

## STRATEGIC DECISION MODELS: INTEGRATING DIFFERENT PERSPECTIVES

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*Different perspectives of strategic decision-making and outcomes have been advanced in the literature. Among those are the rational normative, external control, and strategic choice models. The current research examined hypothesized effects of factors associated with these three perspectives on strategic acquisition decisions. Strong support was found for the rational/analytical normative choice perspective with objective criteria explaining the greatest amount of total explained variance in evaluation of target firms. However, industry and executive characteristics also produced main effects on target firm evaluations. Furthermore, the strategic decision models were found to vary by industry and executive characteristics of age, educational degree type, amount and type of work experience, and level (CEO and below). The results suggest that strategic decision models are quite complex with significant implications for future research and for strategic decision-making.*

### INTRODUCTION

The normative model of strategic decision-making suggests that executives examine the firm's external environment and internal conditions and, using the set of objective criteria derived from these analyses, decide on the strategy. A model of strategic change that builds on this rational normative model by emphasizing the effects that executives can have on strategic decisions, has been labelled strategic choice (Child, 1972; Montanari, 1978). An alternative view, the external control perspective (Romanelli and Tushman, 1986), argues that strategic decisions are largely constrained by the external environment. The chief proponents of this highly deterministic perspective (Bourgeois, 1984) are from diverse disciplines and include industrial organization economists (e.g. Bain, 1956; Porter, 1980; Scherer, 1980) and organization theorists

(e.g. Aldrich, 1979; Hannan and Freeman, 1977). While the two perspectives seem to be in strong conflict, proponents of each seem to be moving closer together (Hambrick and Finkelstein, 1987; Hrebiniak, Joyce and Snow, 1988). Recently theoretical and empirical models, that argue for elements of both strategic choice and external control in strategic decisions, have surfaced in the literature (Astley and Van de Ven, 1983; Finkelstein, 1988; Hrebiniak and Joyce, 1985; Keats and Hitt, 1988).

A direct extension of the choice-determinism debate is the question of whether managers matter (Hambrick and Finkelstein, 1987). External control proponents tend to view managers as unimportant, inactive, or, at most, symbolic (Astley and Van de Ven, 1983; Pfeffer and Salancik, 1978). This view emphasizes the definite limits to which autonomous strategic choice is available and the limited ability of organizations to adapt to different niches within the environment (Aldrich, 1979). Strategic choice advocates, however, emphasize the potential effects that managers can have on strategic decisions. They argue

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that people, not organizations, make decisions and that the decisions depend on prior processes of human perception and evaluation (Child, 1972). These processes are believed to be constrained by the managerial orientation created by needs, values, experiences, expectations, and cognitions of the manager (Child, 1972; Finkelstein, 1988; Montanari, 1978). Hambrick and Mason (1984) advocated an upper echelons theory of organizations, which builds on the premises of earlier strategic choice literature (i.e. Child, 1972; Montanari, 1978). This perspective suggests that strategic choices are the result of both the objective situation and the characteristics of the upper echelons (top executives) of the organization. It argues that upper echelon characteristics (psychological cognitive bases, values, and observable background characteristics) affect managerial perception and, therefore, strategic choices. Research has supported the contention that managers' personal characteristics do make

a difference in strategy formulation and implementation (Finkelstein, 1988; Gupta and Govindarajan, 1984; Miller and Toulouse, 1986). However, much more research is needed to determine when and how upper echelon orientations, and the characteristics on which they are based, affect the strategic decision process.

Current research thus supports the necessity of integrating elements of the rational normative, external control, and strategic choice perspectives in models of the strategic decision process. Bourgeois (1984) and Hrebiniak *et al.* (1988) called for strategy research that combines and examines the interaction of the different perspectives. The purpose of this research is to examine top executives' strategic decisions in an effort to understand more fully the effects of factors associated with these three perspectives on strategic decisions. Specifically, executives' decisions regarding potential acquisitions are modeled to examine the extent to which objective

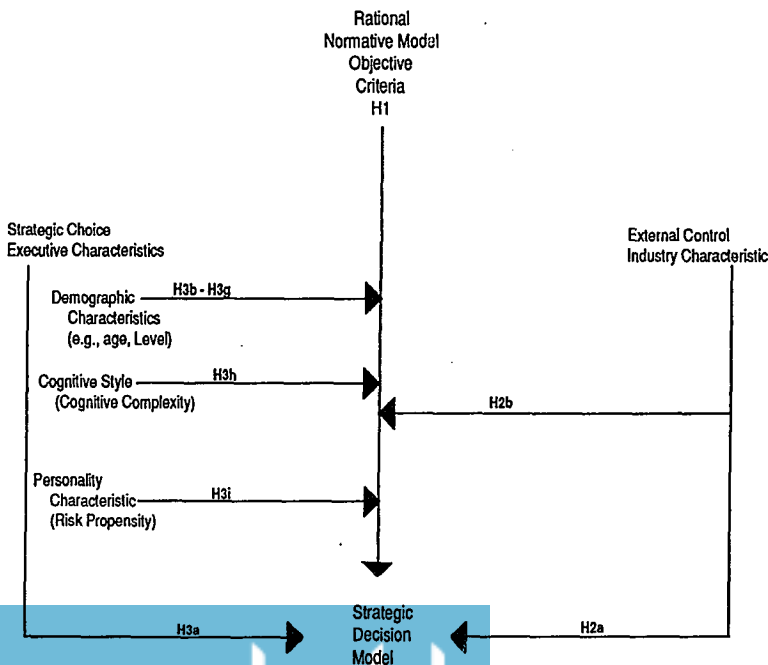


Figure 1. Model of strategic decision-making.

criteria are used, and the extent to which the decisions and criteria chosen are affected by the firm's industry and by the executives' characteristics. A model of the hypothesized relationships is presented in Figure 1.

## RATIONAL NORMATIVE MODEL

Early development of the strategic management literature advanced a rational, normative model of strategic choice (Andrews, 1971; Ansoff, 1965; Hofer and Schendel, 1978). As a result, the normative model of strategy formulation and implementation remains dominant in the teaching and practice of strategic management. Porter (1980), among others, has offered a complex set of analyses designed to help executives formulate an effective competitive strategy. Most top executives have been exposed to this or other forms of the normative model, either through formal education or executive development programs. In fact, most of the *Fortune* 1000 firms now have formal systems for strategic planning (Leontiades, 1980). Although the normative models vary somewhat, there is a dominant theme in this classical approach. These models suggest that managers must analyze both their external environment and internal operations (Pearce and Robinson, 1983). From these analyses, lists of external opportunities and threats and internal strengths and weaknesses are derived. A strategy is formulated in the context of these opportunities and threats, and firm strengths and weaknesses. This strategy, to the extent possible, should be designed to optimize achievement of the firms' goals (Porter, 1980). Thus, according to this model, strategic decision-making involves a series of sequential, rational, and analytical processes (Huff and Reger, 1987) whereby a set of objective criteria are used to evaluate strategic alternatives (Ackoff, 1981; Ansoff, 1980, 1986; Camillus, 1982). Some suggest that this process involves strategic choice. However, Bourgeois (1984) argued that this rational normative model is quite deterministic. While there may be some choice, the process is designed to narrow strategic alternatives to the best one or at least, a small feasible set. Therefore, the choice is highly constrained and is guided by a rational process. Additionally, Bourgeois argued that strategy, once determined, often placed constraints on future strategic alternatives considered.

Acquisition decisions represent a type of organizational decision that can be expected to follow the sequential, rational, and analytical process advocated by the rational normative model. Most acquisition research has employed a rational choice perspective and argues for consideration of the importance of strategic or organizational fit (Jemison and Sitkin, 1986). It can be argued that executives of firms considering acquisitions should carefully analyze both their external environment and internal operations and use the resulting analysis to evaluate potential acquisitions. Alternative characteristics of acquisition candidates will vary along an infinite number of objective dimensions. However, given the limits of human information processing capabilities, a top executive evaluating different potential acquisitions can be expected to simplify the decision process by limiting the criteria considered and by weighing some criteria more heavily than others (Duhaime and Schwenk, 1985; March and Simon, 1958; Schwenk, 1984).

