\hat{g}(\bullet)$. Our conceptualization suggests at least three major reasons why the manager's prediction (\hat{S}_{t+1}) can differ from what actually happens (S_{t+1}). First, the manager may have the wrong mental market model (e.g., the model contains the wrong variables, the wrong functional

form, etc.). Omitted variables (either unobserved or ignored by the manager) are represented with the vector U in the "true" market model. Second, the manager may have incorrectly estimated others' (e.g., customers, competitors, etc.) reactions to the chosen decision variables (e.g., \hat{Z}_{t+1} may differ from Z_{t+1} because the manager has a poor or non-existent $\hat{h}(\bullet)$ function). Third, the included variables in the manager's model $\hat{g}(\bullet)$ may not have the correct "weights" or the correct functional form (i.e., $\hat{g} \neq g$). All three of these factors could play a significant role in explaining managerial decision errors and observed anomalies in strategic decision making.

2.2. *The role of context*

It is important to note that, in Figure 2, context (i.e., Figure 1) is all pervasive and interacts with every component of this model. Context can clearly affect the trigger mechanism. As noted above, actions on the part of customers, competitors, or the company could all trigger the decision process. As examples, customers could demand new products or services, competitors could take threatening actions, or top management could provide the manager with new strategic imperatives (e.g., increase market share). The relative sensitivity of the trigger mechanism to these contextual factors is an interesting, and unresolved, research question. Based on limited empirical and anecdotal evidence, we conjecture that the trigger mechanism is most sensitive to competitive behavior but speculate that it should be equally sensitive to customer and company behavior.

Context also influences the overall mental model of the manager. The manager organizes the history of behaviors of the company, competitors, and customers into a set of current beliefs. In turn, this belief structure is codified into the individual manager's mental model. Ultimately, this codification is driven by the individual manager's ability, goals, aspirations, etc. Thus, our conceptual model of the decision making process explicitly accounts for individual differences. However, changes in the state of the individual manager's perceived world, as evidenced by new competitor, customer, or company behaviors (e.g., new organizational structures/compensation systems), also lead to adjustments in the manager's mental model. Currently salient examples of such changes include the tendency of firms to move from individual-based decision making to group-based decision making, and time compression in the decision making process brought on by an increased rate of industry change. In these instances managers may come to increasingly rely on if-then decision rules, and "group" decision rules, unsupplemented by their own mental response models, to speed their decision making.

Context is also directly incorporated into the "true" market model. For example, competitive reaction will be contingent on the manager's decision. The outcome of the action/reaction sequence appears explicitly in the "true" market model.

2.3. *The role of learning*

Our model acknowledges that managers may "learn" from the decision process. This is captured by the feedback loops from the true market model (i.e., actual outcomes) to the trigger mechanism and the manager's overall mental model. These feedback loops reflect the dynamic nature of strategic decision making.

The use of the word "learn" does not imply that the ongoing nature of strategic decision making necessarily leads to better decisions over time. "Good" learning would be reflected by the development of efficient decision rules, increasing precision in the two types of mental response model predictions, and perhaps even changes in the market response objective function (e.g., a shift from market share to profit as the objective). However, our model does not preclude the possibility of "bad" learning. In fact, the messy nature of strategic decisions leads to the very real possibility that managerial knowledge deteriorates rather than increases over time. This deterioration in knowledge could occur because of, among other reasons, incorrect causal attributions or overgeneralizing a correctly identified relationship. The former problem is likely due to the age-old problem of spurious correlation. The latter problem is perhaps best exemplified by behavior in the airline industry. Specifically, a growing number of airlines have attached their names, surely at great expense, to professional basketball arenas. Based on this behavior, one suspects that the airline industry operates on the general, but potentially inefficient, rule "match every competitive action."

