# TOP MANAGEMENT TEAM DEMOGRAPHY AND PROCESS: THE ROLE OF SOCIAL INTEGRATION AND COMMUNICATION

Ken G. Smith, Ken A. Smith, Judy D. Olian, Henry P. Sims Jr., Douglas P. O'Bannon, Judith A. Scully*

## Abstract

This research used data from 53 high-technology firms to test three alternative models of the effects of the top management team's demography and process on organizational performance: (1) a demography model, in which team demography accounts entirely for performance outcomes, and process has no impact; (2) a process model, in which process contributes incrementally and directly to performance outcomes, over and above the team's demography; and (3) an intervening model, in which the effects of the top management team on performance outcomes are due entirely to the effects of its demography on process. The study found the top management team's demography indirectly related to performance through process and process directly related to performance, although direct effects of team demography on performance were also found. These results suggest a fourth, more complex model of top management team behavior.

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* Ken G. Smith, University of Maryland at College Park; Ken A. Smith, Syracuse University; Judy D. Olian; Henry P. Sims Jr., University of Maryland at College Park; Douglas P. O'Bannon, Webster University, St. Louis; Judith A. Scully, University of Florida.

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Although some researchers have argued that leaders and top management teams have little impact on organizational outcomes (Lieberson and O'Connor, 1972; Aldrich, 1979; Astley and Van de Ven, 1983), the emerging view from more recent research suggests otherwise (Romanelli and Tushman, 1986; Finkelstein and Hambrick, 1990). Finkelstein and Hambrick (1990: 500) found that in high- discretion industries, such as computers, for example, managers seem to "matter greatly." This recent stream of research has been facilitated by Hambrick and Mason's (1984) upper-echelons theory, which was inspired by Cyert and March's (1963) concept of the dominant coalition. According to Hambrick and Mason's upper-echelon theory, upper-level managers have an important impact on organizational outcomes because of the decisions they are empowered to make for the organization. Since these managers make decisions consistent with their cognitive base, which is in part a function of their personal values and experiences, their personal experiences and values can be linked to organizational outcomes. Based on this upper-echelon logic, scholars have linked top management teams to organizational innovation (Bantel and Jackson, 1989; O'Reilly and Flatt, 1989), strategy (Finkelstein and Hambrick, 1990; Michel and Hambrick, 1992), strategic change (Grimm and Smith 1991; Wiersema and Bantel, 1992) and performance (O'Reilly and Flatt, 1989; Michel and Hambrick, 1992; Hambrick and D'Aveni, 1992). The three main clusters of concepts that are of interest in upper-echelons research are the team's demography and process and organizational performance. Demography refers to the aggregated external characteristics of the team, such as heterogeneity, tenure, and size, while process concerns the team's actions and behaviors, such as communication, and psychological dimensions, such as social integration.

Pfeffer (1983: 348) argued that demography is an important, causal variable that affects a number of intervening variables and processes and, through them, a number of organizational outcomes. Hambrick and Mason (1984) contended that a manager's personal experiences and values can be inferred from observable demographic characteristics, such as years of experience, and that studying these observable characteristics overcomes the difficult problem of gaining access to executives to measure psychological or group dynamic variables, which may be the more direct underlying process characteristics linking the top management team's attributes to organizational outcomes. Following Hambrick and Mason (1984), scholars have empirically linked the top management team's demography to organizational performance (Murray, 1989; Eisenhardt and Schoonhoven, 1990; Michel and Hambrick,

1992), but no specific effort has been made to investigate the more fundamental intervening processes. If upper-echelons theory is to become useful in improving our understanding of top management teams, we need to elaborate and fully understand how team demography influences the organization.

While no empirical studies have directly investigated the process through which the top management team's demography influences organizational outcomes, several social-psychological explanations for the linkages have been proposed. Michel and Hambrick (1992) used the concept of social integration to explain links between average team tenure and diversification strategy and performance. They proposed that the length of team tenure is a proxy for the level of team cohesion and that cohesion in turn affects performance. Similarly, Murray (1989) used social integration and communication patterns to predict the form of the relationship between team heterogeneity and organizational performance. He argued that team heterogeneity may lower performance in stable environments because the team would be less cohesive and require more formal communication. Eisenhardt and Schoonhoven (1990), Keck (1991), and Hambrick and D'Aveni (1992) have all attributed findings of links between team demography and organizational performance to unmeasured social psychological concepts. The logic in these studies has been that team demography influences team processes, such as social integration and communication, and these processes in turn affect organizational outcomes.

Although the study of the underlying processes through which team demography affects organizational performance would seem a critical research task, Pfeffer (1983: 350) maintained that such research is unnecessary, because as soon as one says that it is necessary to understand the intervening constructs or processes one inevitably embarks on an infinite regress of reductionism from which there is no logical escape. Moreover, he argued that (1) most organizational theories are premised on a number of hypothetical constructs that are not directly observable or measurable; (2) underlying process variables are neither concrete nor unambiguous in their meaning and interpretation and often violate rules of parsimony, producing two-, three-, and even four-way interactions as explanations of behavior ; and (3) the amount of variance explained by process measures is generally quite small (Pfeffer, 1983: 302). He thus questioned whether intervening process variables could account for any incremental variation in dependent variables beyond that explained by demographic measures alone.

In the present research we attempt to reconcile these alternative views and

investigate how team demography affects performance. The primary questions are empirical: To what extent does team demography predict variation in intervening team process variables and/or directly predict variation in organizational outcomes? Second, to what extent does the addition of team process as an explanatory factor account for variation left unexplained by the team's demography? We test three alternative models of team demography and process and organizational performance. The direct demography model hypothesizes that team demography accounts entirely for performance outcomes and that team process will have no impact on performance. In contrast, the process model predicts that demography and team process each contribute separately to performance outcomes and that team process contributes incrementally over demography. Finally, the intervening model predicts that team demography affects team processes which, in turn, influence performance. This third model posits no direct links between demography and performance and predicts that all of the effects of demography will work through process.

Prior research has shown that top management teams are likely to have greatest impact on organizational outcomes in high-velocity environments (Eisenhardt, 1990), where managers have more decision discretion (Hambrick and Finkelstein, 1987; Finkelstein and Hambrick, 1990). Therefore, the models were tested with a sample of technology-intensive companies from a high-discretion, high-velocity environment.

## THREE ALTERNATIVE MODELS OF TEAM DEMOGRAPHY, PROCESS, AND ORGANIZATIONAL PERFORMANCE

### The Demography Model

Pfeffer (1983) provided the basic rationale for expecting direct relationships between top management team demography and organizational performance. He argued that researchers would find direct effects for demography on performance because it would be impossible to measure all the potential intervening process variables. Consistent with past top management demography research (e.g., Murray, 1989; Eisenhardt and Schoonhoven, 1990; Keck, 1991; Michel and Hambrick, 1992; Hambrick and D Aveni, 1992), we modeled the demography of the team in terms of (1) heterogeneity (measured in terms of variation in job and industry experience; variation in the level of education, and variation in functional background); (2) team tenure (average time in job); and (3) team size.