Thus, many firms use formal strategic planning processes and top managers have been exposed to rational analytical strategic planning models. In addition, top executives in firms considering acquisition candidates can be expected to follow the premises of the normative strategic decision-making model. As a result, we propose the following hypothesis:

*Hypothesis 1: A set of objective criteria explains a significant amount of variance in the strategic evaluation of acquisition candidates, above and beyond the variance explained by other variables.*

Most current advocates of the rational normative perspective realize that strategic decisions are not without constraints, both environmental and individual. For example, Bourgeois (1984) argued that a theory of organizational functioning must account for the possibility of reciprocal causation among external factors, strategic decisions, and internal organizational factors. The works of Hambrick and Mason (1984) and Schwenk (1986) suggest that the human actors (e.g. top executives) also affect the strategic choices made. Thus, we also examine the external control and the upper echelons strategic choice perspectives.

## EXTERNAL CONTROL

The external control perspective suggests that the success of strategic decisions is largely determined by characteristics of the external environment. This deterministic perspective has grown from two disparate yet largely supportive theory bases: organization theory and industrial organization economics. Early organizational researchers established the environment as a source of critical contingencies (e.g. Emory and Trist, 1965; Lawrence and Lorsch, 1969). Organization theorists (e.g. Duncan, 1972; Lawrence and Lorsch, 1969) proposed that environmental turbulence and uncertainty had major effects on organizational functioning. From this earlier work grew resource dependence and natural selection models (Aldrich, 1979; Pfeffer and Salancik, 1978; Hannan and Freeman, 1977). These approaches suggest that the design and choices of organizations are based on the complexity of the environment (Bourgeois, 1984). For example, Keats and Hitt (1988) noted that resource scarcity in a firm's existing markets increases the firm's risk, suggesting a need to expand into new markets. Thus, resource scarcity may drive strategic choices and, in turn, firm performance. Natural selection models argue that an organization's potential for survival and superior performance is dependent on the match or fit between organizational design variables and environmental demands (Aldrich, 1979). This perspective argues for consideration of the organization-environment relationship at the population level (industry), where organizational aggregates are homogeneous in environmental vulnerability.

The organization theory perspective is largely congruent with that of industrial organization economics. Industrial organization economists (Bain, 1956; Hirshleifer, 1988; Scherer, 1980) argue that an industry's structure is a major determinant of the profitability in the industry and thus serves as a powerful influence on strategic decisions (Barney and Ouchi, 1986). The industry structure characteristics believed to have the most influence on strategic choices are concentration, heterogeneity, and existence and height of entry barriers (Bain, 1956; Hirshleifer, 1988; Porter, 1980; Scherer, 1980). The industry's structural characteristics are also believed to have a major effect on firm profitability (Bourgeois,

1984; Hatten, Schendel and Cooper, 1978; Schendel and Patton, 1978). Bourgeois (1984) denotes that the deterministic nature of external control theories evolved from classic microeconomic theory whereby firm survival *requires* the firm to develop long-run economies of scale and focus financial resources and managerial attention on manufacturing efficiencies. Therefore, industry characteristics likely have direct effects on strategic decisions.

Although a firm's relevant environment includes both social and economic forces, Porter (1980) argues that the major aspect of the environment is the industry(ies) in which a firm competes. Furthermore, he suggests that industry structure is a strong influence on the competitive rules in the industry and therefore on firms' strategies. Likewise, resource dependence and natural selection models suggest that environmental pressures are often evidenced at the industry level. Based on these premises, the following hypothesis was formulated:

*Hypothesis 2a: Industry explains a significant amount of variance (main effects) in strategic evaluation of acquisition candidates, above and beyond the variance explained by other variables.*

However, industry structure varies considerably across industries and the importance of objective criteria considered in numerous strategic decisions can vary according to the associated industry. Some industries are R&D-intensive (e.g. pharmaceuticals) while others emphasize marketing (e.g. toys, processed foods). Firms that are R&D-intensive tend to diversify into other R&D-intensive industries (McDonald, 1985). As a result, these firms likely place strong weight on R&D capabilities when evaluating acquisition candidates. Conversely, a toy manufacturer or firm in the processed foods industry may weight the marketing capabilities criterion heavily in evaluating the attractiveness of acquisition candidates. Therefore, top executives in separate industries with different structures may use and weight criteria differently in strategic decisions. As a result, there is a reciprocal interdependence between industry and strategic decisions (Bourgeois, 1984). Strategic decisions determine

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the industries in which a company participates, but these industries, in turn, affect the objective criteria relevant in strategic decisions.

In addition, Spender (1989) argued that executives are involved in a two-step process. While the decision process has a rational component, a process of judgement is used to deal with uncertainty. He argued that judgement intervenes in the proposed causal model that links the executives' objective situation to their decisions. Under conditions of uncertainty and information deficiency, executives interpret and add to the available objective data in order to make decisions. Often, the burdens and risks of exercising judgement cause executives to draw their primary support from other executives operating in the same industry. These executives do not seek detailed or prescriptive formulae because they know that organizations in the same industries are in different circumstances. However, executives 'adopt a way of looking at their situations that are widely shared within their industry' (p. 188). Spender (1989) labeled this pattern of judgements the industry's 'recipe'. An industry recipe is similar to the concepts of managerial dominant logic (Prahalad and Bettis, 1986) and managerial mind sets (decision-making orientations) based on a firm's center of gravity (Galbraith, 1983). Supportive of Spender's arguments, Finkelstein (1988) found that industry moderated the managerial orientation-strategy relationship. These arguments lead to the following hypothesis:

*Hypothesis 2b: Industry moderates the relationship between objective criteria and the strategic evaluation of acquisition candidates.*

Both the rational normative and external control models largely reduce the decision regarding strategic moves to one of mechanics ignoring the 'human actors'. While both of these schools of thought have merits as evidenced by the preceding hypotheses, ignoring the human element in strategic decisions can lead to inaccurate predictions by the models. Therefore, to develop a more comprehensive and accurate understanding of strategic decisions, we incorporate the upper echelons perspective of strategic choice.

Child (1972) suggested that top managers make strategic choices. That is, they make decisions regarding the goals, domains, technologies and structure of a firm. Keats and Hitt (1988) argue that this perspective suggests that organizations select and interpret their environment, respond to those elements that are fixed, and attempt to shape the remaining elements to their advantage. Hambrick and Mason (1984) and Bourgeois (1984) emphasize that executives' strategic choices should be viewed broadly to include not only variables normally associated with strategy (e.g. domain selection) but also those associated with its implementation (e.g. reward systems). Regardless of the extent of strategic choice, these theorists reject the purely deterministic view of the behavior of organizations taken by some organization theorists and industrial organization economists. They also qualify the assumption of objectivity associated with the classical normative model of strategic choice.

Some of the early theorists (e.g. Andrews, 1971; Child, 1972) who proffered the rational or classical models of strategic decision-making recognized that perceptual and evaluational processes of managers played a role in strategic decisions. More recently, others have examined the link between top management characteristics and perceptions, objective decision criteria and strategic choice (Finkelstein, 1988; Hambrick and Mason, 1984; Schwenk, 1984, 1986). The theoretical arguments proposed are based on an extensive literature that has accumulated in the area of behavioral decision theory (Sebora, Crant and Shank, 1990; Walsh, 1989). Research prior to the advent of behavioral decision theory assumed that rational economic actors maximize their utility based on full, complete, and perfect information. Behavioral decision research suggests that people violate the rational normative utility-maximizing model (Sebora, Crant and Shank, 1990).

