

The Influence of Top Management Team Heterogeneity on Firms' Competitive Moves

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This paper explores the executive origins of firms' competitive moves by focusing on top management team characteristics, specifically on team heterogeneity, rather than on the more often studied environmental and organizational determinants of such behaviors. Arguing that competitive actions and responses represent different decision situations, we develop propositions about how heterogeneity may enhance some competitive behaviors but impair others. With a large sample of actions and responses of 32 U.S. airlines over eight years, we find results that largely conform to our propositions. The top management teams that were diverse, in terms of functional backgrounds, education, and company tenure, exhibited a relatively great propensity for action, and both their actions and responses were of substantial magnitude. Heterogeneous teams, by contrast, were slower in their actions and responses and less likely than homogeneous teams to respond to competitors' initiatives. Thus, although team heterogeneity is a double-edged sword, its overall net effect on airline performance, in terms of changes in market share and profits, was positive.*

In recent years, strategy researchers have directed attention to the specific moves and countermoves made by rivals within industries (e.g., Chen and MacMillan, 1992; Smith, Grimm, and Gannon, 1992), recognizing that organizational vitality may depend more on the quantity, quality, and speed of a firm's and its adversaries' on-going actions and responses in the competitive arena than on the traditional concept of sustainable advantage (D'Aveni, 1994). Studies have shown some important effects of firms' competitive behaviors on company performance, indicating, for instance, that quick responders gain market share at the expense of slow responders (Chen and MacMillan, 1992). Research also has shed light on the determinants, or antecedents, of firms' competitive action and response tendencies. For example, Chen and Hambrick (1995) demonstrated that small and large firms differ markedly in their competitive behaviors; for example, small firms were shown to be more active and faster in initiating competitive challenges than large firms.

This paper, like Chen and Hambrick (1995), is one of a series of studies drawn from an extensive and progressively developed database that represents a comprehensive longitudinal study of domestic airline competition during the 1980s. In contrast to previous strategy research, which had tended to infer competition from more static and aggregate firm attributes or from structural properties of the industry, this program of research has examined some fundamental competitive issues through the systematic analysis of concrete, tangible market-oriented actions taken by firms. The research program falls into three distinct but highly related streams. The first stream, focusing on competitive dynamics or the action/response dyad, has shown that competitive response can be predicted by the attributes of the attack, the attacker, and the defender (Chen and MacMillan, 1992; Chen, Smith, and Grimm, 1992; Miller and Chen, 1994). The second stream, of which the present study is a part, has investigated strategic competitive behavior at the firm level—its human and organizational origins as well as performance

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implications (Smith et al., 1991; Chen and Hambrick, 1995). The third stream, conceptualizing a firm's strategy as the entire repertoire of its competitive moves, has examined the antecedents and performance implications of competitive inertia (Miller and Chen, 1994), simplicity of competitive moves (Miller and Chen, 1996a), and nonconformity in competitive repertoires (Miller and Chen, 1996b).

The cumulative goal of this research program has been to develop a coherent predictive theory of competitive behavior, which has so far been lacking in the field of strategic management. Such a theory should ultimately be more reliable if it is based on a common set of empirical observations. This research approach, akin to the PIMS studies (e.g., Hambrick, MacMillan, and Day, 1982) and the Aston studies (e.g., Pugh and Hickson, 1972), is somewhat unusual in the field of strategic management but should be an effective and efficient way to accumulate knowledge in this field. The multiple studies—warranted because of the scale, detail, and evidences of reliability of the data set—have been complementary, yielding integrated insights into the complex topic of competitive dynamics.

This stream of research is still embryonic, however, and far more needs to be known. In particular, theorists of competitive dynamics can benefit, we believe, by expanding their attention from environmental and organizational determinants of behavior to include the characteristics of the decision makers, in particular the company's top management team. Such an upper-echelons approach (Hambrick and Mason, 1984) would acknowledge that human and social biases, filters, and idiosyncratic processes at the top of the organization substantially influence competitive behaviors. This line of thought has been consistently supported in examinations of a wide array of organizational outcomes (summarized in Hambrick, 1994), but with limited exceptions (Smith et al., 1991), it has not yet been considered as a way to improve explanations of microcompetitive action and response behaviors.

Taking the upper-echelons perspective, this paper examines the effects of top management team heterogeneity on firms' competitive behaviors and ensuing organizational performance. We expected that heterogeneity, a central construct in the literature on top management, would be important in competitive decision making, conferring breadth of perspective, on one hand, but with the potential for team dissensus and inefficiency, on the other hand (Jackson, 1992). With a large sample of specific competitive actions and responses of 32 U.S. airlines over eight years, we examine the associations between team heterogeneity and (a) the firm's propensity to act, the magnitude of these actions, and the speed with which they are executed, and (b) the firm's propensity to respond to adversaries' actions, the magnitudes of responses, and the speed of responses.

BACKGROUND

Competitive Behaviors

Contrary to a model of sustainable advantage, Schumpeter and other theorists of the Austrian school (Jacobson, 1992)

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contended that competition is fluid and that a firm advances by continually taking action and responding to the actions of its adversaries. One stream of strategy research has adopted this framework by focusing on the microcompetitive behaviors of firms and the determinants and consequences of those moves. In this view, firm performance can be seen as an outcome of a series of competitive actions that may be rapidly nullified by opponents' incessant competitive challenges (D'Aveni, 1994).

Because of the importance of competitive behaviors to overall firm strategy and performance, an understanding of the determinants, or influencers, of those behaviors is essential. Several studies have already contributed to this understanding. MacMillan, McCaffery, and Van Wijk (1985) showed that competitors' response times to new products were a function of whether the products had major organizational significance for these firms. And a series of studies, using some of the same airline data we are using, has revealed additional determinants of competitive behaviors. First, using the action/response dyad as its analytical level, research has demonstrated that competitive response (likelihood, timing, etc.) can be predicted by the attributes of the actions (Chen, Smith, and Grimm, 1992; Miller and Chen, 1994) as well as those of the initiators and of the defenders (Chen and MacMillan, 1992). Second, distilling the properties of a firm's actions and responses to capture its competitive behavior at the firm level, research has further shown the significance of such behavioral antecedents as firm size (Chen and Hambrick, 1995), information-processing capacity (Smith et al., 1991), and market growth (Miller and Chen, 1994).

The research to date has focused almost solely on environmental and organizational explanations for competitive behaviors. Except for Smith et al. (1991), whose study of the impact of top management teams' educational and industry experience focused exclusively on competitive responses, no attention has been paid to the decision makers behind the observed market behaviors. Because research focusing on top management team characteristics has greatly aided understanding of other organizational phenomena (e.g., Bantel and Jackson, 1989; Finkelstein and Hambrick, 1990), we believe such a focus will also increase our understanding of competitive behaviors of firms, which represent instances of specific decisions or bounded sets of decisions in rivalrous arenas. Attention to decision makers can provide an important new vantage for researchers of competitive interaction, with possibly important theoretical and practical implications. Thus, with newly collected information about top executive characteristics added to the database of competitive interactions used in the prior studies, the current research delves into the largely unexplored terrain of the human origins of competitive decision making and behavior.