**Heterogeneity.** A basic theme of organization theory is that organizations must

coordinate and control the activities and behaviors of the people who make-up the organization. Ouchi (1980) argued that organizations may use different types of control strategies. Some firms rely on strong informal cultures and systems of values to socialize and control member behavior, while others use more formal mechanisms, such as rules and regulations. Pfeffer (1983) drew the link between demography and dimensions of organizational control. He implied that socialization or informal control will be most effective when members are more homogeneous, because their similarity of background, joint experience, and shared perspective provide a common vocabulary and the basis for mutual understanding. In contrast, impersonal, bureaucratic controls will be observed when there is demographic diversity. Diverse teams will be less predictable in their attitudes and behaviors because of goal and informational uncertainties between the chief executive officer (CEO) and each individual top management team member. Holmstrom (1979) suggested that this predictability can be restored by a CEO who monitors team behaviors. By establishing rules and regulations, the CEO can guard against opportunism on the part of team members (Eisenhardt, 1989). Thus, to coordinate and control the behaviors of heterogeneous team members, the CEO will tend to rely on formal rules, regulations, and processes.

The increased bureaucracy necessary to monitor and control heterogeneous teams will, for a number of reasons, adversely affect the organization's performance, especially in high-velocity environments. First, bureaucracy limits the team's capacity to function by directing time and energy toward group maintenance rather than to accomplishing tasks. Information must be gathered, standardized, transferred, and cleared through a greater number of formal channels. Second, rules and regulations will increase the administrative burden on the CEO. The more time the CEO spends monitoring, the less time he or she can devote to leadership. Thus the rules and regulations necessary to monitor heterogeneous teams will increase the costs of administration and adversely affect organizational performance. Bureaucratic control will also make the organization less responsive to changes in the competitive environment (Bums and Stalker, 1961). Organizations that do not respond quickly to change, particularly in high-velocity environments, will find that their performance suffers accordingly. Empirically, Murray (1989) and Ancona and Caldwell (1992b) found direct negative effects of demographic heterogeneity on performance. Thus we expect that heterogeneous top management teams will be more difficult and expensive to coordinate and control than will homogeneous teams and that these added costs will impede performance.

**Team tenure**. Several studies have empirically linked team tenure to organizational performance (Keck, 1991; Michel and Hambrick, 1992; Hambrick and D'Aveni, 1992). Pfeffer (1983: 323) provided a theoretical basis for expecting a direct tenure effect on performance, noting that performance will be highest when employees have been in the position long enough to overcome some initial naiveté and learn the ropes and local practices. Similarly, Katz (1982) argued that increasing the group tenure produces stability; with increased stability there will be reduced goal conflict, which enhances socialization and the use of clan as opposed to bureaucratic control (Eisenhardt, 1989). Eisenhardt noted that when principals and agents engage in long-term relationships, the principal (the CEO) can more readily assess behaviors. In contrast, teams with short tenure would be less predictable and require increased monitoring. McNeil and Thompson (1971: 628) argued that the newcomer is far less familiar with the organization's recent history, its activities in process, its local customs (which we usually recognize as carried in the informal organization). Therefore a team of newcomers will require increased monitoring by the CEO and increased rules and regulations in order to coordinate its functions.

Katz (1982), by contrast, found a nonlinear relationship between group tenure and performance in the research and development teams he studied. He explained that groups go through different stages: socialization, innovation, and stability. He expected young teams to perform poorly because of poor socialization, but he also argued that teams that have spent a long time together become committed to the status quo, experience selective perception, and increasingly rely on the group's own expertise. He concluded that long-tenured groups would eventually become less adaptive and innovative. On balance, however, we predict a positive direct relationship between team tenure and performance, based on the rationale that greater tenure facilitates both coordination and control.

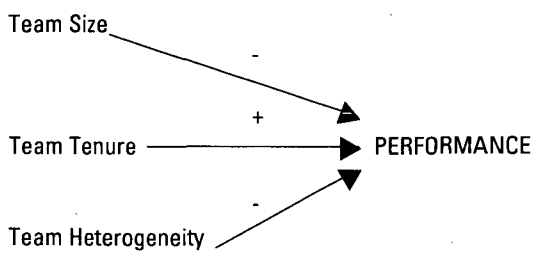
**Team size**. The size of the top management team, the number of members, is a critical element of group demography (Blau, 1977; Ancona and Nadler, 1989). Researchers have recently linked team size directly to organizational outcomes (Eisenhardt and Schoonhoven, 1990; Bantel and Finkelstein, 1991; Wiersema and Bantel, 1992; Hambrick and D'Aveni, 1992). According to the group dynamics literature, increasing the size of a group introduces opposing forces that affect group performance differently (Shaw, 1981). On the one hand, a larger group has greater cognitive resources at its disposal, resources that may contribute to improved group knowledge, creativity, and performance (Haleblian and Finkelstein, 1991). On the

other hand, the larger group may suffer from problems related to control and coordination, with the net result that performance declines. This dynamic tension is also noted in the organization theory literature, in the observation that organizations become more control-oriented as they grow (Mintzberg, 1979).

Top management teams have the task of formulating and implementing the firm's strategy (Hambrick and Mason, 1984), and as part of their leadership function, CEOs must coordinate and control teams behaviors. From this control perspective, large teams present greater coordination and control problems than small teams. The greater the size of the team, the greater the likelihood that there will be goal and information asymmetries between the CEO and the various team members. Given these asymmetries, team members cannot be trusted to do their own thing. Thus, as in the case of heterogeneous teams and short-tenured teams, formal rules, regulations, and processes are more likely to be used with large teams than small teams. As noted previously, formal bureaucratic control will be less efficient than informal clan techniques; moreover, bureaucracy can impede the organization's ability to adapt in high-velocity environments. For these reasons we expect that team size will be negatively related to organizational performance.

Figure 1 summarizes the possible direct effects between top management team demography and organizational performance. Overall, the demography model predicts a significant direct effect for demography on organization performance without a process effect. As Pfeffer (1983) argued, the amount of variance attributed in prior research to intervening variables has been quite small.

**Figure 1. The Demography Model**



## The Process Model

An alternative competing model suggests that the top management team's process will directly affect performance. This process model predicts that both demography and process will be directly and independently related to organizational performance, with process accounting for variation in performance that demography leaves unexplained. The rationale for the process model is derived from social psychology research.

Social psychology has a long tradition of analyzing the interactions among group members. This literature has identified social integration and communication as two key predictors of group performance (Cartwright and Zander, 1968; Shaw, 1981; McGrath, 1984). Other process variables that have been used in previous group research, including conformity (Berkowitz and Daniels, 1963), consensus (Hare, 1952), conflict (Brehmer, 1976), and facilitation (Triplett, 1987) represent overlapping conceptualizations of social integration and communication (Shaw, 1981; McGrath, 1984). In addition, social integration and communication have been included in the underlying theory in previous studies of top management teams to explain relationships between specific measures of team demography and organizational performance, though they were not measured (e.g., Murray, 1989; Eisenhardt and Schoonhoven, 1990; Keck, 1991; Michel and Hambrick, 1992)