Much of the work integrating behavioral decision theory into the strategic decision-making literature has been based on early notions of Tversky and Kahneman (1973, 1974, 1981). Tversky and Kahneman (1974) and Slovic, Fischhoff and Lichtenstein (1977) stated that when faced with uncertain, complex and/or ill-structured problems (e.g. strategic decisions),

individuals develop and use heuristics to simplify the decision process. Most recent research has demonstrated that human cognitive processes attempt to reduce cognitive effort through the use of heuristics which may create systematic biases (Barnes, 1984; Kahneman and Tversky, 1979, 1987; Schwenk, 1984, 1986, 1988). By using heuristics, decision-makers can make fairly accurate interpretations and evaluations without having to examine all available information (Nisbett and Ross, 1980; Starbuck and Milliken, 1988). The literature in management and cognitive psychology suggests that individuals use these heuristics or cognitive models to integrate pieces of information into a single judgement in making decisions (e.g. Hitt and Middlemist, 1979; MacCrimmon and Taylor, 1976; March and Simon, 1958).

Schwenk (1984) suggested that individual characteristics affect the heuristics and cognitive maps used to make strategic decisions, and proposed three variable categories of individual differences: cognitive style, demographic factors, and personality traits (Schwenk, 1988). Upper echelons theory, proposed by Hambrick and Mason (1984), essentially argues that strategic choices have a large behavioral component and reflect the idiosyncrasies of top executives' cognitive bases and values. Hambrick and Mason (1984) argued that, while decision-makers are exposed to an ongoing stream of potential stimuli, these cognitive bases and values filter and distort the decision-maker's perceptions, and thereby affect strategic choice. They argued, further, that observable demographic characteristics of top executives could be used to infer psychological cognitive bases and values, and that 'straightforward demographic data on managers may be potent predictors of strategies' (p. 205). The characteristics that they chose to develop included age, functional tracks, career experiences, education, socioeconomic roots, financial position, and group characteristics.

Work by behavioral decision theorists and strategists (e.g. Hambrick and Mason, 1984; Schwenk, 1984, 1988; Walsh, 1989), therefore, suggests that executives do not follow a totally rational model in making strategic decisions. Furthermore, they may not interpret industry information correctly or utilize all relevant and available information. Thus, introduction of human choice into strategic decisions alters the

strategic decision process. More specifically, Duhaime and Schwenk (1985) suggested that a number of specific simplifying processes may be used in acquisition and divestment decisions.

Because individuals approach complex decisions with previously constructed heuristics or cognitive models that are reflected in personal characteristics, the following hypothesis was developed:

*Hypothesis 3a: Executives' personal characteristics explain a significant amount of variance (main effects) in the strategic evaluation of acquisition candidates, above and beyond the variance explained by other variables.*

Hitt and Barr (1989) found that managers approach ill-structured decisions with complex and differentiated cognitive models. That is, the criteria used and their weightings may vary with the cognitive model used. As noted earlier, Hambrick and Mason (1984) proposed several personal characteristics of upper echelon executives that are likely to affect strategic choices. Additionally, Hambrick and Mason (1984) argued that the interactions between situational and demographic variables should be examined to increase the understanding of the effects of demographic characteristics of top managers on decision processes. In this study several personal characteristics—age, level of education, educational background, total years of work experience, functional experience, level in the firm (in relation to CEO), cognitive complexity, and risk propensity—were examined.

## Age

Hambrick and Mason (1984) proposed that an executive's age affects strategic decisions; for example, younger managers pursue riskier strategies. Additionally, they speculated that firms with younger managers experience greater growth and variability in performance. While age effects may overlap with risk propensity, the effects may be broader. For example, Hitt and Barr (1989) found managers' ages affected compensation decisions. Specifically, younger managers were more willing to pay higher salaries to executives. This may be due to evaluations of greater value as opposed to a riskier posture. Ireland *et al.* (1987) suggested that individuals of similar age

have similar life experiences and potentially similar values and beliefs stored as schemas. As a result they suggest that younger managers may place greater value on participative management than do older managers. Research by Schuman and Scott (1989) supports the contention that the generational character created by the events experienced by a cohort during its youth exerts an important influence on later attitudes. They found that memories of important political events and social changes were structured by age, and that adolescence and early adulthood was the primary period for generational imprinting.

Thus, younger managers might not only evaluate riskier acquisition candidates more highly (exhibit more willingness to take greater risks) but also use and weight criteria differently than older managers (e.g. criteria related to growth and type of managerial talent valued) leading to the following hypothesis:

*Hypothesis 3b: An executive's age moderates the relationship between objective criteria and strategic evaluation of acquisition candidates.*

### **Educational background**

Hambrick and Mason (1984) suggested that executives' educational background provides an indication of their knowledge and skill base. Not only the amount but also the type of education are relevant. The type and amount of education one chooses serve as indicators of her or his values and cognitive preferences. Thus, based on personal values, cognitive preferences and specialized education, we might expect those with formal education in engineering to utilize different cognitive models in making decisions than those with formal education in liberal arts or business (Hambrick and Mason, 1984).

Hitt and Barr (1989) found that managers with higher levels of formal education made different managerial compensation decisions from those with less formal education. Hambrick and Mason (1984) hypothesized that there is a positive relationship between amount of managers' formal education and a firm's innovation. That is, highly educated managers are more favorably predisposed toward, and more likely to promote, innovation. Furthermore, they proposed that firms having top managers with less formal education experience more variability in perform-

ance. We may speculate that those with less formal education have greater variance in their cognitive models because these models are partially the product of more general educational training. As the education level increases, training experiences and paradigmatic perspectives become more specialized and focused, thereby creating greater conformity in cognitive models. Thus, we may conclude that amount and type of formal education affect the cognitive models developed and thereby the strategic choices made. As a result, the following hypotheses were developed:

*Hypothesis 3c: An executive's educational degree type moderates the relationship between objective criteria and the strategic evaluation of acquisition candidates.*

*Hypothesis 3d: An executive's level of education moderates the relationship between objective criteria and the strategic evaluation of acquisition candidates.*

### **Experience**

Both the amount and type of work experience are important. The amount of one's experience may affect the strategic choices made and the models/processes used in making those decisions. Hitt and Barr (1989), for example, found that more experienced managers differ from less experienced managers in decisions regarding compensation of other executives. Additionally, Fredrickson (1985) found that the decision processes of experienced managers differ markedly from those used by inexperienced managers in making the same strategic decision. Experience allows managers to test and 'fine-tune' a cognitive model that produces more successful decisions. Less experienced managers are more naive (Fredrickson, 1985) and do not have the benefit of knowledge based on the outcomes of multiple past decisions. Thus, executives' cognitive models are based partially on their career experiences (Hambrick and Mason, 1984).

The type of experience (e.g. function) also may affect one's cognitive framework and strategic choices. Hitt, Ireland and Palia (1982), Hitt, Ireland and Stadter (1982) and Hitt and Ireland (1985, 1986) found relationships between importance placed on certain functions (distinctive competencies), strategy and performance. Smith

and White (1987) found a relationship between a firm's strategy and the career specialization of top executives. This implies that knowledge and expertise in certain functions may be related to executives' choices of strategy and resulting performance. Dearborn and Simon (1958) found that executives defined problems largely in terms of the goals and tasks in their respective functional areas. However, Walsh (1988) disputed Dearborn and Simon's (1958) findings. He found that managers with different functional experience did not develop different belief structures. On the other hand, Hambrick and Mason (1984) proposed a more complex alignment. They suggested that individuals in different groups of functions develop distinctly different orientations to the firm and its environment. Furthermore, they suggested grouping functional experience into output and throughput functions and those not integrally involved in the organization's core activities (e.g. law and finance).