Although other characteristics of top management teams might also fruitfully be examined, we restrict our theoretical focus here to heterogeneity, first, to elaborate on the complex effects of this important construct and, second, because the fundamental differences between a firm's competitive actions and its responses to competitors' actions provide a unique arena for studying the potentially divergent

effects of heterogeneity and possibly understanding conflicting results in the literature on top management teams.

Heterogeneity of Top Management Teams

Theoretical interest in top management teams can be traced to March and Simon's behavioral theory of the firm (March and Simon, 1958; Cyert and March, 1963). According to this theory, decision makers are often unable to make economically rational decisions because they are boundedly rational and must act in a social context of multiple and conflicting goals. Hambrick and Mason (1984) extended these ideas in their upper-echelons perspective. In their view, (1) the organization becomes a reflection of its top executives, and (2) the characteristics and functioning of the top management team have far greater potential for predicting organizational outcomes than do the characteristics of the chief executive officer (CEO).

Numerous studies over the last ten years have found significant associations between the demographic composition of the top management team and organizational characteristics. Studies have documented the tendency for young, short-tenure, highly educated teams to be relatively innovative, even after controlling for the type of industry (Bantel and Jackson, 1989; O'Reilly and Flatt, 1989). Organizational tenure of top management team members was found to be strongly associated with strategic persistence, or absence of change (Finkelstein and Hambrick, 1990; Grimm and Smith, 1991; Wiersema and Bantel, 1992). Other studies have found organizational effects arising from the mix of functional backgrounds (e.g., Thomas, Litschert, and Ramaswamy, 1991), industry experience (Eisenhardt and Schoonhoven, 1990), and turnover of top management teams (Virany, Tushman, and Romanelli, 1992). Moreover, top management team characteristics consistently predict organizational outcomes better than do CEOs' characteristics alone (summarized in Hambrick, 1994). Scholars of top teams have become particularly interested in the effects of the team's heterogeneity, the variation in team members' characteristics, which has been called a theoretical fulcrum for research on groups and top management teams (Jackson, 1992).

Although many investigations have been conducted on the effects of heterogeneity in groups in general (reviewed by Jackson, 1992) and several on top management teams in particular (reviewed by Hambrick, 1994), the conclusions have been contradictory. Beneficial effects have been observed in some studies. Bantel and Jackson (1989) found that top management team heterogeneity in educational level and functional background was positively associated with innovativeness in a large sample of banks. Eisenhardt and Schoonhoven (1990) showed that growth rates of semiconductor companies were positively related to the top team's heterogeneity in industry tenure. The imputed logic for these positive effects has been the same as originally proposed by Hoffman and Maier (1961): diversity enhances the breadth of perspective, cognitive resources, and overall problem-solving capacity of the group.

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Other studies have found negative effects from top team heterogeneity. O'Reilly and Flatt (1989) showed that company innovation was negatively related to team heterogeneity in firm tenure in a wide cross section of firms. O'Reilly, Snyder, and Boothe (1993) similarly found that team heterogeneity in firm tenure was negatively related to adaptive change in a sample of electronics firms. Although heterogeneity may provide wider cognitive resources, it may also create gulfs or schisms that make the exchange of information difficult (Ancona and Caldwell, 1992). In some instances, heterogeneity may engender outright distrust and acrimony, as widely dissimilar group members may have different vocabularies, paradigms, and even objectives. Thus their aggregate cognitive endowment can become a net liability, with organizational innovation and performance suffering. Further supporting this latter logic, Wagner, Pfeffer, and O'Reilly (1984) found that heterogeneity in firm tenure was associated with higher turnover in top management teams, and the more distant an individual executive was from the average of the other group members, the more likely he or she was to depart. Jackson et al. (1991) obtained the same result in a sample of banks, further suggesting that demographic diversity may lessen the social integration of the top team. Measuring top team processes more directly, O'Reilly, Snyder, and Boothe (1993) found that heterogeneity in tenure was negatively associated with a multi-item measure of team rapport. Similarly, Smith et al. (1994) found that heterogeneity in tenure was negatively associated with informal communication within the team but had no association with social integration or communication frequency. Their study thus illustrates the potentially complex implications of top team heterogeneity.

Direct psychological measures of heterogeneity, although often used in research on work groups (e.g., Hoffman and Maier, 1961), are very difficult to obtain for senior executives in major firms and are unavailable for past, disbanded top management teams. Thus, in line with almost all prior research on top management team heterogeneity, we rely on demographic conceptions of the group, according to which the executives' functional backgrounds, educational experiences, and firm tenures serve as proxies for their perspectives, beliefs systems, and networks and affiliations (Jackson, 1992; Hambrick, 1994).

While distinctions might be drawn between different types of demographic heterogeneity, no established theory for doing so presents itself. Jackson (1992) noted the need to distinguish between different types of heterogeneity, drawing a distinction between heterogeneity of "personal attributes" (e.g., race, gender, and personality) and "task-related attributes" (the specific skills and abilities needed to perform the job). This is a promising line of thought but may have limited application for most research on top management teams, since the major dimensions for describing team members reflect a combination of skill-based and personal attributes. For instance, an executive's primary functional background reflects his or her domain of professional expertise, but it may also greatly reflect the person's personality, cognitive style, values, and other factors. The same could be said for educational background and tenure.

We expect each of the three forms of demographic heterogeneity we examine to contribute independently to dispersion in the group's perspective and that each will tap an amalgam of differences in professional orientations, values, cognitive styles, business and life experiences, and networks (Jackson, 1992). Although the three dimensions are common in prior research on top team heterogeneity, they have not heretofore been examined simultaneously.

Heterogeneity and Competitive Behaviors

A firm's competitive behaviors consist of its moves and countermoves, or its actions and responses to adversaries' actions. Each move represents an instance of a decision, or a bounded set of decisions, in which multiple senior executives are typically involved. This is not to say that every competitive move involves all members of the top management group. A decision about a geographic expansion may involve all the firm's senior executives, whereas a decision about a new sales force structure may involve only a subset of the top team. But even in decisions involving only a part of the firm, a number of executives would likely have input to the decision, especially in single-business firms like airlines, in which the activities of the senior-most executives are highly interdependent. Thus, even though some of the top groups we studied may not have had all the qualities needed to be called "teams," as discussed by Hambrick (1994), their members can be expected to interact, negotiate, and influence each other extensively, a conception that is in line with prior upper-echelons research.

The top team can thus be considered as the aggregate informational and decisional entity through which competitive moves are made. These moves depend on the team's scanning of the environment; recognizing problems and opportunities and interpreting other external stimuli; developing potential moves; negotiating, refining, and selecting moves; and implementing decisions (Mintzberg, Raisinghani, and Théorêt, 1976; Fredrickson and Iaquinto, 1989). Because top management team heterogeneity can be expected to influence these internal processes in ways that substantially affect competitive behaviors, we examine the relationships between top management team heterogeneity and three major dimensions of a firm's actions and responses: (1) its competitive propensity, or its relative tendency to undertake actions and respond to competitors' actions, (2) the competitive magnitude, or the relative scale and significance of the firm's actions and responses, and (3) competitive speed, or how quickly the firm implements its actions and responds to others' actions. In doing this, we distinguish between actions and responses as qualitatively different types of decision situations that are affected in different ways by top management team heterogeneity.