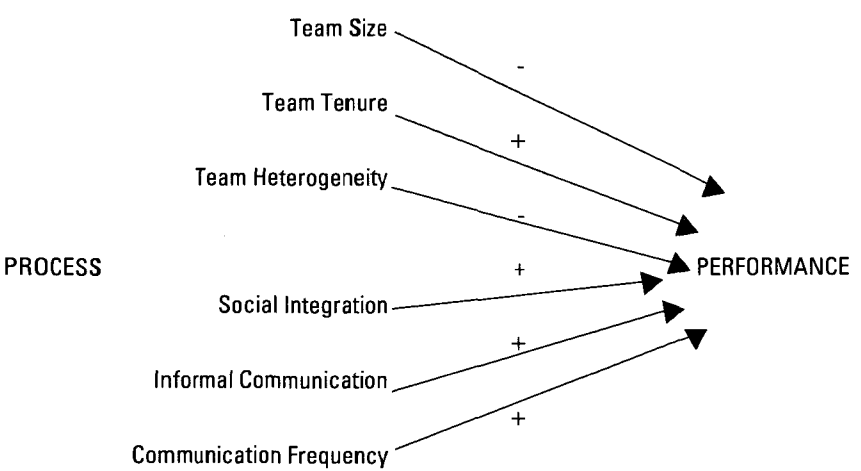
Social integration is a multifaceted phenomenon that reflects "the attraction to the group, satisfaction with other members of the group, and social interaction among the group members" (O'Reilly, Caldwell, and Barnett, 1989: 22). Katz and Kahn (1978: 423) noted that "The great advantage of the cohesive group is that its members can find in group responsibility and group achievement satisfaction for their individual needs for self-expression and self-determination, as well as affiliation." Seashore (1977: 10) has linked social integration and cohesion to such ideas as "group pride," "team spirit," and "teamwork." Members of socially integrated groups experience higher morale and satisfaction and, most importantly, exhibit greater efficiency in the coordination of tasks (Shaw, 1981; McGrath, 1984; O'Reilly, Caldwell, and Barnett, 1989).

The second aspect of process, communication, has been described as the heart of group behavior (Shaw, 1981) and the essence of social systems (Katz and Kahn, 1978). Group communication is multidimensional, and it can vary in frequency (Daft and Lengel, 1984; Ancona and Caldwell, 1992a) and informality (Katz and Kahn, 1978). Communication frequency concerns the amount of interaction among team members, whether communication occurs in face-to-face meetings (one-on-one or

group), by telephone, by written notes, or via electronic mail (Daft and Lengel, 1984; Katz and Kahn, 1978; Shaw, 1981). In contrast, communication informality concerns the extent to which top management teams favor less formal communication channels, such as spontaneous conversations and unstructured meetings, over more formal channels, such as highly structured meetings and written communication. While the two communication constructs are conceptually distinct, as Shaw (1981:150) argued, if a group is to "function effectively, its members must be able to communicate easily and efficiently." Therefore, informal communication is expected to facilitate the ease and frequent flow of communication among team members.

The process model predicts that team process will account for variation in performance that demographic measures leave unexplained. Figure 2 summarizes the anticipated relationships. The principal argument is that the constant change and flux in the high-paced environment confronting the firms in this sample require flexibility and rapid response by the top management teams. Furthermore, this kind of high-speed decision making is fostered through high levels of social integration and communication. In this high-velocity environment, we expect positive direct relationships between team social integration and performance and between team communication and organizational performance.

**Figure 2. The Process Model**



Group dynamic theorists have argued that there is a trade-off between task-oriented and group-maintenance behaviors. From an organizational perspective, task-oriented behavior provides an efficiency benefit, while group maintenance carries an efficiency cost. Stogdill (1959) contended that group maintenance is a precondition for task-oriented behaviors, however, and unless the team can resolve its internal problems, it cannot perform or function efficiently. Because such resolution will delay decision making by consuming valuable time and resources, it is reasonable to expect that the degree of social integration and communication, measures of the smoothness of the teams' internal functioning, will be positively related to organizational performance in environments in which teams must act quickly. Consistent with these ideas, Eisenhardt and Bourgeois (1988) found internal political behavior, which can be seen as a measure of internal strife or conflict, to be negatively related to organizational performance in their study of high-velocity firms. Ouchi (1980) used transaction cost theory to make a similar argument. He argued that clans, which are highly socialized and cohesive teams, have lower communication and coordination costs and are thus more efficient and flexible than formal inflexible bureaucracies. Informal clans can apply greater attention to problems that require quick action, which is particularly important in turbulent, high-velocity environments.

These arguments are consistent with group research, which has found the benefits of social integration and communication to include higher quality problem solving (Lott and Lott, 1961), greater productivity and efficiency (Hoogstraten and Vorst, 1978; Tziner and Vardi, 1983), higher goal achievement (Shaw, 1981), and superior member satisfaction (Lott and Lott, 1961). In cohesive top management teams, members are attracted to the group and presumably want the group to be successful, and they therefore, work harder to help the group solve problems (Goodacre, 1951; Berkowitz, 1954). Shaw and Shaw (1962) found that highly cohesive groups devoted more time to planning and problem solving and that group members followed the established plan, whereas members in low-cohesion groups were hostile and aggressive; they tested each other immediately and did no preliminary planning.

A contrasting argument comes from the groupthink literature, which indicates that social integration may be negatively related to performance (Janis, 1972). The research on groupthink is inconclusive (Flowers, 1977; Courtwright, 1978; Shaw, 1981), however, and Janis (1972) has noted that cohesion can lead to high-quality decisions and high performance when teams establish a norm for critical appraisal. Such a norm is very likely in high-velocity environments, where efforts to preserve

group unity, at the expense of critical appraisal, will lead to a reactive and slow-responding organization. Thus, we expect that the team's social integration, communication frequency, and communication informality will be positively related to organizational performance.

## The Intervening Model

The third model is consistent with upper-echelon theory and the theoretical speculation of most demographic research on top management teams (Hambrick and Mason, 1984; Murray, 1989; Eisenhardt and Schoonhoven, 1990; Keck, 1991; Hambrick and D'Aveni, 1992; Michel and Hambrick, 1992). This intervening model posits that team demography influences organizational performance entirely through team processes and that it has no direct effects on performance. Here we provide the rationale for how we expect the demography of the team to affect the processes that in turn effect performance.

**Effects of heterogeneity on process.** Several demographic studies have used process arguments to explain empirical relationships between the heterogeneity of the top management team and organizational outcomes (Murray, 1989; Keck, 1991; Wiersema and Bantel, 1992). Generally, researchers have argued that team heterogeneity is negatively related to social integration and communication. Wiersema and Bantel (1992) maintained that the unfamiliar language of people with dissimilar experiences, backgrounds, beliefs, and values will presumably lead to difficulties in communication and diminished team integration. Murray (1989) noted that homogeneous groups exert more influence on their members. His assumption was that homogeneity promotes greater cohesion and communication. These arguments stem from findings in social psychology that heterogeneity is negatively related to cohesion (Lott and Lott, 1961; Katz, 1982; O'Reilly, Caldwell, and Barnett, 1989).

Heterogeneity also effects communication. Pfeffer (1981) found that team heterogeneity was associated with more political activities, and Wagner, Pfeffer, and O'Reilly (1984) reported an association between heterogeneity and increased group conflict and decreased interpersonal communication. Zenger and Lawrence (1989) found that similarity in tenure was positively related to communication frequency.