We suspect that the relationship between type of experience and strategic decisions may be more complex than suggested by previous work. For example, Walsh's (1988) sample seemed to be dominated by middle managers in mid-careers. The average age was 38; 80 percent earned less than \$50,000 annually (in 1983) and all were enrolled in a two-year, part-time executive MBA program. While this in no way invalidates his results, they may not be totally generalizable to top executives. Top executives often have experience in multiple functions, although they may have dominant experience in one or two. Thus, their experience may be broader and richer for strategic decision-making. Additionally, the type and weighting of those experiences may well have helped shape a cognitive model used for making strategic decisions. Thus, while distinctions between experience in separate functions may be inappropriate, different combinations of functional experiences may affect strategic choices and the criteria on which they are based. As a result the following hypotheses were formulated:

*Hypothesis 3e: The total amount of work experience possessed by an executive moderates the relationship between objective criteria and the strategic evaluation of acquisition candidates.*

*Hypothesis 3f: The combination of different functional experiences possessed by an executive moderates the relationship between objective criteria and the strategic evaluation of acquisition candidates.*

### Level of executive

Ireland *et al.* (1987) found that strategic decision processes varied by the managers' level in the firm. They found, for example, that managers at different levels had distinctly different perceptions of the firm's strengths and weaknesses and of environmental uncertainty. They speculated that part of the reason for these differences related to different decision models based on the availability heuristic. According to Tversky and Kahneman (1973), people often make decisions by using information that can be easily recalled (e.g. available information). The type and amount of information available for strategic decisions may vary by level. However, since Ireland *et al.* (1987) examined the differences in top, middle, and lower level executives and the current study focused on top executives (i.e. vice presidents and above), less differentiation may be expected in this study.

However, Hambrick and Mason (1984) proposed that managerial aspirations (and thus strategic decisions) may vary based on the proportion of managers' income tied to the performance of a firm. Many incentive compensation plans closely link top executives' compensation to performance. A larger proportion of the CEO's total compensation is linked to performance than top executives below the CEO. Hoskisson, Hitt and Hill (1989b) found that differences in incentive compensation affected the criteria executives used to make strategic decisions. Thus, executives below the CEO may use different models (than the CEO) to make strategic decisions because of the criteria contained in executive incentive compensation plans. As a result we may speculate that criteria on which strategic choices are based may differ by the level of the executive (below the CEO), because of information availability and differences in incentive compensation (strategic controls). Thus, executive level serves as a proxy for differences in information availability and in incentive compensation. These conclusions result in the following hypothesis:



*Hypothesis 3g: An executives' level (CEO and below) moderates the relationship between objective criteria and the strategic evaluation of acquisition candidates.*

Although Hambrick and Mason (1984) advocated the use of observable executive characteristics in studies of upper echelons theory, they acknowledged that the progress of this research stream could not go far without consideration of the psychological and social psychological characteristics that are represented by some demographic characteristics. Schwenk (1988) suggested that cognitive styles and personality characteristics represent two additional categories of variables that reflect individual differences. One of the cognitive style variables that has received attention in decision-making research is cognitive complexity. In addition, it can be argued that risk propensity, a personality characteristic, may greatly affect strategic decision processes.

### **Cognitive complexity**

Schneier (1979) argued that cognitive complexity was originally conceived as a variable that denotes the structural complexity of an individual's cognitive system. Psychological researchers propose that the number of constructs that a person uses in constructing a social perception provides evidence of structural complexity. Biere (1961) argued that cognitive complexity is an ability to differentiate the behavior of other individuals along a number of personal constructs. Individuals with relatively complex cognitive systems have a greater number of personal constructs along which to differentiate behavior in others than do those with relatively simple cognitive systems. The degree of complexity has been used to predict how specific behavioral information is transformed into social or clinical judgements (i.e. Bonarius, 1965).

We can reasonably expect most top executives to have certain minimum levels of cognitive complexity, given the array of factors that they must consider to fulfill their job responsibilities. Top executives must deal with an incredible array of problems and most strategic decisions are quite complex. In addition to greater complexity, Walsh (1988) found that managers' belief structures utilized for ill-structured problems were

more complex than previous authors suggested. Thus, the cognitive structural capacity of even top managers may be taxed.

Hambrick and Finkelstein (1987) argued that a manager's discretion is constrained to some extent by his or her ability to perceive options and simultaneously to process information regarding competing alternatives. They concluded that managers with greater cognitive complexity will have greater discretion in strategic choices because they are aware of more alternatives and are able to differentiate between a larger number of dimensions.

Downey and Slocum (1982) found cognitive complexity to moderate the relationship between perceived environmental uncertainty and managerial performance. In other words, individuals' cognitive abilities affected the manner in which they perceived that uncertainty in the environment affected their performance. Therefore, the effects of cognitive complexity relate to the processing of information. As a result, it affects the number and type (complex) of criteria and alternatives evaluated in the decision. This leads to the following hypothesis:

*Hypothesis 3h: An executive's cognitive complexity moderates the relationship between objective criteria and strategic evaluation of acquisition candidates.*

### **Risk orientation**

Much has been written about risk and strategic decisions. In particular, recent strategic management research focused on the relationship between risk and performance (e.g. Aaker and Jacobson, 1987; Amit and Livnat, 1988; Barton, 1988; Fiengenbaum and Thomas, 1988; Singh, 1986). Most have assumed rationality in strategic choices. However, there is a controversy regarding the relationship between a firm's risk and return (Bowman, 1982, 1984). Fiengenbaum and Thomas (1988) found that the relationship between risk and return can be either positive or negative. Their results supported prospect theory (Kahneman and Tversky, 1979; Laughunn, Payne and Crum, 1980) which suggests that poor performance leads executives to take higher risks. Baird and Thomas (1985) argued that the relationship between strategic risk-taking and performance is quite complex.

One reason for this complexity is that strategic decisions are made by and filtered through executives. As a result, strategic decisions may be partially affected by the managers' personal propensity toward risk (Baird and Thomas, 1985). For example, Williams (1965) suggested that those who have a higher propensity to take risks are likely to choose more uncertain decision alternatives. However, others argue that individuals may adopt a mixture of risk-seeking and risk-averse behaviors (Fiegenbaum and Thomas, 1988; Siegel, 1957). Sitkin, Pablo and Jemison (1990) suggested that a firm's risk perceptions and risk propensity affect merger decision processes. Top executives perceive the risk, and their risk orientations strongly influence the firm's orientation. While Gupta (1984) argued that top executives exhibit a greater willingness to take risks than the general population, Gupta and Govindarajan (1984) found top executives' risk propensity to vary. They found that executives who had a higher tolerance for ambiguity exhibit a greater willingness to take risks. While acquisition decisions often involve considerable ambiguity, the resulting decision may vary somewhat by acquiring firm's executives' risk propensity. Kogan and Wallach (1964) found that individuals with a lower risk propensity used a broader categorization of criteria in decisions, whereas those with higher risk propensities used a narrower categorization scheme. Furthermore, not only the number but the type of criteria may vary in these categorization schemes. Therefore, an executive's risk orientation may affect the type of criteria used to evaluate strategic alternatives. These arguments lead to the following hypothesis:

*Hypothesis 3i: An executive's risk propensity moderates the relationship between objective criteria and strategic evaluation of acquisition candidates.*

## METHOD

### Sample

Data were obtained through a survey instrument mailed to 122 top executives (chosen randomly using a random-number generator from a list of 950 top executives in the southwest United States). Each executive was contacted by telephone and asked to participate in the study.

used to ensure a strong response rate. A total of 69 responses were returned, for a 57 percent response rate. Four of the responses had missing data on at least one of the instruments for a usable sample of 65. The levels (title) and industries of executive respondents and their firms were compared to those of the nonrespondents (including those declining to participate). The results suggested no systematic differences between the groups. For example, the percentages of respondents and nonrespondents by level were almost identical (President/CEO-respondents 33 percent, nonrespondents 34 percent; executive or senior vice president-respondents 22 percent, nonrespondents 22 percent; vice president-respondents 45 percent, nonrespondents 44 percent). Comparison by industry showed a slightly higher nonresponse rate from service firms. However, further analysis of data from initial or follow-up contacts showed that a number of the nonresponses (or declines) in service industries were in highly unique services (e.g. galleries, commodity exchange) or were individuals not a part of the top management team (e.g. some vice-presidents in financial institutions). Therefore, they were not appropriate for this study. As a result we concluded there was no effective nonresponse bias.

