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Unified diversity in top-level teams

Enhancing collaboration and quality in strategic decision-making

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Abstract

Purpose – This study attempts to move beyond the "congruence assumption" surrounding top management team (TMT) demography by exploring the intervening processes that link TMT diversity and organizational performance.

Design/methodology/approach – Using Fiol's concept of unified diversity and employing an information processing perspective of strategic decision-making, this article proposes a model that incorporates both moderating and mediating influences; and then tests the hypotheses using data from specific strategic decisions faced by 85 top-level decision-making teams within the health care industry.

Findings – Evidence was found to support the expectation that goal consensus moderates the relationship between informational diversity and decision quality within the management teams. In addition, team member collaboration was found to partially mediate this effect.

Research limitations/implications – The retrospective nature of the data collection captured the essence of the decision-making process over time, but future research using longitudinal designs that include different types of industries is needed to confirm the validity of the findings.

Practical implications – The practical implications of this study point towards a need for managers to set in motion both divergent and convergent thinking during the strategic decision-making process. The findings indicate that if managers want to reap the benefits of teams with members from different functional and educational backgrounds, they must instigate some aspect of shared framing among team members, such as consensus on broad organizational goals.

Originality/value – This research identified relevant contingency and mediating variables that help to explain the equivocal results of previous studies attempting to link top management team demography to organizational performance.

Keywords Senior management, Decision making, Team working

Paper type Research paper

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Due to the complexity surrounding strategic decisions, it has been proposed that top management teams (TMTs) should be comprised of individuals from different informational backgrounds (e.g. Bantel and Jackson, 1989; Hambrick *et al.*, 1996). According to Jehn *et al.* (1999), educational and functional differences among group

members are primary sources of informational diversity (Jehn *et al.*, 1999). Having group members with diverse educational and functional backgrounds ought to improve decision quality by insuring that a variety of knowledge, perspectives, and experience is brought to bear on the strategic decision under consideration.

Despite this seemingly straightforward argument, group demography and decision-making research has been frustrated by equivocal findings concerning the benefits of diversity (see Milliken and Martins, 1996; Williams and O'Reilly, 1998, for reviews). A few studies found positive relationships between TMT background diversity and organizational outcomes (Bantel and Jackson, 1989; Eisenhardt and Schoonhoven, 1990; Hambrick *et al.*, 1996), while others reported negative relationships (Murray, 1989; O'Reilly *et al.*, 1993; Smith *et al.*, 1994) or produced non-significant results (Simons *et al.*, 1999; West and Schwenk, 1996). Not surprisingly, such a "mixed bag" of findings has served to foster considerable debate in the recent literature over the actual benefits of diversity for top-level decision-making teams. At this point, the only conclusion that can be drawn with any confidence is that the potential benefits of diverse teams appear to be highly vulnerable to certain liabilities. Although team members with diverse educational and functional backgrounds may bring requisite knowledge, information, and skills to bear on complex strategic issues, they are just as likely to promote dysfunctional rivalries, impair social integration, and restrict information flows – all of which serve to inhibit effective decision-making and subsequent organizational performance (Eisenhardt and Bourgeois, 1988; Sundaramurthy and Lewis, 2003; Wiersema and Bantel, 1992). The potential for teams with diverse backgrounds to have beneficial and detrimental effects on organizational outcomes led Milliken and Martins (1996) to label TMT diversity as a "double-edged sword."

Given this apparent contradiction, researchers in organizational behavior have recently proposed that a better understanding of the relationship between TMT diversity and organizational performance lies in identifying relevant contingency and/or mediating variables that allow for more complex types of effects (Lawrence, 1997; see also Dooley and Fryxell, 1999; Pitcher and Smith, 2001). Several authors have suggested that a TMT's ability to formulate and execute effective strategic decisions may depend upon the interaction between group member cognitive diversity and shared framing or cognitive consensus (Fiol, 1994; Hambrick, 1994; Sundaramurthy and Lewis, 2003). Although at first glance embracing both cognitive diversity and consensus may seem contradictory, Fiol (1994) offers some insights into how this two-fold process occurs.

Fiol (1994) proposed that effective decision-making teams will simultaneously agree and disagree when making novel or ambiguous strategic decisions. More specifically, team members will actively encourage conflicting perspectives that provide relevant information about the issues surrounding the decision and, at the same time, strive for shared understandings that provide a broad frame for interpreting these issues. Fiol (1994) referred to this process as "unified diversity" and argued that the most effective strategic decision-making teams generate diverse information and then use their shared understandings to exploit it. Unified diversity is best described as an on-going interaction of conflicting information within a shared frame of interpretations that, if successful, will promote collaboration among team members (Fiol, 1994). Therefore, it follows that when top management teams consider strategic decision alternatives in a context of high uncertainty, team members must bring their differences into play within a shared frame of reference.