Ancona and Caldwell (1992b: 321), who found an overall negative effect of heterogeneity on performance speculated that heterogeneity may have contrary effects on team process: "... it may be that ... [heterogeneity] brings more creativity to

problem solving and product development, but it impedes implementation because there is less capability for teamwork." Following Ancona and Caldwell, we expect that heterogeneity will adversely affect social integration and the frequency and informality of communication. Because heterogeneity is a multidimensional construct (O'Bannon and Gupta, 1992), we examine three dimensions of heterogeneity: variation in experience (industry and firm), variation in the level of team education, and variation in functional background. We expect the effects of all three dimensions to be in the same direction.

**Effects of team tenure on process.** Top management team demography scholars have also used team process to explain empirical links between team tenure and organizational performance (Eisenhardt and Schoonhoven, 1990; Keck, 1991; Michel and Hambrick, 1992; Hambrick and D'Aveni, 1992). In general, longer team tenure is thought to enhance social integration and ease of communication. In their study of the relationship between team tenure and sales growth, Eisenhardt and Schoonhoven (1990: 509) noted that members of top management teams "who have a history together have probably learned how to get along and communicate with each other." Keck (1991) noted in her study of team demographics and performance that teams are likely to be unproductive until members develop roles and patterns of interaction that enhance cohesion and good communication. She suggested that such roles improve with increased tenure. Hambrick and D'Aveni (1992) and Michel and Hambrick (1992) both linked tenure to organizational outcomes and argued that longer team tenure leads to increased integration and the opportunity for shared management values. Goodstein and O'Reilly (1988) found that experienced executive teams were more cohesive and trusting than less experienced teams.

In terms of communication, Katz (1982) found a positive relationship between group longevity and the level of group communication in project teams. Zenger and Lawrence (1989), at the work group level, discovered that people experienced in working with one another are able to communicate more easily than those who do not have shared experience. Teams who have a history of working together are thus less likely to require and use formal communication procedures.

Teams with a long tenure together will not only have spent more time with one another, which facilitates greater social interaction and cohesion, but they will also have a greater shared understanding of their organization and industry than teams with short tenures. Such teams will be more likely to comprehend the specific idiosyncrasies, strengths, and weaknesses of their organizations and the key issues in the industry. This

common basis of understanding accelerates decision making (Stinchcombe, 1965) and further enhances integration and communication. Ouchi (1980) noted that groups with more experience working together will have a more thorough appreciation of how the organization operates and that this will permit unconstrained team interaction and communication. Thus, we expect that team tenure will be positively related to communication informality, communication frequency, and social integration.

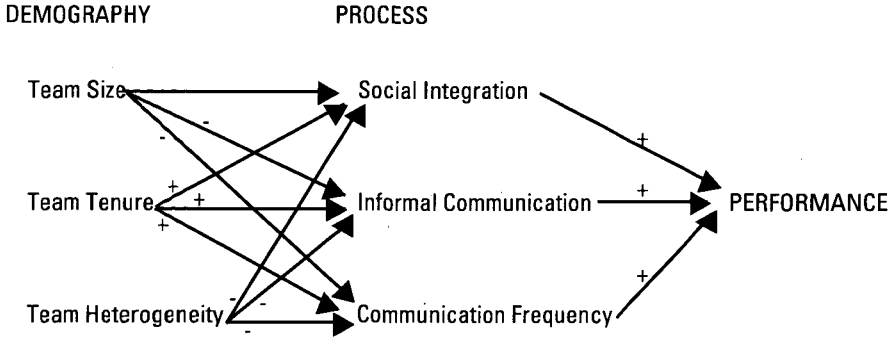
**Effects of team size on process.** Researchers have also used top management team process to explain empirical links between team size and performance (Eisenhardt and Schoonhoven, 1990; Bantel and Finkelstein, 1991; Wiersema and Bantel, 1992; Hambrick and D'Aveni, 1992). As a rule, the contention has been that a larger team adversely affects team integration and communication. Wiersema and Bantel (1992) argued that team cohesion and communication become strained as the number of members in the group increases. Bantel and Finkelstein (1991) contended that increasing the size of the team will result in increased team differentiation and, consequently, in a decrease in cohesion. Haleblian and Finkelstein (1991:2) claimed that "smaller teams tend to be more cohesive and do not experience the same coordination and communication problems that larger groups do." Team size enhances the potential for conflict, because in larger groups there are more sources of input and more subgroups, each with their own centre of power (Bales and Borgatta, 1966; Meyer, 1972). At the work group level, Hoffman and Maier (1961) found that large team size was negatively related to the team's ability to reach consensus, suggesting that such teams would be less cohesive than smaller teams. Slater (1958) discovered that members of smaller teams expressed more positive evaluations of their groups than did larger teams. Katz (1949) found that, relative to large teams, small teams were more cohesive and satisfied.

Aside from its impact on social integration, team size also affects communication among members. Hare (1952) found that members of large groups had fewer chances to participate in discussion than members of small groups because a few members tended to dominate the discussion. Zenger and Lawrence (1989) also found a negative relationship between group size and communication frequency. Wagner, Pfeffer, and O'Reilly (1984) argued that the communication processes in large groups would be more structured and constrained than in small groups. Large teams will be more difficult than small ones to coordinate and control, therefore requiring more formal communication mechanisms (Lawrence and Lorsch, 1967). Although it has been

argued that large teams can draw on more information than small teams and thus enhance creativity (Haleblian and Finkelstein, 1991), this potential benefit is accompanied by problems of communication and lack of social integration in the large team. We thus expect that team size will be negatively related to communication informality, communication frequency, and social integration.

The one remaining question associated with the intervening model concerns the more restricted relationship among the process variables of communication informality, communication frequency, and social integration. One viewpoint is that these variables are concurrent and therefore independent of each other. Another conception, more consistent with the social psychology research on teams, is that informality of communication leads to higher levels of communication and social integration (Lott and Lott, 1961; Shaw, 1981). The logic is that informality encourages members to interact frequently and also to become socially integrated or close to one another. This is the causal assumption we have adopted for testing the intervening model. Figure 3 summarizes the intervening model and shows the various effects of team demography on team processes.

**Figure 3: The Intervening Model**



## Other Factors

Two organizational characteristics, firm size and past performance, and two environmental characteristics, industry growth rate and degree of new competitive entry, may also affect performance and were thus analyzed in each of the models as controls. Firm size was included because of its potential covariation with team size and the use of formal communication. Past performance was included to control for the possible effects of prior firm performance that might lead to changes in group demography or group processes. The industry-level controls were included to remove potential industry effects on firm performance. Industry growth rate was included to account for industry demand, and the degree of new competitive entry was used to control for the level of industry competition.

# METHOD

## Subjects and Procedures

The target population for the study was top management teams of a set of single-business, technology-based companies. The unit of analysis was the firm. The names of firms were first identified from an almanac profiling approximately 150 high-tech or technology-intensive firms that were part of a technology and research and development consortium. One hundred and fourteen of these companies were selected, based on three initial criteria: (1) the companies were single-business, technology-intensive firms; (2) objective performance data were available for the firm; and (3) firms were geographically close enough for on-site visits. After initial contacts (letters and phone conversations), 47 firms were dropped from the sample for a variety of reasons, including unwillingness to release performance measures, lack of time to participate, or because they were mistakenly identified (e.g., were low tech, had merged, diversified, or gone out of business). The CEOs of the remaining 67 firms were interviewed (an initial response rate of 59 percent ).