2.4. *Summary*

In sum, the model in Figure 2 decomposes the strategic decision process into several elements, which should help both researchers and managers. With respect to managers, considerable evidence exists, both empirical and anecdotal, that managers sometimes make bad decisions. Based on this evidence we ask not *if* managers make bad decisions, but rather, *why* managers make bad decisions. Specifically, can we articulate a process that explains apparent anomalies in managerial behavior? The model described above is our answer to this question. The model we propose may help managers articulate, and therefore enhance, their decision processes. In support of this belief, the decision theory literature (e.g., Schlaifer, 1969) tells us that problem decomposition increases the quality of decisions. The model proposed herein accomplishes this decomposition and highlights points where errors may enter into the strategic decision making process.

With respect to researchers, the decomposition helps in two ways. First, it provides a means of linking a number of existing research streams to our particular problem. Examples include knowledge structure research (e.g., Holland, Holyoak, Nisbett, and Thagard, 1986), decision-making biases (e.g., Russo and Schoemaker, 1989), managers' market response models (e.g., Chakravarti, Mitch-

ell, and Staelin, 1981), competitor reaction models (e.g., Hanssens, 1980), managerial forecasting models (e.g., Clemen and Winkler, 1986), decision support models (e.g., Lodish, 1971), and the emerging literature on learning organizations (e.g., see the 1991 Special Issue on Organizational Learning in *Organization Science*).

Second, the decomposition helps identify the researchable components of a very messy process. For example, one might focus on the dynamics that drive good versus bad learning (Gupta and Steckel, 1993). Another area might be to devise research methods designed to tap into and delineate managers' mental models (Mitchell and Russo, 1993). Alternatively, one could look at the influence of the group on decision-making biases (Janis, 1981; Corfman and Kahn, 1993). Other possibilities include studying the process of competitive conjecture (Urbany, 1993), or managers' conjectures about customers (Boulding, 1994; Dickson, Urbany, and Kalapurakal, 1993). A further possibility is to study the trigger mechanism to the decision-making process (Moore and Bettman, 1994).

We believe the current research opportunities are close to limitless. The appendix to this paper contains a representative, but far from exhaustive, list of research questions. We hope that others generate additional research questions. However, in the interest of starting this process we next turn our attention to the issue of potential sources of error in strategic decision making, and in so doing generate a series of testable research propositions.

3. Errors in managers' predictions

Recall that mental market models are implicitly contained in managers' decision rules. Even when managers rely on a decision rule heuristic (if-then knowledge), the origin of such rules can be traced to some manager's mental response models (how knowledge). Consequently, we focus our attention on fallible "how" and "what" knowledge. We make the implicit assumptions that errors in the response models are negatively correlated with the quality of decisions, all else equal. More formally, we propose

P_1 . Managers with better "how" and "what" knowledge make better decisions.

While this proposition seems noncontroversial, it can be argued that the process of obtaining better "how" and "what" knowledge can hinder a manager's ability to act, i.e., "paralysis of analysis." However, if P_1 is true, then we as academics need to work toward enhancing managers' "how" and "what" knowledge.

Another general concern about errors in strategic decision making is whether the learning that emerges from the dynamic nature of strategic decision making is good learning or bad learning. We believe that the size of the prediction error will be reduced only if the managers have both the ability and motivation to learn. Therefore, a relevant line of inquiry is to identify the drivers for both ability and

motivation. We note that, holding fixed the company context, increased external pressures (e.g., greater competitive rivalry, more demanding customers, etc.) should lead to *decreased* ability for managers to enhance their "how" and "what" knowledge. Conversely, such pressures should lead to *increased* motivation for managers to improve this knowledge. Such logic leads us to posit that external forces lead to a negative observed correlation between motivation and ability (Boulding and Staelin, 1993) for managers to develop "how" and "what" knowledge, all else equal.

This negative correlation places the firm in a quandary if it wants to build knowledge over time. Specifically, we propose the following:

P₂. External forces are unrelated to managerial learning since the motivational effects of the external forces will be canceled out by decreases in managers' ability to learn.

As a corollary to this, we propose the following:

P_{2A}. Good learning will only occur within an organization if the firm provides motivation from within.