Drawing from Fiol's perspective on strategic decision-making, we propose that TMT background diversity provides the grist for divergent thinking and consensus on organization-wide goals provides the cognitive frame for convergent thinking. Consequently, it follows that the potential for heterogeneous teams to improve the quality of strategic decisions may be realized when team members with diverse backgrounds and consensus on broad organizational goals engage in a collaborative exchange of conflicting points of view (Fiol, 1994; Hambrick, 1994; Sundaramurthy and Lewis, 2003).

TMT demography and cognitive diversity

Research on decision-making teams and groups has examined many types of demographic diversity (see Milliken and Martins, 1996; Pitcher and Smith, 2001, for reviews). Early studies included a variety of demographic variables, such as age, gender, education, occupation, function, and group or organizational tenure. At first, researchers proposed that all forms of demography would increase cognitive diversity among group members, but recent attempts to link demographic heterogeneity to perceptual measures of cognitive diversity have not been successful (Kilduff *et al.*, 2000; Miller *et al.*, 1998). Several studies have discovered, however, that task or job-related forms of diversity such as educational and functional background increased cognitive conflict in workgroups (Jehn *et al.*, 1997, 1999; Pelled, 1996; Pelled *et al.*, 1999).

Cognitive conflict refers to differing viewpoints and ideas concerning task-related issues, such as disagreement regarding an organization's current strategic position (Amason, 1996; Jehn, 1994; Pelled, 1996). Several researchers have found that functional and educational diversity increases task-related debates in work teams (Jehn *et al.*, 1997; Pelled *et al.*, 1999). In a more recent study, Jehn *et al.* (1999) combined diversity in functional background, educational background, and hierarchical position to form a composite index they referred to as informational diversity. Their results revealed that informational diversity significantly increased cognitive, task-related conflict among group members. Together, these studies indicated that information-based sources of group diversity promoted cognitive diversity in the form of task-related conflicts. Jehn *et al.* (1999) also discovered that group diversity on values and goals did not significantly correlate with informational diversity and that the positive effects of informational diversity on group performance were stronger when disagreement on group values and goals was low.

Informational diversity encompasses differences in job-related variables such as education, experience, and expertise that members bring to the group (Jehn *et al.*, 1999; Pelled, 1996). Thus, information-based sources of diversity among group members increase the likelihood that diverse opinions, viewpoints, and ideas will emerge during the decision-making process (Jehn *et al.*, 1999; Stasser, 1992). Given our argument that diverse TMTs are potentially more valuable than homogeneous teams because they bring richer sources of information to the decision-making process, informational diversity will be the focus of this study.

TMT goal consensus and shared framing

The normative strategic management literature maintains that consensus on organizational goals should occur at the end of a formal strategic planning process, but more descriptive research tends to view consensus as a consequence of both deliberate and emergent decision processes (Mintzberg and Waters, 1985). According to

the latter, consensus on organizational goals evolves from, and is reinforced by, a process involving numerous decisions made over time that are aimed at implementing the organization's strategy (Child, 1972). Thus, rather than being the outcome of a single collaborative session, consensus on organizational goals represents a broad and relatively stable group perception that is strongly influenced by the history of the organization, its successes and constraints, and the individual experiences of each team member (Dess and Origer, 1987; Hrebiniak and Joyce, 1984; Mintzberg and Waters, 1985). Indeed, we assert that the accumulation of such events over time is actually a stronger determinant of goal consensus than activities associated with a formal "strategic plan." This conceptualization infers consensus from "shared perspectives" (Bourgeois, 1980; Dess and Origer, 1987) and reinforces the notion that strategy formulation does not begin in a vacuum, but emerges from an ongoing organization (Hrebiniak and Joyce, 1984).

We define TMT goal consensus as the degree of consensus among strategic decision-makers concerning the relative importance of organizational goals. Organizational goals are broad themes that serve to align individual and subgroup goals by directing efforts toward end states that the organization wants to realize (Barry *et al.*, 1997). According to Connor and Becker (1979), the emphasis placed on various organizational goals by TMT members also reflects the group's value profile. In this regard, consensus on organizational goals provides decision makers with a broad, shared frame around which successful solutions to problems can be developed from differing points of view (Fiol, 1994).