The purpose of the personal interview was threefold. First, the interview allowed the researcher to explain more fully the goals of the study. Since the study design called for the CEO to identify each of the team members and for each team member to complete a questionnaire, it was crucial to obtain the CEO's approval and endorsement of the study. Second, as part of the interview, the CEO initialed a memo to each top management team member, requesting participation in the study. This memo served to endorse the study, increasing the likelihood of participation. Finally,

the interview facilitated our having direct access to annual reports, financial statements, and other archival information about the firm's environment.

Of the 67 CEOs interviewed, usable responses were received from 53, for a participation rate of 79 percent of the final population (47 percent of those originally selected). The companies in the sample ranged in size, measured in gross sales, from $200 thousand to $162 million. Mean sales were $29 million, with a standard deviation of $32.5 million; the median was $17.8 million. The mean size of firms in number of employees was 357, with a standard deviation of 395; the median number of employees was 225.

The companies that chose not to participate in the study were engaged in the same kinds of businesses as the firms included in the final sample. A one-way analysis of variance on gross sales indicated that nonresponding firms were not significantly different from responding firms in terms of size ($F=1.85$; $p<.18$; $n=114$).

Hambrick and Mason's (1984) upper-echelon theory implies that researchers can identify members of a top management team simply by equating executive titles with membership in the team. Recent studies of top management teams have used this approach (Norburn and Birley, 1988; Tushman, Virany and Romanelli, 1989; O'Reilly and Flatt, 1989; Keck, 1991). To approximate Cyert and March's (1963) notion of the dominant coalition more closely, however, we asked each CEO to identify the members of his or her "real" top management team (78 percent of team members were also officers in the corporation).

The CEO and all members of the team were asked to complete questionnaires. A total of 230 usable questionnaires were returned from the 286 requested from team members. The average number of usable questionnaires returned per firm was 4.5. Eighty percent of the team members who were asked to complete the questionnaire did so.

Eisenhardt and Bourgeois (1988) and Eisenhardt (1990) characterized the high- velocity environment as one in which firms face rapid changes in technology, demand, and competition. The firms in this sample fit this definition: They are involved in rapidly changing high-end knowledge industries, such as informational, electrical, biomedical, and environmental technologies. Companies in the sample averaged almost six new product introductions in the previous year and over 10 new product introductions in the previous three years. On average, over 28 percent of previous year's sales were attributed to new products that did not exist in prior years. Moreover, the average industry growth rate for the sample exceeded 13 percent. CEOs

reported that there were approximately 12 new entrants and 12 exits per year in their industries. More than 60 percent of the CEOs indicated that their companies responded to competitive threats within minutes or hours. Finally, over 90 percent of the CEOs considered their companies to be first movers or fast seconds in entering the market with new technology or products. All of these characteristics conform to the definition of a high-velocity environment.

We used a variety of data collection methods including (1) structured interviews with each firm's CEO, (2) questionnaires completed by the CEO and members of the firm's top management team, and (3) an analysis of publicly available annual reports and Securities and Exchange Commission filings.

## Demographic Variables

*Team heterogeneity.* Team heterogeneity was measured by three variables: variation in team experience; variation in level or years of education; and variation in functional backgrounds. Heterogeneity of experience was assessed in terms of each team member's (1) total months of experience in the industry, and (2) total months of experience with the company. A coefficient of variation across top management team members in each company was calculated, for each of the two measures, to assess variation in team experience (Allison, 1978). A score of zero indicates perfect homogeneity along the given dimension. Once the heterogeneity coefficients were calculated for each measure, the two were averaged into a single experience heterogeneity index (alpha =.62). The results did not differ substantially using either of the measures separately.

Heterogeneity of education was measured by calculating the coefficient of variation for number of years of education for each top management team. A zero score indicates perfect homogeneity in the years of education among team members.

Team members were asked to identify the functional category that most closely represented their background. Functional heterogeneity was measured in terms of Blau's (1977) heterogeneity index: $(1-\sum i^2)$, where $i$ is the proportion of the group in the $i$th category. A high score on this index indicates variability in the functional backgrounds among team members or functional heterogeneity; a low score represents greater functional homogeneity.

*Team tenure.* Team tenure was measured by the length of time each team member had been in his/her current position. It was created by averaging the individual

time-in-job scores across team members. A high score indicates a team with a long history of working together.

*Team size.* The size of the team was measured by a single item: the number of team members, as defined by the CEO. The average team size was 5.2; the median was 5.0. Six teams had only two members, while six others had nine members.

## Process Variables

*Social integration.* Social integration was measured by nine Likert-type questionnaire items (5-point scale), completed by each team member. The items, shown in the Appendix, were adapted from Shaw (1981) and supplemented by the researchers. Sample items include the following: "The members of the TMG [top management group] get along together very well," and "The members of the TMG are always ready to cooperate and help each other." The nine items were averaged to form a composite social integration index (alpha= .85). A one-way analysis of variance was performed on the social integration index to determine if there was greater variability in the ratings between organizations than within organizations (Winer, 1971). The F-ratio was significant ($F=4.04$; $p<.001$), which legitimized our aggregating team social integration scores for each organization by averaging the individual team member scores. We used an interrater reliability coefficient (James coefficient) to examine the intragroup reliability of responses (James, Demaree, and Wolf, 1984). The average intragroup reliability for this scale was .94. This score reveals homogeneity among team members in their responses to the items included in this social integration scale. A high score on the social integration scale implies a highly integrated team.

*Informality of communication.* The informality of communication among team members was measured by four Likert-type questionnaire items designed by the authors. The items (see Appendix) included, "Meetings between members of the TMG are very informal," and "Members of the TMG feel free to schedule meetings with other members whenever necessary." These four items were averaged to form an informality of communication index (alpha=.75). Again, one-way analysis of variance suggested that the individual scores could be aggregated to the group level ($F=2.83$; $p<.001$). The average intragroup reliability for this scale was .92. A measure of communication informality was calculated for each team by averaging across individual team members' scores. Higher scores indicate more informal communication.

*Communication frequency.* Communication frequency was measured by six

open- ended questions (see Appendix ) developed from Shaw (1964) and Ruekert and Walker (1987). The items included "The number of times (per week) you meet with more than one, but less than all of the other members of the TMG" and, "The frequency of individual face-to-face meetings." Responses to the six questions were standardized and averaged for each individual to form a communication frequency index (alpha=.73). A one-way analysis of variance again supported the legitimacy of aggregating individual scores to the team level ($F=1.528$; $p<.05$). The average intragroup reliability for the communication frequency scale was .84. Higher scores signal more frequent communication.

An exploratory factor analysis, shown in Table A.1 in the Appendix, established the discriminant validity of the three process variables. With a three-factor constraint, the emergent structure was consistent with our conceptualization (e.g., social integration, informal communication, and communication frequency), providing psychometric support for the measures of top management team process.

## Organizational Performance and Control Variables

In keeping with much of the previous team research, we measured performance in two ways: return on investment (e.g., Murray, 1989; Keck, 1991) and one year growth in sales (e.g., Eisenhardt and Schoonhoven, 1990). We measured return on investment (ROI) as net income divided by total stockholder equity. ROI indicates the percentage of profit from each dollar invested and allows investors to compare different investment opportunities or the same investment opportunity over time. We measured one year growth in sales as the percentage increase or decrease in total sales from one year to the next. These measures were obtained directly from annual reports and 10K filings. Firm size was measured by the number of full-time employees, obtained from corporate records. Industry growth rate and the degree of competitive entry in the last year were provided by CEOs during interviews.