The average age of the respondents was 47, with an average of 24 years of total work experience. The respondents' position ranged from vice-president to CEO with the mean position one level below the CEO (e.g. president and COO). The firms represented a variety of industries (20 different two-digit SIC codes) including manufacturing (consumer goods, producer goods, capital goods) and services (e.g. financial and professional services). The average firm size was \$550 million in annual sales.

### Instrument

The instrument contained four parts including 30 cases with potential acquisition candidates described through 15 objective criteria, a measure of risk propensity, a measure of cognitive complexity and a set of questions regarding individual respondent and firm characteristics (demographics). The order of the components in the instruments sent to executives was randomly determined to control for potential order effects.

As noted earlier, industry may affect strategic decisions (e.g. Dess, Ireland and Hitt, 1990). Thus, industry was controlled in examining the main effects of the other variables.

### Objective criteria

The study examines executives' strategic decision-making. The type of decision chosen for examination involved the evaluation of firms targeted for acquisition. The objective criteria on which to evaluate target firms were developed through a survey of the literature and recommendations from academic 'experts'. Five academicians knowledgeable of the strategy and mergers and acquisitions literature were requested to identify criteria used by executives to evaluate target firms and make acquisition decisions. Based on the 'experts' recommendations and the literature review, 15 objective criteria were identified. The goal of the development process was to identify all potentially important criteria while maintaining a 'manageable' list for case development. The target firm criteria chosen include level of diversification, market share in firm's primary industry, annual sales, return on investment, stock price, anticipated discounted cash flow, projected new products/services to be developed over the next 5 years, projected demand for products/services over the next 5 years, level of management talent, capabilities in marketing, capabilities in manufacturing, capabilities in R&D, attractiveness of the firm's primary industry, degree of synergy with acquiring firm, and acquisition price. These objective criteria were used to develop 30 cases on target firms as described later.

### Risk propensity

Executives' propensity to take risks was measured using the Job Preference Inventory (Williams, 1965). The inventory consists of eight pairs of descriptive statements regarding a job. The respondent is asked to choose the statement which describes the job s/he would most prefer. The statements describing a 'risky' job are scored 1 and statements describing a job with little or no risk are scored as 0. Williams (1965) found the reproducibility coefficients to range from 0.83 to 0.90. Further, studies found the scale to be highly and positively (rank order correlations

ranging from 0.85 to 0.96) related to favorable perceptions of change in job activities providing evidence of validity for the scale. The internal reliability (coefficient alpha) for the scale in this study was 0.66.

### Cognitive complexity

Cognitive complexity was measured using an instrument developed by Bieri *et al.* (1966), modified by Vannoy (1965) and validated by Schneier (1979). Essentially the instrument involves a  $10 \times 10$  grid whereby the respondent is asked to evaluate 10 specific persons (e.g. boss, person who respondent dislikes, etc.) including him/herself on 10 bipolar adjectives using a six-point scale (for a total of 100 ratings). The higher the score, the more cognitively simple the person because she/he is using similar constructs to describe each person. A person who is more cognitively complex (lower score) uses the constructs differently in discriminating among people. Schneier (1979) found the instrument to have a test-retest reliability of 0.54 ( $p < 0.01$ ) for a sample of students and 0.82 ( $p < 0.01$ ) for a sample of managers. Schneier also found evidence of both convergent and discriminant validity for the instrument.

### Demographic characteristics

A number of individual and firm characteristics were measured. The respondents' chronological age was requested. Amount of education was measured on a five-point scale ranging from high school to a Ph.D. (high school, some college, bachelors degree, masters degree, Ph.D.). Additionally, the respondents were requested to denote the major area of study if they held a college degree (e.g. accounting, engineering, liberal arts, etc.). Type of education (major area of study) was coded as a dummy variable.

Respondents were asked to denote the industry representing the greatest percentage of total firm sales. This information was used to help classify the firm into the correct two-digit SIC code. For analytical purposes (e.g. testing hypotheses), the firms were further classified into one of six categories including consumer goods (manufacturers), capital goods, producer goods, financial services, professional services and other. The sample was distributed across the industry

categories in the following manner: consumer goods (7), producer goods (19), capital goods (10), financial services (8), professional services (16), other (5). The other category is composed of firms that could not be classified in one of the other five categories. Industry was then coded as a dummy variable.

In addition to the title of the current position, the respondents provided the number of levels between them and the CEO (0 = CEO). They also provided the chronological number of total years of professional work experience.

Finally two measures of functional experience were obtained. Respondents were asked to denote whether they had work experience in one or more of the functional areas (accounting, engineering, finance, marketing, management, R&D, personnel, production/manufacturing, purchasing) or other areas. Each was coded as a dummy variable (1 = experience, 0 = no experience). The respondents also provided the number of years experience in each function (to the extent that such experience could be specifically identified). Our sample was composed of top executives, many of whom had general manager experience for a number of years. As such, they had responsibility for multiple functional areas in the same job. Therefore, our sample of top executives had broad and overlapping experience. As a result our measure of type of work experience is more complex than has been examined in past studies (e.g. Walsh, 1988). These data presented no problem for examining general main effects for personal characteristics because we did not hypothesize specific main effects for each separate characteristic. However, to test for the moderating effects of work experience we needed to examine the combination of experience across functional areas. It would not be realistic or appropriate to examine the effects of experience in each functional area separately because of their interdependence. While we expected most top executives to have a broad experience base, we were interested in determining whether the strategic decision models of those with somewhat more specialized experience differed from the others. Therefore, a clustering technique was used to differentiate group executives with similar backgrounds. The clustering procedure used an iterative algorithm for minimizing the sum of the squared distances from the cluster means. As a

result it allowed the determination of groups with the highest within-group similarities and the greatest between-group differences (process used to delineate the six clusters). Thus, to examine moderating effects of type of experience, respondents were clustered according to the type and number of years of functional experience.

The cluster analysis produced six distinct clusters. However, the results also showed that many of the respondents had similar background (as expected from top executives with significant general manager experience). The first cluster contained 47 respondents and represented those with a broad base of experience with some experience in each of the functional areas (broad-based experience cluster). The remaining clusters (except four and six) while having multifunctional emphases, were also more specialized, each in different ways. Cluster two included those with a fairly broad base of experience but no experience in finance or personnel (business and technical cluster). Cluster three includes those with heavy experience in finance, marketing, management and personnel but no technical experience (core business cluster). Clusters four and six represent one respondent each who has significant experience in engineering combined with other experience that differentiates them significantly from other respondents (technical clusters). These clusters were dropped from further analysis. Cluster five respondents had dominant experience in engineering, management and production but little or no other business functional experience (technical management cluster). For purposes of the moderated regression analyses, this variable was coded as a dummy variable.

Size of the firm was used as a control variable. In particular, firm size might affect the emphasis on specific criteria. Thus, to ensure that other effects examined were not contaminated by firm size, it was controlled in the primary analyses. Firm size was measured using total annual firm sales and total number of employees.

### Decision models

The procedure known as policy capturing (Slovic and Lichtenstein, 1971; Hobson and Gibson, 1983) was used to obtain and analyze the data. Such a procedure has been used in past research to model managers' decision processes (e.g.