Collaboration and decision quality

Theories that link TMT diversity to organizational performance are typically based on arguments that demographic heterogeneity increases cognitive diversity, which improves decision quality and ultimately firm performance (Priem *et al.*, 1999). Empirical studies testing these theories tend to rely on some aspect of firm performance as a proxy for the team's decision-making abilities (Simons *et al.*, 1999). According to Simons (1996), inferring decision quality directly from subsequent firm performance is problematic because performance is the result of many factors, including decisions, implementation, competitor behavior, the business environment, and even luck. Using Lawrence's (1997) theory of congruence assumptions, Priem *et al.* (1999) argued that decision quality, like other intermediate links, should be measured and tested "rather than assumed" (p. 940). Researchers are beginning to address this issue by examining the quality of specific strategic decisions made by top management teams (Amason, 1996; Dooley and Fryxell, 1999; Simons, 1996). Although Amason (1996) included decision quality as an outcome of cognitive conflict, he did not define or provide a distinct conceptualization of the construct. Following recommendations by Tilles (1963) and Schweiger *et al.* (1986), we define decision quality as the extent to which a strategic decision is based on valid information, achieves its objectives, and contributes to the overall effectiveness of the organization.

Collaboration plays a key role in determining whether a decision is based on valid information because it is the process through which information from various functional areas of the organization is shared and integrated (Fiol, 1994). According to Gray (1989), when individuals collaborate, they seek to constructively explore their differing viewpoints and develop solutions to problems that go beyond any one individual's limited perspective. Simons (1996) argued that collaboration improves decision quality

because collaborative solutions are subjected to the scrutiny and standards of various parties that will be affected by the outcomes of the decision and this process leads to a more creative and workable solution. Collaborative behavior represents the interactive or behavioral aspects of Pfeffer's (1997) cognitive behavioral model and is critical to an information processing approach to decision-making (Hambrick, 1994). Following these guidelines, we define TMT collaboration as an interactive process in which group members work together to discover optimal strategic solutions through joint decision making and open discussion of the issues surrounding a specific decision.

Hypotheses

Several scholars have proposed that decision processes must simultaneously encourage diverse viewpoints and shared understandings to promote collaboration and effective decision-making (Fiol, 1994; Sundaramurthy and Lewis, 2003). Building diverse backgrounds and viewpoints enhances the team's decision-making capabilities, while developing shared understandings among team members encourages cooperative problem solving (Sundaramurthy and Lewis, 2003). Furthermore, it is the on-going interactions of conflicting content and shared understandings during the decision-making process that lead to successful collaborations among team members (Fiol, 1994; Hambrick, 1994; Sundaramurthy and Lewis, 2003). In this section, we argue that the relationship between TMT diversity and decision quality will be moderated by consensus on organizational goals, and that the effect of this interaction (i.e. between informational diversity and goal consensus) is mediated by the collaborative effort among team members during the decision-making process.

Fiol (1994) demonstrated that effective decision-making teams embrace diverse interpretations of the issues surrounding a decision within a broad, collectively shared frame. According to Fiol, shared framing provides decision makers with a common language to shape their arguments and to interpret the validity and relevance of diverse and often conflicting information. For top management teams, organization-wide goals provide a common basis upon which such framing occurs. Not only are organization-wide goals broad themes that are sufficiently nonspecific in nature (i.e. growth and expansion, service quality, profitability), but they afford a common view or understanding of the relative importance of the organization's combined strategies (i.e. innovation and service quality over growth/expansion). Moreover, because consensus on organization-wide goals is derived in large measure from shared perceptions of an organization's past performance, capabilities, and constraints, a consensus on such goals is unique to each organization. According to Fiol (1994), this "framing of interpretations" provides decision-makers with a common language that shapes their arguments and then helps them to interpret the validity and relevance of diverse, and often conflicting, information. Furthermore, the interaction of agreement and disagreement facilitates movement away from polarized extremes (Fiol, 1994), and thus buffers the tendency for cognitive diversity to escalate into dysfunctional conflict that may restrict information sharing and effective information processing. Jehn *et al.* have provided empirical evidence to support Fiol's theory. Jehn (1995) discovered that when group members engaged in especially novel or non-routine decisions, there was an "optimal" range of cognitive conflict. Group members associated absence of conflict with complacency about problems and decisions, and overall group performance suffered. At moderate levels, members reported that task-related disagreements enhanced their abilities to