## Analysis

The three alternative models were tested with hierarchical regression analyses and path analysis. Hierarchical regression analyses were used to examine the demography and process Models or the direct effects of team demography and process on performance. One hierarchical regression model was used with each of the dependent variables: return on investment (ROI) and sales growth. In each case, control variables, team demography variables and team process variables were entered as blocks. After

entering the control variables, we examined the relative direct contribution of the team demography variables (the demography model) and the incremental contribution of process variables (the process model).

We used path analysis to test the intervening model (Pedhazur, 1982; James, Muliak, and Brett, 1984). Path analysis is especially useful here because it provides an opportunity to investigate a model with demographic dimensions as the exogenous variables, process dimensions as intervening variables, and measures of organizational performance as the ultimate dependent variables. LISREL was not an alternative for the present research, for two reasons. First, the measurement advantages of LISREL were not available because responses in this study were aggregated from the individual level to the team and organizational level. LISREL is not capable of dealing with two different levels of analysis in a single simultaneous step. Scales in this study were derived through factor analysis based on individual team member scores and acceptable alphas coefficients associated with each scale rather than by LISREL measurement specification. Although it is possible to estimate a structural model without a measurement model, this specification is consistent with the regression procedures followed in path analysis. A second advantage of LISREL is model fitting, but LISREL is not reliable for small samples such as ours (Breckler, 1990).

## RESULTS

Table 1 reports the means, standard deviations, and correlations for the variables in this study. The results are presented in terms of the three hypothesized models. The intervening model is presented last, because it provides an aggregation of the demography and process models.

### The Demography and Process Models

Table 2 reports the results of the two hierarchical regression analyses with ROI and sales growth as the dependent variables. These equations were used to assess the direct effects of team demography and process on performance. Step 1 brings in the control variables. Step 2 is a test of the demography model. A significant change in $R^2$ would demonstrate the influence of demography on performance. Step 3 adds the cluster of process variables and is a test of the process model. A significant change in $R^2$ for step 3 would demonstrate the separate influence of team process or that team process adds significantly to the explained variance after the control and demographic variables are entered.

**Table 1. Means, Standard Deviations, and Intercorrelations (N = 53)**

| Variable | Mean | S.D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. *Social integration* | 3.558 | .493 | | | | | | | | | | | | | |
| 2. Informal communication | 2.076 | .462 | -.544*** | | | | | | | | | | | | |
| 3. Communication frequency | .067 | .819 | -.263** | .247* | | | | | | | | | | | |
| 4. Team tenure | 52.817 | 33.766 | .174* | .018 | .100 | | | | | | | | | | |
| 5. Industry growth | 12.626 | 15.462 | -.014 | .105 | -.148 | .178* | | | | | | | | | |
| 6. Entry | 12.811 | 26.189 | .175* | .146 | .011 | .235* | -.034 | | | | | | | | |
| 7. Team size | 5.19 | 2.131 | -.433*** | .414*** | .140 | -.355** | .047 | -.099 | | | | | | | |
| 8. Functional heterogeneity | .53 | .213 | -.319** | .242* | -.035 | -.201* | .007 | -.160 | .495*** | | | | | | |
| 9. Heterogeneity of experience | .575 | .225 | -.320** | .414*** | .205* | -.145 | .035 | -.004 | .160 | .316** | | | | | |
| 10. Heterogeneity of education | .358 | .199 | .019 | .119 | .067 | -.202* | .238* | .195* | .237* | .064 | .082 | | | | |
| 11. Firm size (# of employees) | 367.302 | 389.825 | -.252** | .392*** | .151 | .191* | -.020 | .159 | .189* | .141 | -.034 | -.078 | | | |
| 12. ROI (time *t*) | 48.931 | 276.956 | .418*** | -.341** | -.324** | .022 | -.227* | .052 | -.152 | -.224* | -.479*** | .186* | -.036 | | |
| 13. Sales growth | .112 | .204 | .281** | .002 | -.414*** | .053 | .200* | -.027 | .012 | .165 | -.175* | .225* | -.062 | .543*** | |
| 14. ROI (*t* - 1) | 21.273 | 99.321 | -.079 | .030 | .207* | -.147 | -.193* | .010 | .067 | .238* | -.042 | -.064 | .024 | .274** | .235* |

**Table 2. Results of Regression Analyses for Hypothesized Model (N = 53)†**

| | Dependent variables | | | | | |
|---|---|---|---|---|---|---|
| | ROI | | | Sales growth | | |
| | beta | $R^2$ | Change $R^2$ | beta | $R^2$ | Change $R^2$ |
| Step 1 (Control variables): | | .11 | .11 | | .12 | .12 |
| Firm size (# of employees) | -.05 | | | -.06 | | |
| | (.10) | | | (.00) | | |
| ROI (t - 1) | .24* | | | .29* | | |
| | (.39) | | | (.00) | | |
| Entry | .05 | | | -.01 | | |
| | (1.45) | | | (.00) | | |
| Industry growth | -.18 | | | .25* | | |
| | (2.48) | | | (.00) | | |
| F = 1.502 | | | | 1.66 | | |
| d.f. = 48 | | | | 48 | | |
| Step 2 (Demographic variables); | | .44*** | .33*** | | .24 | .12 |
| Heterogeneity of experience | -.26* | | | -.18 | | |
| | (158.53) | | | (.13) | | |
| Heterogeneity of education | .38** | | | .26* | | |
| | (168.13) | | | (.14) | | |
| Functional heterogeneity | -.19 | | | .21 | | |
| | (174.82) | | | (.15) | | |
| Team tenure | .14 | | | .14 | | |
| | (1.07) | | | (.00) | | |
| Team size | -.07 | | | -.02 | | |
| | (18.97) | | | (.02) | | |
| F = 3.82*** | | | | 1.53 | | |
| d.f. = 43 | | | | 43 | | |
| Step 3 (Process variables): | | .56* | .12** | | .44** | .19** |
| Social integration | .23* | | | .37* | | |
| | (78.71) | | | | | |
| Communication frequency | -.26* | | | -.32* | | |
| | (40.85) | | | | | |
| Informal communications | -.07 | | | -.32* | | |
| | (91.31) | | | | | |
| F = 4.32*** | | | | 2.58** | | |
| d.f. = 40 | | | | 40 | | |

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

†*All beta weights are from final step in hierachical regression. Standard errors are in parentheses.*

Results for the relationship between team demography, process, and ROI in step 2 reveal a significant increase in $R^2$, supporting the demography model (change in $R^2$=.33; F= 5.15; <.001). The addition of team process in step 3 also indicates a significant increase in $R^2$ (change in $R^2$=.12; F= 3.68; p<.02), supporting the process model. Results thus show that both team demography and team process directly affect ROI after the control variables are entered. In terms of specific demographic effects, the heterogeneity of experience measure has a direct negative impact on ROI (beta=-.26; p<.05) after all variables are in the model, as expected. Counter to our expectations, however, the direct influence of heterogeneity of level of education is positive (beta=.38; p<.01). With regard to team process, the level of social integration is positively related to ROI (beta=.23; p<.05). The level of communication frequency is negatively related to ROI (beta=-.26; p<.05), contrary to our expectation.