Ireland *et al.*, 1987). The method is similar to a repeated-measures design and allows assessment of what Argyris and Schon (1974) described as 'theories in use' as opposed to 'espoused theories of action.' Hitt and Middlemist (1979) conducted *post hoc* interviews with superiors of the managers in their study, revealing that the policy-capturing models accurately represented actual decision-making behavior, providing support for the external validity of the procedure.

For this study 30 cases were constructed by randomly varying the level of each of the 15 target firm characteristics (criteria) on a scale of one (low) to five (high) across the cases (a sample case is shown in the Appendix). The random assignment of criteria levels controlled for potential collinearity among the independent variables. The highest  $r$  between any pair of criteria was 0.37 for a common variance of less than 14 percent.

Executives were asked to examine each case describing a target firm on the basis of the 15 criteria and rate the attractiveness of the target firm as an acquisition candidate (on a one to seven scale) and rate the probability that this firm would be acquired (on a one to seven scale). The coefficient alpha for the scale combining these two questions was 0.90. This combined scale represented the dependent variable.

Each manager evaluated 30 target firms yielding a sample size of  $30 \times 65$  or 1950 observations. The assumption of independence between each of the respondent's 30 observations is consistent with a within-subjects, repeated-measures design (Winer, 1974). Precedent exists for the assumption that each case represents an independent observation (Hitt and Middlemist, 1979; Hitt *et al.*, 1983; Stewart and Gelberd, 1972). To check on the independence of the observations, we examined the possibility of serial correlation among within-person observations (only the objective criteria varied in the within-person observations—personal demographics and industry represent between-person effects). We used a common procedure to block within-person variance (dummy variables for each respondent) and examined the remaining (between-person) variance explained by the objective criteria. Using hierarchical regression analysis we found the objective criteria to explain slightly over 30 percent of the variance (model  $R^2 > 0.40$ ) in the strategic decisions beyond the control variables

(individual dummy variables had an  $R^2 = 0.085$ ). These results suggest that the data are relatively free of serial correlation (within respondents) and support the independence of individual observations.

### Pilot study

A pilot study was conducted with executives involved in a 4-week development program to evaluate the use of the instruments. The executives required a minimum of 30 minutes and maximum of 1 hour to complete all parts of the instrument. The data were analyzed and individual results were provided to and discussed with each executive. The exercise suggested that the cases were viable and criteria used were inclusive of those felt important by the executives. Furthermore, the feedback provided guidance regarding the type of instructions necessary for executives to accurately complete the instruments.

## RESULTS

The intercorrelation matrices are presented in Tables 1 and 2. The data were aggregated and Hypotheses 1, 2a and 3a were analyzed using hierarchical regression. To control for the effects of firm size, annual firm sales (sales and number of employees were highly correlated) was entered into each regression model. The results of these analyses are shown in Table 3. The differences in  $R^2$  were tested using a procedure recommended by Cohen (1968) which accounts for the degrees of freedom.

As shown in Table 3, Hypotheses 1, 2a and 3a were all supported. The table also shows that the main effects for objective criteria were by far the strongest. In Model 1, industry, personal characteristics, and firm sales accounted for slightly over 7 percent of the variance in evaluation of target firms. However, addition of the objective criteria to the model added almost 33 percent to the explained variance. This provides strong support for Hypothesis 1.

The addition of industry variables to the hierarchical regression model (Model 2) increased the  $R^2$  by 0.022. This change was statistically significant and thus Hypothesis 2a was supported. The addition of personal characteristics to the hierarchical regression model increased the variance explained by almost 3 percent. The change

Table 1. Intercorrelation matrix for objective criteria and target evaluation

Variable	Mean	Standard deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Diversification	3.57	1.36	—															
Market share	3.17	1.44	0.19	—														
Sales	2.87	1.26	-0.19	0.18	—													
ROI	2.77	1.41	0.03	0.18	-0.13	—												
Stock prices	3.10	1.38	-0.17	0.04	0.05	-0.14	—											
Discounted cash flow	3.13	1.63	-0.12	-0.02	0.20	-0.06	-0.18	—										
Projected new products	3.10	1.42	0.09	0.32	0.03	0.34	0.18	-0.16	—									
Projected demand	2.77	1.28	-0.02	0.04	-0.33	0.01	-0.04	-0.02	-0.02	—								
Management talent	2.97	1.38	0.10	-0.40	-0.10	-0.04	-0.21	0.08	-0.05	-0.08	—							
Marketing capabilities	2.83	1.32	0.16	0.03	-0.05	0.01	-0.08	0.24	-0.26	0.10	0.14	—						
Manufacturing capabilities	2.67	1.37	0.35	0.23	0.03	0.13	-0.05	0.23	0.12	0.01	0.24	0.19	—					
R&D capabilities	2.93	1.21	0.41	0.04	0.17	-0.11	-0.12	0.09	-0.23	-0.22	0.04	0.35	0.13	—				
Industry attractiveness	3.27	1.24	-0.03	0.05	0.00	0.07	0.06	0.00	0.16	-0.07	0.06	-0.10	0.17	-0.37	—			
Synergy	2.87	1.26	0.12	-0.19	-0.12	-0.09	0.01	0.04	0.08	0.00	0.23	0.17	-0.14	0.30	0.02	—		
Acquisition price	3.17	1.32	0.04	0.18	0.13	-0.10	0.16	0.13	-0.20	0.00	-0.03	0.13	0.09	0.24	0.20	0.17	—	
Target evaluation	7.00	3.28	0.18	0.10	0.01	0.24	-0.21	0.25	0.19	0.19	0.19	0.19	0.27	0.07	0.10	0.16	-0.05	—

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statistically significant (at  $p < 0.01$ ).  
support for Hypothesis 3a.

Hypotheses 2b and 3b–3i were tested using moderated regression analysis. This type of analysis yields a conservative estimate of the moderating effects of one variable (e.g. industry–Hypothesis 2b) on the relationship between two or more other variables (in this case, objective criteria and the evaluation of target firms) (Darrow and Kahl, 1983). Thus, in this study, these analyses test the effects variables have on executives' acquisition decision models. The same method used for the hierarchical regression analyses (Cohen, 1968) was used to test the change in  $R^2$  between the restricted (main effects) and full models (main and interaction effects). The results of these analyses are presented in Table 4.

As shown, six of the nine moderated regression results produced statistically significant changes in  $R^2$ . Industry (categories), age, type of education, amount of work experience, type of work experience and level of the executive were found to be statistically significant moderators of the relationship between objective criteria and evaluations of target firms; thereby providing support for Hypotheses 2b, 3b, 3c, 3e, 3f and 3g. An executive's cognitive complexity, level of education and risk orientation were not found to be statistically significant moderators. Thus, no support was found for Hypotheses 3d, 3h and 3i. These results suggest that the industry in which a firm competes, executives' age, type of education, amount and type of experience and organizational level tend to affect their strategic decision models. As might be expected, age and amount of work experience were highly correlated, with a  $r = 0.97$ . Because of this collinearity, further analyses were conducted in an attempt to examine their true independent effects. We partitioned the variance explained by each variable in moderated regression models. The results showed that neither age nor amount of work experience explained a statistically significant amount of variance beyond the other in these analyses. As a result, an age/work experience index was created by standardizing (z score) each and obtaining a mean of the two sets of standardized scores for each respondent. Next, a moderated regression analysis was conducted using this index as the moderator. As shown in Table 4, age/work experience index is a statisti-

cally significant moderator (at  $p < 0.01$ ).

To examine how each of the moderating variables tended to affect executive strategic decision models, further regression models were developed for each category (e.g. different type of industry) where moderating effects were found. While interesting, these stepwise regression models are not presented because they are beyond the scope of this article. However, these results may be obtained from the authors.