Competitive actions as creative initiatives. To undertake a competitive action, not directly prompted by an adversary's prior move, a firm must initiate and invent to "create" the move (MacMillan, 1982). Some actions are unequivocally novel, such as American Airlines' initial frequent-flyer program. Other competitive actions, such as expanding into new geographic markets, are less innovative but are still acts

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of initiative. In the context of competitive interplay, actions—compared with responses—can be considered creative initiatives. It is in creative, unstructured tasks that top management team heterogeneity is expected to have its most positive effects (Jackson, 1992). A diverse team has broader cognitive resources, encompassing a wider field of vision and more extensive external contacts, than does a homogeneous team (Hoffman and Maier, 1961; Jackson, 1992). With multifaceted backgrounds and orientations, heterogeneous top management team members can observe more opportunities, threats, and overall stimuli on multiple fronts and thus have a broader potential repertoire for generating actions.

At the same time, because of its diversity, the heterogeneous team may experience internal conflict and strains, which could result in slow decisions. It might further be expected that the conflict that often accompanies diversity would impair the firm's ability to launch actions at all. Overall, however, the heterogeneous team has access to such wide-ranging stimuli and has such a broad potential repertoire that its ability to conceive and launch actions on many fronts should outweigh the dampening effects of internal strains. Undertaking competitive actions is foremost a function of being able to create, or generate, those actions, particularly in very turbulent industries like the airline industry that lack clear models of competitive behavior. The top management team's ability to agree on certain actions, while not unimportant, is a secondary determinant of the firm's action propensity. Therefore, compared with homogeneous teams, which have relatively restricted, redundant scanning and action-design capabilities, the heterogeneous team can be expected to engage in quantitatively more actions than homogeneous teams. Thus, we propose:

Proposition 1: Top management team heterogeneity is positively related to the firm's action propensity.

The magnitude, or significance, of an action is also important. Some moves are relatively substantial in scale and boldness, while others are incremental and routine (MacMillan, McCafferey, and Van Wijk, 1985). The magnitude of an action can be characterized by its strategic significance, its noteworthiness, and its scope. The strategic significance of a firm's actions can be gauged by the firm's relative use of strategic rather than tactical initiatives. Strategic moves involve large outlays, long time-horizons, great departures from the status quo, and are difficult to reverse (Ghemawat, 1991; Chen, Smith, and Grimm, 1992). Tactical moves, such as price changes and sales force redeployments, tend to be incremental and limited in their implications. Competitive actions similarly vary in their noteworthiness, or the amount of attention they receive from industry observers and analysts (Porter, 1980; Chen and Hambrick, 1995). Some moves receive a great deal of attention in an industry, often because they are radical, creative, or complex, while others receive bare mention, often because they are conventional, limited, and predictable. Finally, a firm's actions can be considered in terms of their scope, or the extent of the firm's operations that are affected by the moves (Chen and MacMillan, 1992). Initiatives taken only in one product line or one region are

relatively narrow in scope, while others affect the company's full range of operations, all of its products and markets (Porter, 1980). We expect that these three elements of competitive magnitude—strategic significance, noteworthiness, and scope—will reflect the firm's degree of boldness and, indirectly, innovation in its competitive initiatives. The firm that undertakes strategic and highly noteworthy moves of broad scope is behaving differently from a firm that takes primarily tactical, little-noted, and narrowly restricted moves.

We expect top management team heterogeneity to contribute substantially to these differences. As a source of broad cognitive resources, team heterogeneity has long been thought to enhance creativity and innovation (Hoffman and Maier, 1961; Bantel and Jackson, 1989; Jackson, 1992). Marketing innovations, such as American Airlines' introduction of a frequent-flyer program in the early 1980s, have been attributed to top management team diversity (Labich, 1990). Chaganti and Sambharya (1987) similarly observed an association between the functional diversity of top management teams in tobacco companies and strategic adaptation. With a broad array of information and experience, diverse teams can generate a wider range of options that synergistically combine the members' orientations while avoiding groupthink and behavioral inertia (Janis, 1972; Hambrick, 1994). Thus, we propose the following:

Proposition 2a: Top management team heterogeneity is positively related to the strategic significance of the firm's actions.

Proposition 2b: Top management team heterogeneity is positively related to the noteworthiness of the firm's actions.

Proposition 2c: Top management team heterogeneity is positively related to the scope of the firm's actions.

The speed of organizational moves has also received increasing attention (Smith and Grimm, 1991; D'Aveni, 1994), because the firm's speed in making its moves allows it to achieve early advantages in its initiatives, often putting its competition on the defensive (Stalk, 1988; Eisenhardt, 1989). Although we expect top management team heterogeneity to have positive effects on action propensity and magnitude, we expect that it will slow an organization's speed in executing its actions. Communications and decision making in a heterogeneous team are cumbersome because of the disparate perspectives and vocabularies (O'Reilly, Caldwell, and Barnett, 1989). Heterogeneity can even be a source of outright information blockage and conflict (Zenger and Lawrence, 1989; O'Reilly, Snyder, and Boothe, 1993). At a minimum, the wide-ranging information and opinions available in a heterogeneous team require time to process (Jackson, 1992). In contrast, the homogeneous top management team may take fewer actions, but when it does—when potential actions fall within the team's field of vision, preferences, and repertoire—it can act very quickly. We particularly expect that top management team heterogeneity will affect the amount of time taken to implement an action:

Proposition 3: Top management team heterogeneity is negatively related to the firm's action execution speed.

Overall, then, we expect the diverse, abundant cognitive resources of heterogeneous top management teams to be

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manifested in a propensity to launch competitive actions with relatively great magnitude, but not quickly. Conversely, homogeneous top management teams will undertake fewer, less substantial, but faster actions than heterogeneous teams. It is also possible that heterogeneity would increase the amount of time required to formulate an action, but we do not have data to test this idea.

Competitive responses as induced counterplay. Compared with launching initial actions, responding to an adversary's act does not require as much ability to scan broadly and create wide-ranging alternatives. When the adversary has taken an action, providing a distinct and usually obvious stimulus, the primary question becomes, "Should we respond?" For two reasons, we expect management team heterogeneity to have negligible effects in determining the firm's tendency to respond. First, the stimuli are relatively clear. Drawing on Mischel's (1968) concept of "situational strength," when the situation is "weak"—complex, ambiguous, and open to many interpretations—the characteristics of the actor greatly affect his or her behavior, just as top management team heterogeneity is expected to affect taking action. But when the situation is "strong"—unambiguous, with few and clear-cut stimuli—as in responding to a competitor, then the stimuli prevail in determining behavior. Even though there are instances of secretive competitive actions (Prescott and Smith, 1987), in an industry with an active business press and strong trade associations, competitors' actions can be assumed to be universally known to all top teams. Because the stimuli are generally unambiguous and overt, then, a firm's tendency to respond will be more a function of its resources and other characteristics (Smith et al., 1991) than of the cognitive limits and biases of the top management team.