Results show that for the relationship between team demography, team process, and growth in sales, the demography model (step 2) is not supported by a significant change in $R^2$ (change in $R^2$=.12; F= 1.36; p<n.s.). In the process model (step 3), however, there is a significant increase in $R^2$ (change in $R^2$=.19; F= 4.60; p<.01), which supports the model. The analysis thus reveals that team demography does not add explanatory power to the sales growth model but that team process does. The level of social integration (beta=.37; p<.05), communication frequency (beta=-.32; p<.05), and informal communication (beta=-.32; p<.05) are all directly related to sales growth. The negative signs for informal communication and communication frequency, however, were unexpected. Moreover, as with the ROI measure of performance, heterogeneity in level of education is positively related to sales growth (beta=.26; p <.05) when all variables are in the model.

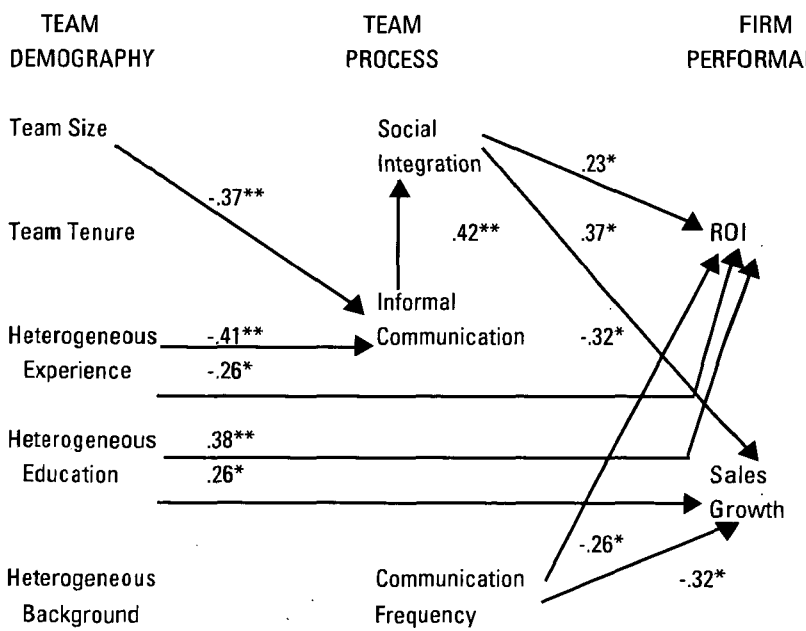
## The Intervening Model

The intervening model depicted in Figure 3 above, predicts that each demographic dimension will influence each process dimension, with no direct links between demography and performance emerging in the data. This model was tested with path analysis. According to James, Muliak, and Brett (1984), two conditions are necessary to confirm a path model. First, all of the predicted paths must be supported. If any path is not confirmed, then the total hypothesized model (the intervening model) must be rejected. Second, paths predicted to be nonsignificant must be nonsignificant. In our case, that means that no significant direct path can exist between demographic

variables and organizational performance.

The two regressions reported previously in Table 2 reveal all the direct performance effects. Three additional sets of regressions were performed to explore the indirect effects outlined in the intervening model. In the third and fourth regressions, team social integration and communication frequency were used as intervening dependent variables, and all team demography and control variables, plus informality of communication, were treated as independent variables. In the fifth regression, informality of communication was treated as an intervening dependent variable, and the demography and control variables were treated as independent variables. These equations provide the test of relationships depicted in Figure 3. Figure 4 portrays the actual empirical results of our test of the intervening model.

**Figure 4. Extended path model, controlling for past performance (ROI), firm size, industry demand, and competition.**




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

As shown in Figure 4, team demography is directly related to performance. The intervening model is therefore not confirmed. The analysis reveals some intervening effects, however, namely that team demography is directly related to team process. The analysis reveals that team size (beta=-.37; p<.01) and heterogeneity of experience (beta=-.41; p<.01) are negatively related to informality of communication. In addition, informality of communication between team members is positively associated with team social integration (beta=.42; p<.01). None of the other demographic measures is related to process.

We have labeled Figure 4 the extended model. It graphically provides an empirical summary of the direct and indirect effects, revealing a much more complex pattern of relationships than originally expected. All the path coefficients shown in the figure are significant at the .05 level or greater, and additional analyses revealed that there were no interaction effects or curvilinear relationships for any of the variables in the model. Consistent with Pedhazur (1982), path coefficients that did not meet the criteria of statistical significance (p<.05) were deleted from the model. In essence, the path model shown in Figure 4 is an extended version of the intervening model, since this empirically derived path model also includes the remaining direct effects of demography. For the most part, our discussion will focus on this extended model.

## DISCUSSION

Virtually all research on top management teams has emphasized the use of demographic measures to represent team composition and structure. This stream of research has consistently taken for granted that team demography is a critical determinant of organizational outcomes because of its effects on more fine-grained team process variables, such as social integration and communication. Despite this widely discussed assumption, the intervening effect of process variables has remained presumed. This research measured process variables directly in an effort to answer the following questions: (1) To what extent does team demography predict variation in either intervening team process variables and or organizational outcomes? and (2) To what extent does the addition of team process account for variation that demography measures leave unexplained? Three alternative models or explanations for how team demography and process affect performance were tested and contrasted. We also presented a fourth, empirically derived extended model.

Overall, there was partial support for the intervening model, in which process

is a mediator of the relationship between demography and performance, and the process model, in which demography and process variables each affect performance separately. Little support was found for the argument underlying the demography model, in which demography rather than process affects performance. This latter finding contradicts Pfeffer's (1983) contention that process measures can be dismissed because they account for little of the variation in outcomes. In this research, team process had a direct impact on performance, while team demography was found to have both direct and indirect effects. The analysis shows that the relationships between team demography, team process, and organizational performance are not as straightforward or as simple as scholars have previously believed.

Among the process effects, the finding of a positive direct relationship between team social integration and both measures of performance is intriguing. Presumably, top management teams that work well together react faster, are more flexible, use superior problem solving techniques, and are more productive and efficient than less integrative teams. Such teams may operate as efficient clans, not needing to expend extra energy or resources on group maintenance. These behaviors appear to be especially important in high-velocity environments, a result also implied by Eisenhardt and Bourgeois (1988).

Of the two communication process measures, only communication frequency was significantly related to both measures of performance, and this was opposite to the hypothesized direction. Ancona and Caldwell (1992a) also found a negative relationship between communication frequency and self-rated performance when they studied new-product teams. Stogdill (1959) has argued that the primary demand on a team is the resolution of internal conflict, referred to as group maintenance, and that groups cannot operate efficiently until this internal conflict is resolved. One explanation for our findings is that communication frequency indicates conflict and disagreement in the group, resulting in a flurry of meetings and written memos that detract from task-oriented activities. The top management teams in this study may be communicating frequently to reduce conflict. Conversely, infrequent communication may indicate that a team functions well, with little need for information exchange and clarification.

Increased communication among team members appears to impose a cost on organizations. While providing an important maintenance function, it likely consumes time and delays decision making, which is apparently harmful in this high-velocity environment. In support of this argument, results in Table 1 show that the correlations

between communication frequency and social integration and between communication frequency and informality of communication are negative and significant. Socially integrated teams using informal communication do not need to communicate as frequently as less integrated teams. The only communication necessary in integrated groups, apparently, is a fairly unstructured and sparse exchange of information, without the need to formalize communication exchange for the record.