## DISCUSSION

The results showed that elements of the rational normative, external control, and strategic choice perspectives of strategic decision-making are operative. Additionally, the research suggests that objective criteria play a prominent role in executives' strategic decision models. However, industry and executive characteristics also produced statistically significant but small main effects on strategic decisions, as well as moderating effects on the criteria used in those decisions. While the effects are not large, these findings appear relevant, considering the conservative nature of the test used. Therefore, the research suggests that strategic decisions cannot be accurately modeled with one perspective alone. The results support Fredrickson's (1985) conclusion that executives' approaches to strategic decisions were simultaneously rational and intuitive.

The dominance of the objective criteria in executives' strategic decision models provides strong support for the normative strategic choice perspective. Almost 82 percent of the total explained variance in executives' strategic decisions was attributed to objective criteria. These results suggest that a rational analytical approach dominates strategic decision processes. Additionally, these results are very similar to those of Rumelt (1991) when he partitioned the total variance in performance among FTC Line of Business reporting units into industry factors, time factors, corporate factors, and business-specific factors. He found that stable business effects were six times as important as stable industry effects in explaining the dispersion of rate of returns. This suggests that returns of business units differ from one another within industries to a much greater extent than industries differ from one another. He concluded that

Table 2. Intercorrelation matrix for target evaluation, industry, executive characteristics, and size

Variables	Mean	Standard deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Target evaluation	7.00	3.28	—																					
2. Consumer goods	0.11	0.31	0.00	—																				
3. Capital goods	0.15	0.36	-0.04	-0.15	—																			
4. Producer goods	0.29	0.45	-0.01	-0.22	-0.27	—																		
5. Financial services	0.12	0.33	0.06	-0.13	-0.16	-0.24	—																	
6. Professional services	0.23	0.42	0.03	-0.19	-0.23	-0.35	-0.21	—																
7. Age	46.77	10.18	-0.05	0.01	0.01	0.20	-0.39	-0.01	—															
8. Accounting degree	0.06	0.24	0.02	0.12	-0.11	0.12	0.10	-0.14	-0.14	—														
9. Engineering degree	0.38	0.49	-0.01	0.24	0.10	0.12	-0.20	-0.13	0.38	-0.20	—													
10. Finance degree	0.11	0.31	0.02	-0.12	-0.15	-0.11	0.32	0.16	-0.40	-0.09	-0.27	—												
11. Management degree	0.23	0.42	-0.02	-0.19	0.17	-0.03	0.02	-0.04	-0.01	-0.14	-0.43	-0.19	—											

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Table 3. Hierarchical regression models for predictors of acquisition decisions

Model 1				Model 2				Model 3			
Independent variables	$R^2$	$\Delta R^2$	$F$	Independent variables	$R^2$	$\Delta R^2$	$F$	Independent variables	$R^2$	$\Delta R^2$	$F$
Industry, personal characteristics, and sales	0.073			Personal characteristics, objective criteria, and sales	0.377			Industry, objective criteria, and sales	0.370		
Objective criteria	0.399	0.326	70.83**	Industry	0.399	0.022	3.54**	Personal characteristics	0.399	0.029	2.83**

\*  $p < 0.05$ \*\*  $p < 0.01$ 

Table 4. Moderated regression model results

Moderator	Model	$R^2$	$\Delta R^2$	$F$
Industry (5 categories)	Restricted	0.333		
	Full	0.373	0.04	1.56*
Age	Restricted	0.328		
	Full	0.338	0.01	1.83**
Type of education (5 categories)	Restricted	0.331		
	Full	0.367	0.036	1.43*
Level of education	Restricted	0.327		
	Full	0.332	0.005	0.91
Amount of work experience	Restricted	0.326		
	Full	0.337	0.011	2.03**
Type of work experience (4 clusters)	Restricted	0.328		
	Full	0.362	0.034	1.61**
Executive level	Restricted	0.326		
	Full	0.338	0.012	2.32**
Cognitive complexity	Restricted	0.327		
	Full	0.330	0.003	0.65
Risk orientation	Restricted	0.326		
	Full	0.332	0.006	1.07
Age/work experience index	Restricted	0.328		
	Full	0.338	0.01	1.93**

\*  $p < 0.05$ ; \*\*  $p < 0.01$ .

impediments to the long-term rates of return are associated with unique endowments, positions, and strategies of individual businesses.

Interestingly, however, such a rational approach to strategic decisions is supposed to account for environmental conditions, yet industry contributed a statistically significant but small addition to the explained variance above and beyond that which was explained by other variables examined. The results support those of

Rumelt (1989), who found small but stable effects of industry on firm performance. These results provide support for the influence of the external control perspective. Thus, we might conclude that the strategic decision process may be, at least, partially deterministic. Perhaps even more importantly, however, the results suggest that the objective criteria used in making strategic decisions may vary by industry. The results suggest, then, that industry has both direct

and moderating effects on executives' strategic decisions. Thus, industry characteristics may contribute to the development of managerial orientations in the form of an industry recipe (Spender, 1989). Over time, experience in an industry may focus an executive's attention on certain criteria while ignoring others (Starbuck and Milliken, 1988). Therefore, executives evaluating target firms place emphasis on criteria important in their firm's as well as the target firm's primary industry. The results support the Bourgeois (1984) conclusion that a reciprocal interdependence exists between industry and strategic decisions.

The results also provide some support for Hambrick and Mason's (1984) upper echelons theory. Essentially, the results suggest that executives matter above and beyond rational analytical processes and industry characteristics. Executive characteristics produced main and moderating effects on strategic decision models. The results support contentions by a number of theorists (e.g. Gupta, 1988; Norburn, 1989) that an accurate understanding of strategic decisions requires consideration of the effects of executives' personal characteristics. While the results did not support fully all contentions of Hambrick and Mason's (1984) upper echelons theory related to specific individual characteristics, they denote effects of executive characteristics on decisions. Furthermore, they suggest that upper echelons theory as originally proposed by Hambrick and Mason may need some refinement.

While this study was not a complete test of upper echelons theory as proposed by Hambrick and Mason (1984), support was found for the effects of executives' age, years of work experience, functional experience, and type of education. However, no support was found for the effects of level of formal education on strategic decisions (except in selected subgroup analyses). The results support Tversky and Kahneman's (1981) assertions that decision frames adopted are controlled partially by the personal characteristics of the decision-maker. Furthermore, the results suggest that, while some cognitive simplification occurs (Schwenk, 1984), executives' strategic decisions are also incredibly complex. Executives use rational analytic approaches but their strategic decisions may also be affected by their firms' industry and their own personal characteristics.

Upper echelons theory may require modification to include executive level as a differentiating variable. The results herein focused on top executives assumed to be a part of the top management team (TMT) but found differences in the strategic models by level (in the inclusion and weighting of several strategic decision criteria). Of course, the CEO may be considered the most important executive in the TMT for strategic decisions. Robbins and Duncan (1988) argued the importance of CEOs in the creation and implementation of strategic vision. However, a CEO's ability to create and implement a strategic vision could be affected considerably by the extent to which other members of the TMT agree with and support that vision. The effects of executive level on strategic decisions support current work on the importance of the homogeneity/heterogeneity of the TMT (e.g. O'Reilly and Flatt, 1989).

Additionally, we found that most top executives are generalists with broad functional experience. However, even though most executives had a broad experience base, there were differences in the combinations of interrelated experiences (we found four separate clusters after eliminating two outliers). Furthermore, we found that the strategic decision models varied across executives with different combinations of experience. Thus, the types and effects of experience may be more complex than previously suggested.

Risk propensity and cognitive complexity were not found to be universally important as hypothesized. The results do not allow rejection of the importance of risk propensity and cognitive complexity. However, they should be examined in conjunction with other characteristics to obtain a more accurate picture of their effects on strategic decisions.