Second, top management team heterogeneity will have little effect on a firm's propensity to respond because there is little need to create. The adversary's action provides a template, minimizing the degree to which responding requires idiosyncratic design capabilities. In its action, the initiator has already handed the potential responder a possible response. Even a homogeneous top management team, with limited cognitive breadth and repertoire, can, at a minimum, often simply imitate the action. Thus, we propose:

Proposition 4: Top management team heterogeneity is unrelated to the firm's response propensity.

We see a qualitative difference between the decision to respond and the characteristics of the response itself. Although situational strength may prevail in a firm's decision to respond, once the decision has been made, we expect top management team characteristics to affect the design and execution of the particular response. Heterogeneous top management teams should draw on their broader cognitive resources in designing more significant, bolder responses than homogeneous teams, who could be expected to undertake more incremental, measured, and conventional responses—perhaps simply imitating the action—reflecting the group's narrow and redundant cognitive endowment. Thus, we expect heterogeneous top management teams to engage in relatively high-magnitude responses. In assessing

response magnitude, noteworthiness and scope are the important indicators. Significance, or the proportion of responses that are strategic rather than tactical, is not useful in the way it is for actions, because strategic actions tend to engender strategic responses, and tactical actions tend to engender tactical responses. Thus, we propose:

Proposition 5a: Top management team heterogeneity is positively related to the noteworthiness of the firm's responses.

Proposition 5b: Top management team heterogeneity is positively related to the scope of the firm's responses.

As with actions, responses by a heterogeneous team are likely to be slower than those of a homogeneous top management team. The design, negotiation, and elaboration of high-magnitude responses from heterogeneous teams take time. Added to the time such teams lose as a result of diversity and considering different points of view is the time that accrues strictly because the team often opts to design a special response from its wide-ranging cognitive resources rather than to counter with a narrow, marginal, or imitative response. In this study, we focus on two dimensions of response speed: response generation speed, or the time taken to formulate and announce a response to a competitor's action; and response execution speed, or the amount of time taken to implement an announced response. We propose:

Proposition 6a: Top management team heterogeneity is negatively related to the firm's response generation speed.

Proposition 6b: Top management team heterogeneity is negatively related to the firm's response execution speed.

Thus, we expect heterogeneity to exert the same effects on responses taken as on actions, increasing their magnitude but slowing their development and execution. In contrast to prior studies that have sought primarily to determine the overall advantages or disadvantages of top management team heterogeneity, we argue that heterogeneity may benefit some particular behavioral outcomes but impair others. The next question is whether the benefits outweigh the costs.

Heterogeneity and Organizational Performance

Researchers have found inconsistent evidence about the effects of top management team heterogeneity on organizational performance: positive effects (Eisenhardt and Schoonhoven, 1990), negative effects (Murray, 1989), and no effects (Michel and Hambrick, 1992). It is clear from our own propositions that heterogeneity may be a double-edged sword. On the one hand, we expect heterogeneity to enhance a firm's action propensity and its action and response magnitudes, potentially benefiting company performance (Chen and MacMillan, 1992). On the other hand, we expect heterogeneity to reduce the firm's speed, both in acting and responding, possibly leading to lower performance (Eisenhardt, 1989; Chen and MacMillan, 1992).

Some theorists have incorporated contingency factors as potential moderators of the heterogeneity-performance link. Jackson (1992), following Steiner (1972), proposed that heterogeneity has benefits for unstructured, novel tasks, but

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homogeneity is better for routine tasks. Another distinction, drawn by Hambrick and Mason (1984), was between stable and turbulent environments. In their view, heterogeneity yields benefits in turbulent environments; homogeneity is beneficial in stable environments. The U.S. airline industry in the period immediately following deregulation experienced exactly the conditions under which these theorists expect top management team heterogeneity to be advantageous. There was a high level of uncertainty and turbulence, no clear role models to be imitated, and extremely rivalrous conditions (Levine, 1987). Breadth of perspective, creativity, and a willingness to undertake unprecedented action were required under these conditions, and a heterogeneous top management should have been able to meet those needs. Thus, we propose:

Proposition 7: Top management team heterogeneity is positively related to overall performance improvements in a turbulent industry.

RESEARCH METHODS

Sample

Data were gathered from *Aviation Daily*, the major industry publication, on competitive moves by 32 major airlines, those noted by the Department of Transportation as having annual operating revenues of \$100 million or more, for the post-deregulation years of 1979 to 1986.

Aviation Daily, a 50-year-old industry journal, offered complete and detailed information on airline competition. The journal aims at objectively reporting airlines' announcements and actions, which minimizes any concerns over post hoc rationalization of competitive moves and bias toward covering only certain airlines' activities. An extensive survey of 57 senior airline executives and industry experts (e.g., consultants and analysts) indicated that the respondents considered *Aviation Daily* comprehensive, accurate, and a significant source of information for the airlines themselves.

The method used in collecting the data was similar to Miller and Friesen's (1977), which has been labeled "structured content analysis" (Jauch, Osborn, and Martin, 1980). The methodology is unique in that competitive interactions of sample firms were directly identified from an extensive review of public information. A specially designed, structured coding schedule was used to perform the content analysis.

Dependent Variables

A competitive move has the potential effect of acquiring rivals' market shares or reducing their anticipated returns. To identify such moves, an extensive review of every issue of *Aviation Daily* was undertaken to discover all of the competitive moves in this industry, such as promotional activities or market expansions, as suggested by Levine (1987). To identify the actions that met with responses, a researcher then identified all entries in *Aviation Daily* that were responses by searching for the following key words: "in responding to," "following," "match," "under pressure of," or other words that indicated a move was a response to a competitor's ac-

tion. The identification of responses was straightforward and involved little judgment.

Next, three researchers carefully traced streams of actions and responses back to the initial action. First, the researchers read all *Aviation Daily* issues in chronological order to find all competitive moves. Second, using the above keywords, the coders first identified responses and then worked back to find the report of the initial action, thereby tracing every initial action and all of the announced responses to it. In total, 1,445 moves (1,027 actions and 418 responses) over the eight years were identified. They were classified into 21 types (e.g., price cut, promotion, route entry), to allow statistical controls for types of moves taken.

Action propensity was calculated as the total number of actions a firm launched in a given year. *Response propensity* was measured by the total number of responses a firm executed in a year, given that it was identified as a competitor affected by an action. To define the response opportunities, the researchers first identified all airports affected by the initial action and defined the airlines that competed via those airports as affected and, hence, as potential responders. They then calculated response propensity as the percentage of response opportunities that the firm actually took in each year.

Five measures were used for the *competitive magnitude* of actions and responses: strategic significance, noteworthiness, and scope of a firm's actions; and noteworthiness and scope of responses.

Action significance was measured as the number of strategic actions the firm took in a year, divided by its total number of actions. Strategic actions involve substantial investments in fixed assets, people or structure, while tactical ones involve smaller investments, without large-scale or irreversible commitment (Miller and Chen, 1994). Three raters working independently classified actions as strategic (e.g., mergers and acquisitions, hub creations) or tactical (e.g., price cuts). There was total agreement among the raters in classifying the various types of moves as strategic or tactical.