exchange and critically assess information. At high levels, however, task conflict began to interfere with group performance. Members reported that as disagreements escalated they became easily side-tracked and lost sight of the main goal of the discussion. More recently, Jehn *et al.* (1999) found that low levels of disagreement on group values and goals enhanced performance in work teams composed of members with higher levels of informational diversity. Although this study focused on lower-level groups and the measure of goals and values did not specifically capture organization-wide goals, it was broad enough in scope to fit with Fiol's (1994) conceptualization of "shared understandings." Jehn *et al.* concluded that diversity alone is not enough to enhance team performance. They suggested that for workgroups to willingly engage in the conflictive processes that lead to exceptional performance, diverse group members must achieve consensus on group values and goals. This observation falls in line with Fiol's (1994) argument that information alone does not lead to effective collective decisions. She demonstrated that convergence around a "broad frame of interpretations" initiated a shift from conflict towards collaboration despite the persistence of "divergent and conflicting content interpretations" among members of a new venture development team. Although not conclusive, the combined results of these studies provide empirical support for Fiol's (1994) proposition that simultaneous agreement and disagreement among group members has a positive impact on both collaboration and decision quality. Thus we propose the following:

H1a. When the level of TMT goal consensus is high, informational diversity will be positively related to collaboration and decision quality.

H1b. When the level of TMT goal consensus is low, informational diversity will be negatively related to collaboration and decision quality.

Although the marriage of informational diversity and goal consensus increases the likelihood that TMT members will engage in cognitive debates that provide reliable sources of information, it is the discussion process that determines whether this source will be tapped (Hackman and Morris, 1975; Simons *et al.*, 1999). TMT member interactions must provide opportunities for decision makers to exchange information and voice disagreement to ensure that decisions are based on accurate and valid information (Hambrick, 1994; Simons *et al.*, 1999). Jehn (1995) observed that for groups involved in nonroutine decision-making tasks, norms promoting open discussions about task issues increased critical evaluations of problems and decision options. If debates become competitive as opposed to collaborative, however, some members may be out-voiced (Simons and Peterson, 2000) or opt not to participate (Jehn *et al.*, 1999) and valuable information may not be shared or evaluated.

In contrast, team members engaged in collaborative discussions work together to bring all concerns out in the open, which allows them to thoroughly investigate the possibilities and pitfalls surrounding a decision. This process enhances the quality of information upon which the ultimate decision is based. In a study of hotel management teams, Simons (1996) found that collaboration had a powerful and positive impact on both the quality and implementation of a team's decisions. Collaboration involves joint decision-making that seeks to evaluate and integrate diverse perspectives, and thus, provides the mechanism through which the interaction of cognitive consensus and diversity improves the quality of group decisions. Therefore, we propose the following hypothesis:

H2. The interactive effects of TMT informational diversity and goal consensus on decision quality will be mediated by TMT collaboration.

Method

All analyses in this study were conducted at the group level using a sample of health care TMTs. We chose this industry because the culture in which health care is delivered is in the process of tumultuous change. Many hospitals are becoming corporate giants that are heavily invested in sophisticated technologies. Also, the industry-wide transition to "managed care" is redefining the role of the physician and hospital financing (Meighan, 1994), and scandals periodically emerge to shake the industry. Such turmoil and uncertainty increases tension and conflict among the groups responsible for rendering and managing health care, including physicians, nursing administrators, hospital executives, and board members. Given that TMT members representing these groups tend to be highly specialized with strong professional affiliations, this situation provides fertile ground for studying demographic diversity and collaborative decision-making processes.

Sample and procedures

The survey included the entire population of 450 hospitals listed in the Hospital Blue Book for the US states of Alabama, Kentucky, and Georgia. The data were collected in two phases. First, the CEO of each hospital received a letter describing the study along with a questionnaire requesting a brief description of the most important strategic decision made by management within the past 18 months. In addition, the CEO was asked to identify the key management team members who were involved in the decision-making process. This method is recommended to avoid the issue of requesting data from top-level executives who may not have actually participated in the decision-making process. Pitcher and Smith (2001) provided a thorough examination of this problem in previous research and concluded that having the CEO define the team with either surveys or interviews represents the best hope for accuracy of TMT membership. All other questions in the initial survey were framed in the context of the identified strategic decision and in reference to the identified individuals. This method allowed us to capture the idiosyncrasies of each organization's strategies and thus avoid the common problem of requesting responses to universal survey items that are implausible to the respondents (West and Schwenk, 1996). In addition, framing the survey within the context of a single decision has the advantage of reducing retrospective distortion by focusing team member recollections on the same event (Podsakoff and Organ, 1986) and provides a more accurate assessment of team dynamics.

Out of the 450 original contacts, 88 usable questionnaires were returned, resulting in a response rate of 20 percent from the CEOs. Over 80 percent of the decisions could be classified into one of four decision types:

(1) Internal restructuring (downsizing or eliminating departments).