The above discussion leads us to ask the more general question, "When are managers motivated to learn?" We believe learning is most likely when managers admit "ignorance" (Zaltman and Staelin, 1993) or "lack of knowledge" (Boulding, 1993). Thus, managers who perceive themselves to be "knowledgeable" will be less likely to update their mental models over time. However, as the environment changes, which is a defining characteristic of strategic decision making, this lack of updating will lead to increasing levels of prediction errors. The more managers codify their mental market models into decision rule heuristics, the more serious the lack of updating will become. Thus, we offer the following proposition:

P₃. Future prediction errors are increasing in the manager's current level of confidence in his or her "what" and "how" knowledge.

We now focus on the three specific sources of the prediction errors identified above (e.g., specifying the right variables, the correct functional form, and the specific parameters). Although these sources of error quickly become interrelated, we start with the variable specification problem. The potential problem here is one of spurious correlation; that is, the manager omits the variable that drives the observed relationship. Further, it seems highly unlikely that, without formal modeling, managers can control for omitted variable bias. This leads to the proposition that managers cannot disentangle the influence of observed variables from the unobserved error. More technically:

P₄. Managers cannot perform two-stage least squares in their heads.

A stronger version of this proposition is as follows:

P₅. Managers' mental market models are single parameter models in the decision variables.

This last proposition suggests that without formal modeling and estimation, managers are certain to generate prediction errors in situations where relevant omitted variables change over time and are correlated with the decision variable of interest. Thus, even minimally complex, dynamic decision contexts will lead to prediction errors.

These prediction errors will occur because the manager will infer biased weights. Consequently, the "wrong variables" problem blends into the "wrong weights" problem. One so-called solution is to increase the frequency of market response feedback. Due to technology advances, the frequency of market feedback has increased dramatically in many industries. In static markets where everything but response and the decision variable remains fixed, increased frequency of feedback will help the manager hone in on the true weights. However, in even moderately complex or dynamic environments (i.e., the "messy" context of strategic decision making), increased feedback can lead to increased distortion in the weights. This happens for at least two reasons. First, the increased time pressure to make decisions will increase prediction errors. Second, according to P₄ and P₅, managers will make incorrect inferences from the market feedback. Instead of ignoring noise, managers will overreact to noise. Thus, we add another proposition:

P₆. Increasing the manager's access to market feedback when the manager has a fallible mental market model leads to increasing prediction errors.

We note that this proposition underscores the importance of identifying the boundary conditions for when managers' mental models are or are not fallible.

Another potential source of error in developing market response weights emerges from the behavioral decision theory and social cognition literatures. We believe that many of the standard biases (e.g., availability bias, false consensus, and so forth; cf. Russo and Schoemaker, 1989; Moore and Urbany, 1994) hold in the context of strategic decision making. Other than suggesting the applicability of these biases, we leave discussion of these effects, and the numerous related propositions, to others.

We also acknowledge the importance of research directed toward understanding competitor actions and reactions. Of particular interest are the weights managers attach to competitor actions in their market response models. Based on limited empirical and anecdotal evidence we propose the following:

P₇. Managers overweight market response to competitor actions.

We conjecture that this overweighting is due to the potential impact of competitor actions on the firm, especially in the short run. It is usually the case that one competitor can do more damage to the manager's firm, more rapidly, than a single customer can. As a result, the salience of competitive actions results is quite dramatic. A corollary of overweighting the effect of competitive actions on market response is as follows:

P₈. Managers overreact to competitive actions relative to customer actions.

These propositions are consistent with our earlier conjecture that the trigger mechanism in our process model is more sensitive to competitive behavior than customer behavior.

Managers' conjectures about competitive behavior is another potential source of prediction error in mental market models. A logical extension of P₈ is

P₉. Managers are better able to predict competitor response to an action than customer response.

The logic supporting this proposition is that managers can effectively predict competitive response via self-analysis. In particular, we believe that the manager and his or her company are typically more similar to other competitors in the industry than to the firm's customers. Managers' self-attributions to competitors, therefore, should be more accurate (and more likely) than self-attributions to customers, resulting in more accurate predictions of competitor behavior than customer behavior. Notice that the tendency to expect competitors to act the same as the manager's firm would be a potentially important and even disastrous judgmental bias.