Action noteworthiness was measured by the amount of industry attention accorded a move. We first counted the number of lines *Aviation Daily* devoted to reporting the action, but, because press attention differs inherently by type of move, we standardized the noteworthiness scores for each of the 21 types over all years and all airlines to have a mean of zero and standard deviation of one. Similarly, we measured *response noteworthiness* by the number of lines *Aviation Daily* devoted to the response, standardized for each type of response. We assume that *Aviation Daily*, a longstanding, well-respected industry publication, allocates space in proportion to newsworthiness and that, on average, items commanding more attention are viewed as relatively innovative, bold, unexpected, or complex.

Action scope, or the extent to which the action affects the full breadth of the firm's operations, was measured as the proportion of the firm's revenue base potentially affected by

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the action. After identifying the airports affected by a firm's action, we divided the firm's annual number of passengers at these airports by the firm's total number of passengers in that year. For example, an airline's decision to initiate a nationwide price discount would be greater in scope, affecting all of its domestic market, than a discount at a specific airport. *Response scope* was similarly measured as the percentage of the firm's revenue base affected by its response.

For *competitive speed*, we used three measures: action execution speed, response generation speed, and response execution speed. *Action execution speed* is the amount of time a firm took to execute an announced action. First, we measured the time between the date the firm publicly announced or acknowledged the intended action and the date that action began to be executed, as both were reported in *Aviation Daily*. We then controlled for the different types of actions by standardizing the time lag across all years and firms (mean of zero and a standard deviation of one). To represent speed rather than time lag, the signs of the scores were reversed so that a large value indicates great speed. *Response generation speed* was measured as the amount of time a firm took to generate a response if it did so. Relying on the reports in *Aviation Daily*, we calculated the time lag between the day that a competitor announced its initial action and the day that the focal firm announced its response. This was again standardized by response type and reverse-scored to indicate speed. *Response execution speed* was the amount of time that a firm took to execute an announced response. Because a firm's response execution speed depends on the type of the initial action and other features that may have affected the execution time of that initial action, we regressed response execution time on type of action and action execution time for all years and airlines to control for these effects. We then used the average residual scores of the above regression results across all the responses made by an airline in a given year as its response execution time for that year. The signs of scores were again reversed so that a large value implies great speed.

To explore effects on organizational performance, we used two measures. The first was the firm's market share change during the year, calculated as the percentage change from the previous year in market share in those markets in which the airline was present (this year's market share minus last year's, divided by last year's). The second was the firm's change in profits during the year, calculated as the percentage change in dollar profits between this year and the previous year.

Independent and Control Variables

Each top management team was defined as all executives above the vice-president level (e.g., senior vice president, vice chairman, chief executive officer). This operationalization, used in prior top management team studies (e.g., Chaganti and Sambharya, 1987; Murray, 1989; Michel and Hambrick, 1992), yields a more complete group than if only executives who are inside directors are included (e.g., Finkelstein and Hambrick, 1990) but a more restrictive group than if all officers are included (e.g., Wagner, Pfeffer, and

O'Reilly, 1984). The chosen operationalization is intended to include all major line and staff executives, encompassing all the key activities of the firm at the senior-most level. This definition yielded a mean top management team size of 8.6 (standard deviation of 3.4) executives. All information pertaining to management characteristics was obtained from each year's *Dun and Bradstreet Directory of Corporate Management*.

We examined three types of top management team heterogeneity: functional heterogeneity, educational curriculum heterogeneity, and company tenure heterogeneity. Each of these three types of heterogeneity has been used in prior studies, but typically not together. The three types are complementary, reflecting diversity on somewhat different dimensions. To the extent that results are consistent across the three types, we can have greater confidence in the effects of heterogeneity on competitive behavior. Functional backgrounds represent executives' primary professional orientations, including their implicit causal models, vocabularies, and internal and external networks (e.g., Hambrick and Mason, 1984; Walsh, 1988). Educational curriculum similarly reflects professional orientations but also taps some fundamental formative qualities such as cognitive style, values, and early upbringing (Smart and Pascarella, 1986). Company tenure, which is strongly correlated with industry tenure and age in our sample, indicates an executive's cohort, frame of reference for viewing the history of the firm, and internal network (Wagner, Pfeffer, and O'Reilly, 1984). We did not measure tenure on the team, because we viewed it as a less fundamental reflection of an executive's orientation than tenure in the company. Since top management team boundaries are permeable, membership on the top management team, as we defined it, may or may not have been an important factor in an executive's point of view and internal social network, at least not when compared with the importance of membership in the firm.

Functional heterogeneity was measured by a variation of the Herfindal-Hirschman index,

$$H = 1 - \sum_{i=1}^{16} p_i^2,$$

where H is the heterogeneity measure and p the percentage of top management team members in each of 16 functional background categories listed in the Appendix. In almost all cases, coding executives' functional backgrounds was straightforward. In those few cases in which an executive had substantial experiences in more than one category, we selected as the primary category the one in which the executive spent the most time. In a validity test, Barbosa (1985) found that 82 percent of executives indicated their primary function as the same one he had coded from the *Dun and Bradstreet Directory*.

For *educational background heterogeneity*, we used eight different disciplines, listed in the Appendix, to code each executive's educational background. For executives with graduate degrees, we coded the corresponding graduate disciplines; for those without graduate degrees, we coded their

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undergraduate disciplines. We then calculated the Herfindal-Hirschman index for educational background heterogeneity.

Company tenure heterogeneity was calculated as the standard deviation of the number of years the executives on the top management team had spent in the firm. We did not use the coefficient of variation, since one of our control variables was the top management team's mean company tenure.

We also included as control variables top management team size, average educational level (mean number of years of higher education), and firm size (measured by annual revenue-passenger miles). Firm size is a particularly important control variable, because a number of our dependent variables are inherently a function of company scale (Chen and Hambrick, 1995). Also, because competitive behaviors may depend on resource availability (Smith et al., 1991), we included three measures of organizational slack: equity/long-term debt, current assets/current liabilities, and prior profits (all lagged by one year). These data were collected from COMPUSTAT tapes. Finally, the years 1980–86 were included as dummy variables, with 1979 as the omitted category. The control variables are those identified as most essential in the competitive interaction and top management team literatures.

Analysis

In analyzing the data, we pooled the observations cross sectionally for all years. Although this approach produces more precise estimates, two potential problems exist: First, slope coefficients may be inconsistent over time, making the pooled techniques inappropriate. Second, the ordinary least squares (OLS) estimates may be biased, since neglected firm-specific characteristics would lead to violating assumptions about the independence of observations (Pindyck and Rubinfeld, 1991). Because a number of tests, including the Durbin-Watson test and Bartlett's test, indicated serial correlation and heteroskedasticity, we used a generalized-least-squares technique for analysis (Harrigan, 1982; Smith et al., 1991).

We used Kmenta's (1986) autoregressive heteroskedastic model to correct for serial correlation and heteroskedasticity. To correct for first-order serial correlation we applied the Cochrane-Orcutt transformation to each individual firm and corrected for heteroskedasticity by dividing dependent and independent variables by the firm-specific error variance obtained from the regressions on the serial-correlation-corrected data. After these transformations, the data were pooled and analyzed using OLS regression techniques. This approach was used in a number of recent related studies such as Miller and Chen (1994), Smith et al. (1991), and Finkelstein and Hambrick (1990).

RESULTS

Descriptive statistics and correlation coefficients for all variables are presented in Table 1.