(2) Boundary decisions (mergers, strategic alliances, purchasing other organizations).

(3) Control decisions (planning and budgeting).

(4) New service or product offerings.

The reported average size of the decision-making teams was 7.14 members.

In the second phase of data collection, a descriptive letter and questionnaire were mailed to each of the 534 team members identified by the sample of hospital CEOs. The members were instructed to answer all questions in the survey in the context of the strategic decision specified by their CEO. A total of 365 surveys from the second phase were returned for a much higher response rate of 68 percent. The respondents included executive officers (73 percent), chiefs of staff or chiefs of a specific medical field (16 percent), and directors or vice presidents of nursing services (11 percent). Two hospitals had no respondents other than the CEO, and one CEO indicated that he alone had made the specified decision. Because team heterogeneity was impossible to measure for these cases, they were dropped from the data sample, resulting in a final sample of 85 hospitals. Of these, the number of TMT members responding ranged from 2 to 14, with an average of 6.85. This sample was compared to the larger population of hospitals on several key dimensions. The comparisons indicated that the sample was adequately representative of the population of hospitals in these three states in terms of size, type, and profit orientation.

Measures

TMT informational diversity. Following Jehn *et al.* (1999), we created a composite measure of information-based demographic variables to measure informational diversity. Jehn *et al.* included functional background, educational degree, and hierarchical position in their measure. Given that all members of our management teams held executive level positions we were unable to establish positional differences and thus included only education (type of degree earned) and functional area in the organization in our composite measure. The functional heterogeneity components were based on Bunderson and Suttcliffe's (2002) recommendation that "by looking at diversity in current assignments rather than functional background, researchers seek to understand how the breadth and mix of functional accountabilities on a team relate to team processes and outcomes" (p. 879). The group level component of our informational diversity measure was calculated from these categorical measures and then aggregated using Blau's (1977) index ($1 - \Sigma pi^2$), where p is the proportion of group members in a category and i is the number of different categories represented in the team. Values close to 0 indicate homogeneity, and values close to 1 indicate high levels of diversity.

TMT goal consensus. The organizational goal consensus measure consisted of nine items measured on a seven-point Likert-type scale ranging from 1 = "not important" to 7 = "very important." The content domain of the nine items was based on previous consensus research conducted by Dess (1987). This measure was adapted to represent strategic organizational goals relevant to the hospital industry. Examples of these items include: low cost relative to competitors, prestige/reputation of the hospital, innovation, and profitability. Prior to administering the survey instrument, the validity of the items was assessed in a pre-test of CEOs in the healthcare industry. Each team member responded individually to the nine items. To assess the level of goal consensus within each team, we first calculated the coefficient of variation for each organizational goal. Each coefficient indicates the extent to which TMT members within a team disagree over the importance of a given goal. To capture the overall level of goal consensus of each team, we calculated the average of the dispersion scores and subtracted the number from 1.

Collaboration. Collaboration was measured as the within-team average of six items taken from Rahim (1983). These items assessed the extent to which team members worked to integrate their ideas and share information during the decision-making process and were measured on a seven-point Likert-type scale ranging from 1 = "strongly disagree" to 7 = "strongly agree." Since individual TMT member scores on collaboration had to be aggregated, it was necessary to assess whether each team exhibited within-group agreement prior to combining their responses (Glick, 1985). We calculated an inter-rater reliability coefficient for the set of items measuring each variable using a statistical technique developed by James *et al.* (1984). This technique produces a coefficient labeled r_{WG} that ranges from 0, indicating complete disagreement, to 1, indicating complete agreement. A value greater than 060 is recommended as a heuristic to determine whether aggregating individual responses is warranted (Glick, 1985). The inter-rater reliability coefficient r_{WG} for the aggregated measure was 0.80, and Cronbach's alpha was 0.90.

Decision quality. The quality of the specific decision made by each team was assessed using a measure developed by Dooley and Fryxell (1999). The seven-item measure is based on recommendations by Tilles (1963) and Schweiger *et al.* (1986) for assessing the quality of strategic decisions. The items were measured on a seven-point Likert-type scale and asked each team member's opinion concerning the quality of information used in making the decision and the effectiveness of the decision's outcomes. The individual scores for this measure were aggregated as explained for the collaboration measure. The inter-rater reliability r_{WG} coefficient was 0.89, and Cronbach's alpha for the aggregated scale was 0.93.