In contrast, it is also possible to justify the alternative proposition:

P_{9A}. Managers are better able to predict customer response to an action than competitor response.

Support for the alternative proposition rests in the limited empirical and anecdotal evidence suggesting that managers show little foresight in considering competitive reactions to their decisions. Further, one might argue that the decision processes for customers are sometimes more visible and accessible to the manager than those of competitors. We suspect that whether P₉ or P_{9A} holds depends on this issue of relative accessibility of decision processes.

4. Discussion

Our intent is not to portray managers as poor decision makers or in any way be critical of managers. We believe errors in strategic managerial decisions exist be-

cause of the complexity and pressure of the decision environment. Often the simplifying heuristics that managers employ are a rational response to an overwhelming task, decision errors notwithstanding. Nevertheless, we believe that managers can improve their strategic decision making skills. Outlining and decomposing the decision making process is a first step. Understanding the components of the process allows managers to begin attacking the errors during the process. The same decomposition serves to delineate a research agenda for researchers. We hope this agenda leads to increased interest in, and understanding of, strategic decision making.

An implicit part of this research agenda should be of mutual interest to both academics and managers. Specifically, how do we move from mere description of the process (i.e., this paper) to prescription? We reiterate the belief stated in our first proposition that sophistication in "what" and "how" knowledge both matters and helps. Only with such knowledge can one devise the right decision rules. In contrast to this statement, we offer our final proposition:

P₁₀. Managers' decisions are more typically based on "if-then knowledge" (decision rules) than "how knowledge" (market response models).

Thus, driving errors out of the decision process implies that managers need to substantially alter their decision making behavior. Further, because of the dynamic setting, managers must possess a constant capacity for updating the decision making process. Therefore, a key issue to consider in future research is how to get managers to repeatedly unfreeze and update their mental models.

Academics probably possess comparative advantage, relative to managers, in terms of delineating the how's of market response. The question still remains as to whether such knowledge leads to better decision making. If we hope to move from a descriptive model of strategic managerial decision making to a normative model, we need to first be sure that our own models are not flawed. Then we must bridge the gap between academic model building and current managerial strategic decision making practices. Building this bridge requires receptivity to change on the part of both managers and academics.

Notes

1. The authors comprise Group 9 of the 1993 Duke Invitational Symposium on Choice Modeling and Behavior. The authors thank Joel Huber for his helpful comments.
2. For example, see Dickson, Urbany, and Kalapuraki (1993) for incorrect market facts, Boulding (1994) for managers' misperceptions of customers' perceptions, Armstrong, Colgrove, and Collopy (1992) for overreaction to competitors, Moore and Urbany (1994) for lack of foresight in considering competitive reaction, and Gupta and Steckel (1993) for more information leading to poorer decisions.

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Appendix

1. What triggers the initiation of a strategic decision making process?
2. How do managers scan the environment for information essential for strategic decision making?

- How do they decide whether to use the information? If they choose to use it, how does it get incorporated into their decision model? How do we reliably uncover managers' mental models?
3. How do managers learn? Where do the "rules" in managers' decision models come from? How much is individual-specific and how much is company-specific?
 4. Under what conditions is a manager's mental model (decision rules, market model or context model) updated or changed? Is the adjustment more sensitive to information based on competitors or information based on customers? How do managers use feedback from the environment?
 5. How can we help managers learn the "how" of decision models? What can be done to help managers recognize and undo biases that pervade their strategic decision making process? What form of information decomposition or aggregation is most helpful?
 6. What aspects of the strategic decision making context affect the differential impact of different kinds of information? Do certain aspects of context drive the updating or selection of mental models? Do managers within the same company or the same industry have differing perception of the same context? If so, how do they differ, why do they differ, and what are the consequences of the differing views?
 7. What is the appropriate benchmark against which to compare managers' mental models and decision making performance?
 8. What are the appropriate decision aids for managers? Do these aids vary by level of managerial knowledge? by context?

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