Table 1

Means, Standard Deviations, and Correlations

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9			
1. Firm size	798270	10586605												
2. Slack (E/LTD)	.63	1.12	.33***											
3. Slack (CA/CL)	1.15	.64	-.15	-.12										
4. Slack (Profit)	11300	102433	.28***	.11	.04									
5. TMT size	8.61	3.71	.15**	-.1	-.09	.03								
6. Average education	4.13	.93	.04	.20**	.09	.02	-.12*							
7. Average tenure	14.32	7.85	.38***	.49***	-.14	.16**	.14**	.00						
8. Functional heterogeneity	.84	.12	-.19***	-.27***	.18*	-.08	.24***	-.08	-.16***					
9. Educational background heterogeneity	.55	.25	.28***	.33***	-.22**	.08	.41***	.06	.15**	-.11				
10. Tenure heterogeneity	8.57	4.48	.29***	.01	-.13	-.02	.07	-.07	.55***	-.27***	.13			
11. Action propensity	5.02	5.32	.61***	.06	.11*	.11*	.02	-.02	.17**	-.11	-.02			
12. Response propensity	.05	.06	.41***	.04	.07*	-.07	-.07	.17***	.04	-.13***	.19***			
13. Action significance	.17	.37	-.08	.03	-.08	.02	.08	-.04	.05	.09	.06			
14. Action noteworthiness	0	.94	-.01	.02	-.06	.60	-.07	-.01	.07	-.04	-.07			
15. Response noteworthiness	0	.98	-.03	-.03	.04	.04	-.11	-.05	-.56	-.06	-.09*			
16. Action scope	.62	.22	.15**	-.06	-.02	-.02	-.09	-.17**	.08	-.08	-.08			
17. Response scope	.68	.25	.35***	.08	-.02	-.05	-.01	-.24	.06	.11	-.12			
18. Action execution speed	0	.99	-.03	-.06	-.02	-.03	-.03	.02	.00	-.06	.00			
19. Response generation speed	0	.99	-.21***	-.04	-.05	.00	.00	-.19***	.00	.09**	-.03			
20. Response execution speed	0	.98	-.07	-.01	-.04	-.08	-.09+	-.05	.06	-.01	-.02			
21. Growth in market share	-.0007	.11	.01	.01	-.01	.04	-.10	-.09	.10	-.04	-.03			
22. Growth in profitability	-.14	.65	-.04	-.04	.02	-.02	.05	-.09	-.06	.04	.09			
Variable	10	11	12	13	14	15	16	17	18	19	20	21	22	
11. Action propensity	.19**													
12. Response propensity	-.08	-.16**												
13. Action significance	.01	.08	-.13**											
14. Action noteworthiness	.03	-.01	.05	.01										
15. Response noteworthiness	.01	.01	-.06	-.11**	.31**									
16. Action scope	-.11	-.17**	.14*	.23***	.27**	.01								
17. Response scope	.20	-.21*	-.11	.07	.01	.12	-.02							
18. Action execution speed	-.02	-.06	.04	.09*	.20**	-.05	.11**	.12**						
19. Response generation speed	-.01	-.11**	.00	.07	-.02	-.02	.19**	.17**	.26**					
20. Response execution speed	.01	.03	-.04	.06	.11**	-.05	.08	.09*	.56**	-.08*				
21. Growth in market share	-.26***	-.03	-.27***	.10	-.08	.08	.02	.25	-.01	.05	.16			
22. Growth in profitability	.01	-.06	-.02	-.03	.15	.06	.13	.04	-.03	.10	.13	.01		

* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$.

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Table 2 presents GLS regression results, with action characteristics as the dependent variables. Turning to the top management team heterogeneity variables, the results for action propensity generally supported proposition 1. Both education heterogeneity and tenure heterogeneity were significantly positively related to action propensity.

Table 2

Regression Results of Top Management Team Characteristics and Control Variables on Action Characteristics*

Variable	Action Characteristics				
	Propensity	Significance	Noteworthiness	Scope	Execution speed
Functional heterogeneity	.122 (.482)	.063*** (.024)	.114** (.054)	.076** (.037)	-.010*** (.003)
Educational background heterogeneity	.355**** (.051)	-.053 (.192)	.133** (.060)	.022** (.011)	-.144*** (.055)
Tenure heterogeneity	.084** (.040)	.012 (.051)	.234 (1.347)	-.237 (.942)	-.122 (.582)
Firm size	.832**** (.124)	.231**** (.021)	-.133**** (.030)	-.132 (.562)	-.042 (.159)
Slack (E/LTD)	-.053 (.623)	-.012 (.248)	-.424 (1.542)	-.073 (.442)	.124 (.562)
Slack (CA/CL)	-.275** (.132)	.044*** (.017)	.093 (.454)	-.044 (.257)	.221* (.133)
Slack (Profit)	.054**** (.015)	.022**** (.005)	-.123** (.051)	.084 (.281)	.023 (.245)
TMT size	-.022 (.162)	-.123** (.058)	-.132** (.052)	-.326* (.181)	-.122 (.468)
Average education	.022*** (.008)	.134** (.066)	-.424* (.242)	-.314*** (.116)	-.143 (.649)
Average tenure	-.321** (.152)	.064 (.242)	.643** (.298)	.233 (2.154)	.334 (1.382)
N	156	153	642	642	603
F	124	164	142	180	165

* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$.

* Because generalized-least-squares regression equations corrected for serial correlation are used, R^2 statistics are not reported. Standardized regression coefficients are listed, with standard errors in parentheses. Because no systematic pattern existed, the statistics for the dummy variables for the years 1980–86 are not shown.

Propositions 2a–2c linking top management team heterogeneity with action magnitude received substantial support. Functional heterogeneity was significantly positively related to action significance, partially supporting proposition 2a. Proposition 2b was more strongly supported, with both functional heterogeneity and educational heterogeneity significantly positively associated with action noteworthiness. Proposition 2c also received general support; the signs for both functional heterogeneity and educational heterogeneity were both positive and significant. Thus, the more diverse the top management team, the greater the overall magnitude of the firm's competitive actions.

Providing general support for proposition 3, both functional heterogeneity and educational heterogeneity were significantly negatively related to action execution speed. Tenure heterogeneity, however, did not have a significant effect.

The control variables showed highly significant associations with the action characteristics, as they did in all the results we will present. To maintain our focus, we will not comment here on the control variables but will note the most significant results below.

Table 3 presents GLS results for the response characteristics. In contrast to proposition 4, which predicted no relationship, all three types of top management team heterogeneity were significantly negatively associated with response propensity. Thus, the more heterogeneous the top management team, the less likely the firm was to respond to a competitor's action.