Control variables. Group size, organizational slack, and decision type were included as control variables in the analysis. Previous research suggests that both group size (Miller *et al.*, 1998; Hackman and Morris, 1975) and organizational slack (Hambrick, 1994; Pfeffer, 1981) have significant effects on group behaviors. Group size is particularly important because our independent variables are inherently a function of the number of members that make up the top management team. Size was measured as the number of individuals identified by the CEO as having participated in the specific decision process. Research indicates that both limited (Eisenhardt and Bourgeois, 1988; Singh, 1986) and abundant (Bourgeois, 1981) resources may have negative effects on cooperative group processes (Hambrick, 1994). Therefore, organizational slack was included as a control variable and measured using four questions developed by Miller and Friesen (1982) that pertain to slack in capital, skilled labor, material supplies, and managerial talent. The Cronbach's alpha for this measure was 0.69. Lastly, Hickson *et al.* (1986) argued that strategic decision-making processes differ by decision type. In this study, the type of decision might be expected to influence the need for collaborative efforts and information exchange. Using the Hickson *et al.* (1986) strategic decision typology, categorical variables were created from the CEOs' decision descriptions. The categories were as follows:

- "internal restructuring" decisions such as downsizing or elimination of departments;
- "boundary" decisions involving mergers, strategic alliances, or purchases of other organizations;
- "control" decisions pertaining to planning and budgeting;
- "service/product" decisions involved with offering new products or services; and
- "personnel" decisions pertaining to hiring, staffing, and training of personnel.

Design and analysis

Prior to hypotheses testing, we wish to acknowledge that the decision to use self-reported measures raises the concern that the relationships among the independent and dependent variables are attributable to common-method variance. During the development stage of this study, several design aspects and analytical steps were incorporated to minimize such concerns.

First, aggregating the responses of several decision makers with potentially different stakes in the outcome of a decision lessens the impact of social desirability, ego-flattering, or self-serving biases (Podsakoff and Organ, 1986). Second, interactions of the type used to test *H1a* and *H1b* are substantially less sensitive to distortions due to common-method bias than the direct effects associated with the second hypothesis, which proposed a direct relationship between perceptual measures of collaboration and decision quality (Aiken and West, 1991; Podsakoff and Organ, 1986). Focusing on this relationship, a confirmatory factor analysis was conducted on the items measuring collaboration and decision quality. The model constrained each item to load only on the factor for which it was a proposed indicator and permitted no correlations among the error terms. Each item loaded significantly on its intended factor, and the overall results of the analysis indicated that a two-factor model is consistent with the data ($\chi^2_{34} = 212.57$, NFI = 0.98, CFI = 0.99, RMSEA = 0.09).

Following the advice of James and Brett (1984), we used OLS regression to test the moderated and mediated relationships in our model. Moderation is functionally involved in the first-stage of our mediation model; thus, the first step was to test *H1a* and *H1b*. In order to correct for multicollinearity problems that arise when testing moderated relationships, the independent variables were centered prior to generating the interaction terms, a procedure proposed by Cohen and Cohen (1983) and further refined by Aiken and West (1991). Once the interaction terms were computed, hierarchical moderated OLS regression was used to test *H1a* and *H1b*. In the first step, each dependent variable – collaboration and decision quality – was regressed on the control variables. In step two, the independent variables – goal consensus and informational diversity – were entered to test for main effects. Then the interaction term for informational diversity and goal consensus was entered in step three to test for moderation.

To establish mediation, it is necessary to show that m, a mediating variable (i.e. collaboration in this study) enhances the explanatory power of a model because it specifies the process by which xz (the interaction of informational diversity and organizational goal consensus) impacts or produces a change in y (decision quality). Thus, $m = f(xz)$ and $y = f(m)$. Consequently, in the final step (4), collaboration was entered to determine whether the effects of the interaction terms on decision quality were mediated by collaboration as proposed in *H2*. Mediation will be evident if adding collaboration to the model significantly attenuates the direct effect of the diversity-by-consensus interaction term on decision quality.

Results

Descriptive statistics and correlation coefficients for all variables are presented in Table I. Several points are worth noting. First, as expected there is a significant correlation between the two dependent variables, decision quality and collaboration ($r_{xy} = 0.49$); however, a confirmatory factor analysis described in the previous section

provided evidence of the discriminant validity of these two measures. Second, significant bivariate correlations between TMT informational diversity and the two dependent variables are absent. This is consistent with previous research that has found confirmation of these relationships to be elusive. Finally, goal consensus does not significantly correlate with collaboration but has a significant and positive relationship to decision quality ($r_{xy} = 0.24$). The relatively low correlations among these three variables provide further evidence that the respondents viewed them as being conceptually distinct from each other.