We should recognize that the range of cognitive complexity among individuals narrows considerably as they move up the managerial hierarchy. Thus, there may not be significant variance among top executives' cognitive complexity. In this study, cognitive complexity ranged from a score of 91 (high complexity) to 279 (low complexity). The mean score was 130 suggesting a distribution skewed toward higher complexity.

Risk taking was significantly negatively associated with age in some early studies (Vroom and Pahl, 1971; Wallach and Kogen, 1961). However, it is interesting to note the significant positive

relationship between age, experience, executive level (CEO = 0), and risk (Table 2) suggesting top executives to be unique. As the governing body of an organization, top executives cannot afford to exhibit the lack of confidence. Thus, managers that show confidence and ability to make necessary but risky decisions become the top executives of an organization. This suggests a potential range restriction in risk propensity among top executives. The mean risk propensity for executives in our sample was 6.5 and the mode 8 (22 executives had a risk propensity score of 8), thereby supporting this notion.

Our findings suggest that selection and socialization processes for top executive positions likely narrow the individual differences between executives. Top management team members may not differ greatly in individual characteristics (e.g. experience, risk propensity). These findings suggest a further modification of upper echelons theory. Yet our findings also suggest that the differences in individual characteristics that do exist may well affect strategic decisions. Thus, while the effects may not be as great as originally proposed, upper echelons theory remains operative.

Hambrick and Mason (1984) proposed that the interrelationship among and effects of executive characteristics are complex and difficult to disentangle. For example, age and amount of work experience are highly interrelated, similar to previous studies (e.g. Taylor, 1975). Analysis suggested that the effects of these two factors are inextricably interwoven and independent effects of age and amount of work experience may not be able to be isolated. Thus, it may be advisable, in future research, to consider the combined effects of these two factors.

Finally, while Walsh (1989) suggested that policy capturing has high investigator involvement, this technique may actually be more realistic for strategic decisions than techniques used in past decision-making research. Rarely do top executives conduct preliminary analyses on potential acquisitions. Rather staff members or other managers assimilate and analyze relevant data and present executives with summary evaluations of targets (similar to the procedure in the present study). As noted earlier, policy capturing delineates models that are effective predictors of managerial decision behavior (Hitt and Middlemist, 1979).

Additionally, the study focused on the decision of great importance to strategic management academicians and practitioners alike. The 1980s have been labeled by some as the decade of merger mania. We need to understand better the models on which strategic acquisition decisions are made. For example, Duhaime and Schwenk (1985) suggested that the quality of the acquisition decision process influences the subsequent success or failure of the resulting acquisition. The results of this study support theory and research on acquisition decisions. Discounted cash flow was one of the most important predictors (criteria) of acquisition decision in our subgroup analyses. This supports Jensen's (1986) contention that cash flow is the critical criterion for diversification and acquisition decisions.

Additionally, Roll's (1986) 'hubris hypothesis' of corporate takeovers suggested that hubris on the part of individual decision-makers causes 'mistaken estimates of target firm value' (p. 214). If the individual bidder/manager is confident that the market does not reflect the full economic value of the combined firms, the bid for the target will be greater than is economically justifiable. Thus, pride or overconfidence, bolstered by past successes, may bias the bid price. This 'hubris' may be the result of the manager's personal characteristics.

Given the potential for individual characteristics to affect strategic evaluations, some may argue that opportunity exists for managers to act consciously against shareholder interests (Roll, 1986). While agency problems may exist, the results of this study suggest that executive effects do not necessarily represent conscious opportunistic behavior. However, it also does not preclude the potential for managers to act in their own interests (i.e. utility functions), which may diverge from shareholders' interests (Hoskisson *et al.*, 1989a). An application, in future research, of agency theory to the cognitive modeling of strategic decision processes would be a valuable contribution (Eisenhardt, 1989).

## CONCLUSIONS

A review of research related to environment, strategy, structure, and performance revealed an emphasis on objective measures with a

disproportionate number of studies based on quantitative data drawn from the PIMS and Compustat data bases (Hrebiniak *et al.*, 1988). Furthermore, Hrebiniak *et al.* (1988) argued that 'the skewing of strategy research in this measurement direction has tended to underrepresent the intentional and cognitive aspects of strategy.' Stubbart (1987) argued that future research should focus on middle-range synthesis of cognitive phenomena, linking them to broader organizational phenomena. In addition, Stubbart (1987) and Gupta (1988) concluded that future research should focus on executive behavior. The methodology employed in this study allowed us to examine executives' strategic decision behavior, use the behavioral data to construct executive strategic decision models and overcome some of the limitations of previous strategic decision research as noted by Robey and Taggart (1983).

This research provides new insights regarding a potential source of emergent strategy. Rational processes may dominate the strategy formulation process, but industry and executive characteristics may also affect the decision process. These effects may be further amplified during strategy implementation and may help explain at least some of the variance between intended and emergent strategy. Research related to the effect of executives and industry on the strategy implementation process provides a fruitful area of future investigation.

Much more research is required before any definitive conclusions can be reached regarding the specific effects of individual executive characteristics on strategic decisions. Furthermore, this study should be replicated with other types of strategic decisions. However, this research provides insight into the complex and multifaceted relationship between the industrial environment, objective business-level criteria, executive characteristics, and strategic decisions. Elements of rational normative, external control, and strategic choice (upper echelons theory) perspectives were all found to contribute to the explanation of strategic decisions. Barnes (1984) argued that strategic planners must recognize their cognitive biases and attempt to formulate strategic decisions that accurately reflect the firm's strategic situation. Future research should examine more precise formulations of upper echelons theory with the purpose of disentangling the complexity

of strategic decisions. Furthermore, future research should examine the effects of inertia on strategic decision making (Fredrickson and Iaquineto, 1989) and whether industry or executive characteristics contribute to this inertia. Jackofsky and Slocum (1988) argued that, despite the importance of CEOs, there is a dearth of knowledge about them. We expand this concern to the top management team. The current research provides a base on which a better understanding of executive strategic decision-making may be developed.

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Evaluation report for target firm TW

Target firm characteristics	Evaluation				
	Low 1	Moderately Low 2	Average 3	Moderately High 4	High 5
1. Level of diversification	[ ]	[ ]	[X]	[ ]	[ ]
2. Market share in firm's primary industry	[ ]	[ ]	[X]	[ ]	[ ]
3. Annual sales	[ ]	[X]	[ ]	[ ]	[ ]
4. Return on investment	[ ]	[ ]	[ ]	[X]	[ ]
5. Stock price	[ ]	[ ]	[ ]	[ ]	[X]
6. Anticipated discounted cash flow	[X]	[ ]	[ ]	[ ]	[ ]
7. Projected new products/services to be developed over next 5 years	[ ]	[ ]	[ ]	[ ]	[X]
8. Projected demand for products/services over the next 5 years	[X]	[ ]	[ ]	[ ]	[ ]
9. Level of management talent	[ ]	[X]	[ ]	[ ]	[ ]
10. Capabilities in marketing	[ ]	[X]	[ ]	[ ]	[ ]
11. Capabilities in manufacturing	[ ]	[X]	[ ]	[ ]	[ ]
12. Capabilities in R&D	[ ]	[X]	[ ]	[ ]	[ ]
13. Attractiveness of firm's primary industry	[ ]	[ ]	[ ]	[X]	[ ]
14. Degree of synergy with your firm	[ ]	[ ]	[X]	[ ]	[ ]
15. Acquisition price	[ ]	[X]	[ ]	[ ]	[ ]

Based on the information provided above, and your experience and knowledge, please rate the attractiveness of this firm as an acquisition candidate. Place an × in the appropriate space.

Very unattractive

1      2      3      4      5      6      7

Very attractive

What is the probability that you would recommend that this firm be acquired? Place an × in the appropriate space.

Low probability

1      2      3      4      5      6      7

High probability