Table 3

Regression Results of Top Management Team Characteristics and Control Variables on Response Characteristics*

Variable	Response Characteristics				
	Propensity	Noteworthiness	Scope	Generation speed	Execution speed
Functional heterogeneity	-.015 ^{***} (.006)	.184 ^{**} (.089)	.032 ^{**} (.015)	-.542 ^{***} (.180)	-.322 ^{**} (.159)
Educational background heterogeneity	-.054 ^{**} (.027)	.154 (.649)	.125 (.632)	-.245 [*] (.146)	-.025 ^{**} (.012)
Tenure heterogeneity	-.155 ^{**} (.079)	-.045 (.371)	.342 [*] (.182)	-.386 ^{**} (.192)	-.132 (.449)
Firm size	.664 ^{****} (.154)	-.123 (.554)	-.320 ^{**} (.150)	.465 ^{***} (.156)	-.524 ^{****} (.075)
Slack (E/LTD)	-.214 ^{****} (.041)	.132 (.848)	.234 (.944)	.362 [*] (.211)	-.213 (.792)
Slack (CA/CL)	-.012 ^{****} (.002)	-.032 (.250)	-.222 (1.325)	.186 (.577)	.211 (1.078)
Slack (Profit)	-.063 ^{***} (.025)	.244 (.911)	.086 (.641)	-.285 ^{**} (.143)	-.233 [*] (.138)
TMT size	-.126 ^{***} (.042)	-.034 (.152)	-.081 (.365)	.225 (.762)	-.053 (.792)
Average education	.204 ^{**} (.081)	-.122 (.494)	-.323 (1.597)	-.153 (.706)	.053 (.782)
Average tenure	.144 ^{****} (.032)	-.243 (1.066)	-.224 (.885)	.534 ^{**} (.265)	.124 (.712)
N	139	286	286	263	263
F	723	484	155	401	112

* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$.

* Because generalized-least-squares regression equations corrected for serial correlation are used, R^2 statistics are not reported. Standardized regression coefficients are listed, with standard errors in parentheses. Because no systematic pattern existed, the statistics for the dummy variables for the years 1980-86 are not shown.

Propositions 5a and 5b, on response magnitude, were partially supported. Functional heterogeneity was significantly positively related to response noteworthiness and response scope. Tenure heterogeneity was also positively associated with response scope, but with marginal significance ($p < .10$). Overall, though, the results tend to support the premise that heterogeneous top management teams engage in relatively significant, bold competitive responses.

Propositions 6a and 6b posited that heterogeneous top management teams would be slower than homogeneous teams in their competitive responses. Results show consistent sup-

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port for these ideas. All three types of heterogeneity were significantly and negatively associated with response generation speed. Similarly, both functional heterogeneity and educational heterogeneity were significantly negatively related to response execution speed. In the aggregate, there is evidence that the heterogeneous teams were slower than homogeneous teams in their competitive responses.

Performance

We proposed that in the turbulent industry we are studying that the advantages of top management team heterogeneity would outweigh the disadvantages and that the effects on overall corporate performance would be positive. The results, shown in Table 4, strikingly conform to these expectations. The dependent variables are the two performance measures, growth in market share and growth in profits. Performance for the prior year is included as a control variable, to assure that the analysis is capturing strictly change in performance in the focal year.

Table 4

Regression Results of Top Management Team Characteristics and Control Variables on Performance*		
Variable	Growth in market share	Growth in profits
Functional heterogeneity	.332 ^{****} (.042)	.623 ^{**} (.298)
Educational background heterogeneity	.064 ^{**} (.029)	.323 ^{**} (.150)
Tenure heterogeneity	.093 [*] (.058)	.323 ^{****} (.095)
Firm size	.232 (.594)	-.312 ^{**} (.142)
Slack (E/LTD)	.144 (.561)	.332 (1.389)
Slack (CA/CL)	.561 ^{**} (.224)	.084 (.334)
Slack (Profit)	.524 [*] (.280)	.124 (.541)
Previous year's performance (growth in market share or profit)	-.052 ^{**} (.025)	-.134 (.492)
TMT size	.353 (1.272)	-.212 (.721)
Average education	.230 ^{**} (.115)	.454 [*] (.252)
Average tenure	.083 (.342)	.304 (1.492)
N	139	138
F	54	43

* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$.

* Because generalized-least-squares regression equations corrected for serial correlation are used, R^2 statistics are not reported. Standardized regression coefficients are listed, with standard errors in parentheses. Because no systematic pattern existed, the statistics for the dummy variables for the years 1980-86 are not shown.

The results reveal a clear pattern: All three types of heterogeneity were positively associated with performance improvement, both in market share and profitability. Thus, de-

spite the low response propensity and slowness of the heterogeneous top management team, its other benefits appear to more than compensate, and in general the airlines with diverse top management teams advanced in their competitive arena. These results show that top management team heterogeneity is of considerable consequence not only to the firm's competitive behaviors but also to its performance.

Effects from Control Variables

A brief review of the effects of the control variables is warranted, particularly since they showed some strong associations with both competitive behaviors and performance (as seen in Tables 2, 3, and 4). Because the four variables representing firm size and slack have been included in prior studies using the airline data, we will not comment on them. Instead, we will note briefly the effects of the top management team control variables.

Top management team size was negatively related to response propensity and to three measures of competitive magnitude (action significance, action noteworthiness, and action scope). This consistent pattern may suggest that large teams tend to be restrained in their competitive initiatives. Team size was positively related to growth in market share, however, indicating that, overall, there may be some benefits from large teams. Team members' average education level was positively related to action propensity, action significance, and response propensity but negatively related to action noteworthiness and action scope. The average education level of the top management team was positively related to both performance measures, however, indicating overall benefits from top management team education levels. Finally, the average tenure of the team showed limited effects, with little pattern. Average tenure was negatively related to action propensity, but positively related to action noteworthiness, response propensity, and response generation speed. These results indicate that the top management team characteristics we controlled for may have substantial implications for competitive behaviors and firm performance and may thus merit further study.

DISCUSSION

Both longstanding theory (Schumpeter, 1950) and more recent empirical evidence (e.g., Chen and MacMillan, 1992) indicate that firm performance depends greatly on the ongoing competitive behaviors of the firm and its adversaries. It is thus important to improve understanding of the determinants of those behaviors. This paper complements previous work emphasizing the environmental and organizational determinants of firms' microcompetitive behavior by incorporating the composition of the top management team as an important influence in such outcomes. Seeking to explore in depth the effects of one centrally important upper-echelon construct, top management team heterogeneity, we found broad and significant associations with both the firm's competitive behaviors and performance.

Top Management Team Heterogeneity and Competitive Behavior

The effects of top management team heterogeneity on the firm's competitive actions conformed to our propositions. First, heterogeneity was positively related to action propensity, or the basic tendency to undertake competitive initiatives. Second, it was positively related to the magnitude of competitive actions. Across multiple measures, gauging the significance, noteworthiness, and scale of actions, we found consistent evidence that heterogeneous top management teams were bolder in competitive actions than homogeneous teams. Finally, we found the heterogeneous teams were slower in their action execution than homogeneous teams. These findings fully align with prior theory positing several consequences of group heterogeneity: broad gathering of information, decision creativity and boldness, but friction and slowness in decision making and action.

Results for the firm's response characteristics were partly in line with expectations but diverged in one important way. Whereas we proposed that there would be no association between top management team heterogeneity and response propensity, we found a negative relationship for all three measures of heterogeneity. Thus there was broadly consistent evidence that homogeneous teams were most likely to respond to their adversaries' initiatives. Our logic in proposing no relationship was based on the premise that competitors' actions are usually so clear-cut and unambiguous that they amount to "strong situations" (Mischel, 1977) for the potential responder, and top management team characteristics will not influence the likelihood of a response. The finding of a negative relationship between heterogeneity and response propensity causes us to conclude that we were perhaps considering only the scanning element of the response decision-making process and ignoring other elements of the process (Mintzberg, Raisinghani, and Théorêt, 1976).