H1a and *H1b* predicted that of the interaction of team diversity and goal consensus would have significant direct effects on collaboration and decision quality. Table II presents the results of the hierarchical regressions used to test these hypotheses. Including the interaction term resulted in a statistically significant improvement in R^2 for decision quality (model 1, $\beta = 0.45$; $p < 0.001$) and collaboration (model 2, $\beta = 0.25$; $p < 0.05$), thus the statistical results provide support for *H1a* and *H1b*. Following Aiken and West (1991), we plotted the interaction between informational diversity and goal consensus on each criterion variable. The slopes were computed from β coefficients that were derived from regression equations where the interaction term was manipulated to reflect high and low values of the interacting variables (high and low values being one standard deviation above and below the sample means). Graphs containing plots of the interactions are shown in Figures 1 and 2.

The interaction plots reveal that when goal consensus was low, TMT informational diversity had a negative effect on the level of collaboration and decision quality reported by an executive team. In contrast, under conditions of high goal consensus, the plots show that collaboration and decision quality increased among the more heterogeneous teams. These results confirm that the direction of the interaction conforms to that predicted by the two hypotheses. We also tested whether the interaction slopes were significantly different from zero following the procedures recommended by Aiken and West (1991) for "simple slope analysis by computer" (p. 18). The results confirmed that the slopes were significantly different from zero at low and high values of goal consensus for both collaboration ($SE = 3.519$; $p = 0.032$) and decision quality ($SE = 2.907$; $p = 0.000$).

H2 predicted that collaboration would mediate the relationship between the TMT diversity-by-consensus interaction and decision quality. Following procedures recommended by Baron and Kenny (1986), we tested each of the necessary conditions for determining mediation. In Table II, the results of the second model reveal that the diversity-by-consensus interaction term was positively related to collaboration ($\beta = 0.25$; $p \leq 0.05$), and the third model (last column in Table II) shows that collaboration was strongly predictive of decision quality ($\beta = 0.43$; $p \leq 0.01$). The next step in the test of mediation was to compare the regression coefficients for the diversity-by-consensus interaction term in the first and third models. When compared to the first model, it can be seen that adding collaboration as a predictor in the third model substantially attenuated the effects of the interaction term on decision quality (i.e. from $\beta = 0.45$ to $\beta = 0.34$). This result indicated that collaboration partially mediated the effects of the diversity-by-consensus interaction on decision quality.

Table I.
Descriptive statistics and correlations

Variable	Mean	SD	1	2	3	4	5	6	7	8	9
1. Team size	6.85	3.71									
2. Organizational slack	4.72	0.71	0.01								
Decision type											
3. Restructuring decision	0.22	0.41	0.09	0.02							
4. Control decision	0.15	0.36	0.30**	−0.19	−0.24*						
5. Boundary decision	0.25	0.43	−0.10	0.21	−0.33**	−0.27*					
6. Service/product decision	0.28	0.45	−0.14	0.02	−0.31**	−0.25*	−0.35**				
7. Informational diversity	0.62	0.32	0.33**	−0.11	0.08	0.26**	−0.04	−0.17			
8. Goals consensus	0.83	0.07	−0.29**	0.38**	−0.16	−0.31**	0.19	0.23*	−0.23*		
9. Collaboration	5.20	0.68	−0.03	0.31**	−0.03	0.02	−0.09	0.12	−0.02	0.17	
10. Decision quality	5.98	0.61	−0.26*	0.18	0.05	−0.29**	0.08	0.15	−0.15	0.24*	0.49**

Notes: $n = 85$; $^{*}p \leq 0.05$; $^{**}p \leq 0.01$

Independent variables	Model 1 Decision quality	Model 2 Collaboration	Model 3 Decision quality
Step 1: control variables			
Team size	−0.13	−0.03	−0.12
Organizational slack	−0.12	0.34**	−0.03
Decision type:			
Control	−0.12	0.06	−0.14
Restructure	0.05	−0.09	0.09
Boundary	0.01	−0.20	0.09
Expansion	0.13	0.04	0.11
ΔR^2	0.14	0.14	0.14
F	2.20*	2.09	2.20*
Step 2: main effects			
Goals consensus	0.15	0.11	−0.10
Informational diversity	−0.16	−0.03	−0.14
ΔR^2	0.00	0.01	0.00
Partial F	0.24	0.26	0.24
R^2	0.15	0.14	0.15
Adjusted R^2	0.06	0.05	0.06
F	1.68	1.61	1.68
Step 3: interaction			
Consensus × diversity	0.45***	0.25*	0.34**
ΔR^2	0.17	0.05	0.17
Partial F	18.25***	4.76*	18.25***
R^2	0.32	0.19	0.32
Adjusted R^2	0.24	0.10	0.24
F	3.86***	2.03*	3.86***
Step 4: mediator			
Collaboration			0.43***
ΔR^2			0.15
Partial F			20.42***
R^2			0.46
Adjusted R^2			0.39
F			6.42***