Complicating this finding is the negative path between informal communication and growth in sales. This finding implies that teams require a certain level of formality in communication to achieve high sales growth, perhaps as a means of frequently sharing information, but this formality may also be detrimental to team integration if the level gets too high. It appears that there is a threshold level of formal communication that is needed even in the most socially integrated teams, an intriguing issue for future research. It should be noted that none of the team demography measures were directly related to communication frequency and social integration, as many scholars have suggested they would be.

Turning to the demography results, the heterogeneity findings are noteworthy but challenging to untangle. Team heterogeneity was found to have (1) both a direct and indirect influence on performance, and (2) different effects on performance, depending on the specific measure of heterogeneity. The negative relationship between heterogeneity of experience and return on investment may be due to the fact that teams with diverse levels of experience encounter conflict in decision making, requiring greater coordination and monitoring by the CEO and thereby delaying the team's ability to act. Ancona and Caldwell (1992b) specifically suggested that negotiation and conflict resolution skills are necessary to offset the natural differences that stem from diverse experience.

In this study, heterogeneity in the years of education had a positive direct relationship with both measures of performance. Perhaps some forms of heterogeneity are desirable for performance, because they contribute to team creativity, an argument also made by Eisenhardt and Schoonhoven (1990). In high-velocity environments, the creative benefits of a heterogeneous knowledge base in the top management team may offset the problems of managing a diversity of educational qualifications. The data also suggest that some forms of heterogeneity, such as functional background heterogeneity, may have neither direct nor indirect effects on firm performance.

The indirect influence of heterogeneity of experience on both measures of

performance is also interesting. Heterogeneity of experience does not seem to have an impact on social integration directly but, instead, works through its effect on communication informality. One explanation for this finding is that teams with heterogeneous experiences fall back on more formal communication systems to coordinate diverse decision styles and to maintain control. As stated earlier, this formality, in turn, seems to affect team integration adversely. Researchers who have argued that homogeneity affects performance through social integration may be simplifying a more complex process (e.g., Murray, 1989; Keck, 1991; Michel and Hambrick, 1992).

The negative relationship between team size and social integration through informal communication is also intriguing, though hardly surprising. Consistent with Seashore (1977), the results suggests that the larger the team, the less likely members are to get along. To counter the size effect, larger teams may resort to more formal communication. Hence, team size indirectly detracts from performance through negative effects on informal communication and social integration, possibly because size creates distance among team members, thereby inhibiting their interaction.

For reasons that are not entirely clear, team tenure had no effect on communication or social integration, and it did not affect performance. This "non" finding is in contrast to the literature that speaks of the importance of group process to team longevity (Seashore, 1977; Shaw, 1981; Katz, 1982; Pfeffer, 1983) and enhanced organizational outcomes (Hambrick and Mason, 1984). Since the measure of "time in the job" is merely a proxy for the history of the team together, an obvious direction for future research would be to examine team history more directly.

While the findings of this study are interesting, as with any study there are certain limitations. In particular, the study is based on a limited sample of firms from a high-velocity environment. Given the sample size, the research was limited in the number of independent variables that could be examined simultaneously. In addition, by focusing on a homogeneous sample of firms from a high-velocity environment, we can make only limited generalizations about the impact of exogenous contextual variables.

One important competing explanation of the results—a possible reverse-causal impact of financial performance on team demography and process variables—can be ruled out by the statistical control of the previous year's financial performance. Nonetheless, alternative causal sequences must not be dismissed. In addition, there

may be other constructs, especially process variables, that are worthy of study. Follow-up research is needed to elaborate further alternative process explanations and sequences for how top management teams affect firm performance.

Despite these qualifiers, a particular strength of this study is its focus on group dynamics and team process at the top. Although researchers have long recognized the importance of the topic, most have taken a relatively coarse-grained approach by emphasizing team demographics and inferring process relationships. The direct measurement of process variables has been by-passed in earlier studies, perhaps because these measures are so challenging to obtain from top-level executives. The finding that team process accounts for variability left unexplained by demography highlights the need for more such process research.

There are implications for practice that can be drawn from these data. First, the data suggest that there is value in keeping the team size relatively small, to enhance informal communication and social integration. Second, behavioral change efforts directed at enhancing informal team communications and social integration, such as team building, are likely to have payoffs in terms of team efficiency and total organizational performance. Finally, top management teams that are homogeneous in level of experience (but not education) seem to add value by enhancing informal communication and social integration and perhaps through other direct effects on performance. This study makes clear that the effects of team demography are complex and yet to be completely unraveled, but whatever we can learn will be useful, for only by understanding the relationship between team demography and process can CEOs effectively structure their teams for the high performance that survival in some environments requires.

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## APPENDIX: Questionnaire Administered to the Top Management Group (TMG)

### Social Integration

1) The members of the TMG are quick to defend each other from criticism by outsiders.
2) The successes of other members of the TMG help me achieve my own objectives.
3) Everyone's input is incorporated into most important company decisions.
4) The members of the TMG get along together very well.

5) Relationships between members of the TMG are best described as "win- lose;" if he/she wins, I lose. (reverse-coded)
6) The members of the TMG are always ready to cooperate and help each other.
7) When final decisions are reached, it is common for at least one member of the TMG to be unhappy with the decision (reverse-coded).
8) There is a great deal of competition between members of the TMG (reverse-coded).
9) The members of the TMG really stick together.

**Communication Frequency (in times per week)**

10) The frequency of formal face-to-face meetings between you and other members of the TMG.
11) The frequency of informal face-to-face meetings between you and other members of the TMG.
12) The frequency of formal written communication between you and other members of the TMG.
13) The frequency of informal written communication; personal notes, etc., between you and other members of the TMG.
14) The frequency of telephone conversations between you and other members of the TMG.
15) The number of meetings involving more than one member but less than all members of the TMG.

**Communication Informality**

16) TMG meetings tend to be very formal in nature (reverse-coded).
17) Meetings between members of the TMG are very informal.
18) Communication between members of the TMG is always in writing (reverse-coded).
19) The TMG employs informal rather than formal communication channels.

**Table A.1 Rotated Factor Matrix of Process Variables (3-factor constraint)**

| Question# | Social integration | Communication frequency | Informal communication |
|---|---|---|---|
| #4 | .78478 | .04373 | .10791 |
| #6 | .76591 | -.05820 | .17600 |
| #9 | .72295 | -.00968 | .09591 |
| #5 | .72128 | .00442 | .11913 |
| #8 | .66688 | -.09377 | .19235 |
| #3 | .60046 | -.00509 | .10437 |
| #7 | .58297 | -.07672 | .19818 |
| #1 | .54746 | -.10095 | -.09687 |
| #2 | .52005 | .21607 | .04623 |
| #14 | .05591 | .74792 | -.12776 |
| #15 | -.04500 | .73362 | .07188 |
| #12 | -.16635 | .69775 | -.02300 |
| #11 | .07269 | .67211 | .19076 |
| #10 | .10356 | .50117 | -.20567 |
| #13 | -.22952 | .47091 | -.31890 |
| #17 | .11531 | -.13456 | .74311 |
| #16 | .06101 | -.21576 | .70071 |
| #19 | .11738 | .19473 | .67641 |
| #18 | .26346 | .00237 | .53169 |