It may be that initiators' actions are generally unambiguous in their occurrence, and homogeneous and heterogeneous top management teams are equally aware of such events, but actions may be open to varying interpretations (Porter, 1980). Perhaps, then, heterogeneous teams experience dissonance about issues ranging from the meaning of the competitor's action to the design of an appropriate response. Conversely, the homogeneous team may have an advantage in this respect. Its internal similarity, shared vocabulary, and relatively fluid exchange properties enhance its ability to interpret the competitor's move and decide to make a countermove.

When acting, a top management team must develop a move from its repertoire; as our results suggest, the broader the repertoire, the greater the number of actions that can be created. In responding, however, the team becomes anchored to the nature of the initial action and does not have to create anything to respond. Simple imitation is commonly a possibility. The negative association between heterogeneity and response propensity suggests that the diverse orientations in heterogeneous teams may lead them to engage in more interpretation, negotiation, and creative formulation of re-

sponses, which lessens their likelihood of responding at all, compared with the more straightforward, reflexive response behaviors of homogeneous teams. Such a portrayal is further supported by our other findings on response characteristics. When heterogeneous top management teams did respond, their responses were of greater magnitude but slower than those of homogeneous teams. These findings were consistent with our propositions and add to the overall indication that heterogeneous top management teams are cognitively rich.

It might be said that heterogeneous teams are good (but slow) at creating, but that homogeneous teams are good at deciding (Jackson, 1992). Self-initiated actions involve creating competitive moves, and top management team heterogeneity will aid in this. Responding to another's actions, however, involves little creating; it is primarily a matter of deciding, and top management team homogeneity may enhance this competitive tendency. In this sense, our findings are consonant with Eisenhardt and Schoonhoven's (1990) more general conclusion that heterogeneity of industry experience brought helpful diversity to the top teams they studied, but that long tenures helped group processes. In our study, average team tenure, which is generally seen as a contributor to fluid group processes, had a very strong positive effect on response propensity, supporting the notion that top management groups with shared experiences and perspectives are most able to react to clear-cut stimuli. An additional reason that top management team heterogeneity dampens response propensity may be that diverse teams draw on their cognitive breadth to develop highly elaborate, multidimensional offensive strategies, which in turn restrict their flexibility in responding to others' initiatives. Moreover, such top management teams might become highly committed to their elaborate, creative offensive strategies and unwilling to move into a reactive mode.

Heterogeneity and Organizational Performance

Our results indicate that top management team heterogeneity may have potential benefits and drawbacks to the firm's competitive behaviors. It is understandable, then, that prior research has produced mixed results on the influence of top management team heterogeneity on overall organizational performance. In this study of the airline industry, the advantages of heterogeneity exceeded the disadvantages. All three types of heterogeneity examined were independently and positively associated with performance, measured both as change in market share and change in profits. And each type of heterogeneity contributed in its own way to overall airline performance.

We would not assert that top management team heterogeneity is always beneficial. The U.S. airline industry in the period studied was exceedingly turbulent and lacked clear competitive role models, precisely the conditions under which theorists expect top management team heterogeneity to be advantageous (Hambrick and Mason, 1984; Jackson, 1992). It may be that a more stable industry, with more widely accepted models or recipes for behavior (Spender, 1989) and less intense rivalry would have favored top management

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team homogeneity. It is also possible that after the period we studied, the airline industry became more orderly and programmed, yielding diminished benefits of top management team heterogeneity. But our results indicate that in a highly turbulent setting, diverse top management teams, despite their drawbacks, have superior competitive and adaptive capabilities.

It is also important to note that the three types of heterogeneity examined showed considerable consistency in their effects on competitive behaviors and performance. Among the 12 models presented in Tables 2, 3, and 4, two or three of the heterogeneity measures were significant in the same direction for 10 of the models. There were no instances of opposing significant effects. Moreover, for those criterion constructs for which we have multiple measures (such as competitive magnitude, speed, and performance), the effects of heterogeneity were highly consistent in their signs across those indicators. Thus, even though we have examined three different dimensions of heterogeneity—so different that they are not correlated among themselves and hence do not warrant being combined into an index—they exhibit strikingly consistent effects on corporate outcomes. These three forms of top management team dispersion may differ in their subtleties and the specific conduits by which they affect outcomes, but at the broadest level they can be considered complementary and corroborative of the importance of top management team heterogeneity as a robust construct.

Because our data were archival, we were unable to gain an in-depth understanding of the actual processes of competitive decision making in the firms we studied. For instance, it is possible that some of the actions and responses we studied were not a result of interactions among the entire executive group but, rather, involved a small subset of those managers. Additionally, some decisions, such as tactical pricing responses, may have been formulated in a routine, even automated way that minimally involved the senior executives. The strong and consistent results we obtained, however, suggest that these conditions did not prevail and that the composition of the top management team is of substantial importance to the competitive functioning of the firm. Insights about the actual team dynamics and processes involved in competitive moves will require field methods such as those used by Eisenhardt and Bourgeois (1988), Gersick (1989), and Smith et al. (1994). Our results suggest that field work, directed at understanding the actual processes of competitive decision making engaged in by homogeneous and heterogeneous top management teams, could bear fruit.

Our findings illuminate the importance of focusing on executive characteristics and processes as major influences on competitive dynamics. This conclusion is perhaps not so surprising, considering that these microcompetitive actions and responses, often the building blocks of sustainable advantage, tend to occur in a limited time span and with imperfect information. The cognitive and social processes and biases of the decision makers themselves will almost invariably become manifested in their strategic choices in such situations.

In addition to highlighting the "human factor" in interfirm competitive behavior, our study may have important practical implications. For instance, our results suggest that companies whose main focus is to launch innovative actions in an effort to gain competitive advantage may wish to ensure that their top management teams comprise executives with diverse backgrounds. Conversely, firms that strive to be promptly reactive to others' attacks may want to configure their top teams with greater homogeneity so that maximum efficiency in decision-making responsiveness and speed can be achieved. Depending on the environmental context and the firm's overarching strategic repertoire, the profile of the top management team can be modified to make it more congruent with the firm's objectives. Overall, our findings indicate the need to incorporate the composition of the top decision makers in attempts to understand and enhance competitive advantage.

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APPENDIX: Coding Categories for Executives' Backgrounds

Functional Background

1. CEO (Chief Executive Officer)
2. COO (Chief Operations Officer)
3. Finance/Treasurer
4. Planning
5. Personnel
6. Public Affairs
7. General Counsel/Secretary
8. Operations/Field Service
9. Marketing/Sales/Customer Service
10. Information Systems
11. International
12. Maintenance/Field Service
13. General Management
14. Other Corporate Staff
15. Accounting/Controller
16. Other

Educational Background

1. Engineering
2. Science
3. Business Administration
4. Economics
5. Liberal Arts
6. Law (LL.B./J.D.)
7. Business (other than administration, e.g., accounting, finance)
8. Other