Table II.
Results of hierarchical regression analysis for collaboration and decision quality

Notes: All standardized regression coefficients are from the final step in the hierarchical regression; $n = 85$; One-tailed tests were used for interactive and mediator effects, which are directionally predicted in the hypotheses. *H1a* and *H1b* are tested with models 1 and 2. *H2* is tested with models 1, 2, and 3; $^{*}p \leq 0.05$; $^{**}p \leq 0.01$; $^{***}p \leq 0.001$

Discussion

Lawrence (1997) argued that pervasive inconsistencies in demography research results can be traced to the practice of assuming congruence between demographic predictors and subjective concepts. This study attempted to move beyond the "congruence assumption" surrounding TMT demography (Lawrence, 1997) by exploring the intervening processes that link TMT diversity and organizational performance. To accomplish this objective we employed three departures from much of the previous

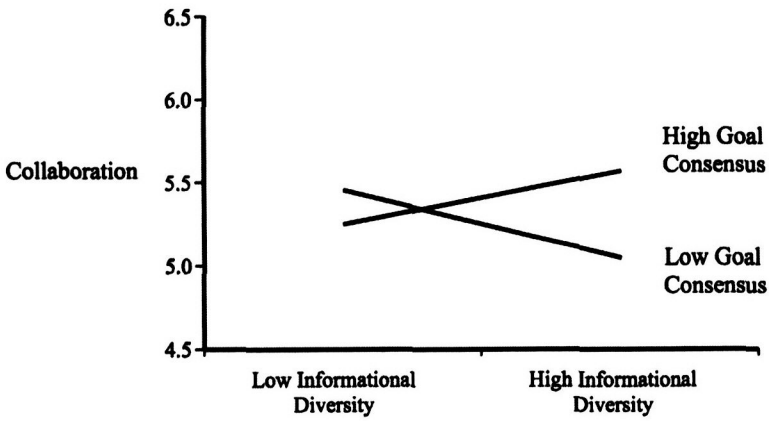

Figure 1.
Interactive effects of goal consensus and informational diversity on collaboration

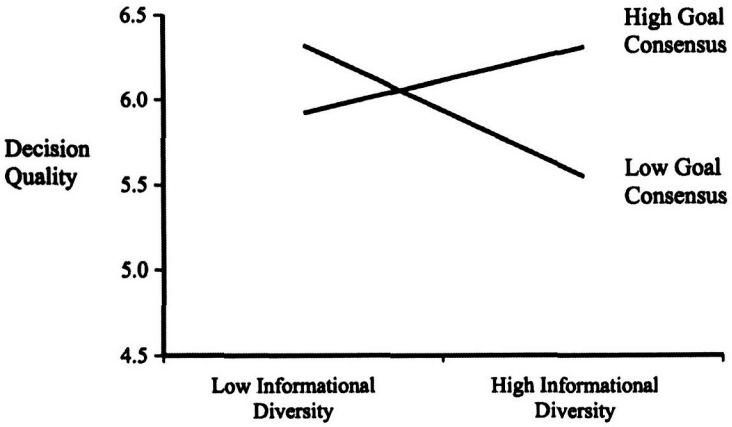

Figure 2.
Interactive effects of goal consensus and informational diversity on decision quality

work in this area. First, the relationship was examined in the context of a specific strategic decision made by top management teams in a single industry – health care. This industry has experienced substantial environmental turbulence in recent years; and the TMTs of health care organizations typically have high levels of informational heterogeneity. This environmental setting provided a sharper focus for the study and enhanced the strength of the diversity measures.

Second, we examined outcome constructs that are more proximal than firm performance – specifically the level of collaboration among TMT members and their collective perceptions of decision quality. Given the assumption that collaboration and strategic decision quality have a positive causal relationship to organizational performance (Amason, 1996; Hambrick, 1994), this design afforded a better opportunity to unravel some of the inconsistencies of prior research on top management teams' diversity, consensus, and performance. And finally, the research model was theoretically grounded in Fiol's (1994) perspective of unified diversity and extended the research of Jehn *et al.* (1999) by examining top-level teams across different organizations.

The results of this study indicate that reaping the benefits of TMT informational diversity in a strategic decision-making context is contingent upon the level of organizational goal consensus among decision makers. When consensus on organization-wide goals is high among informationally diverse TMT members, they are more likely to collaborate and improve the quality of their decisions. In contrast, when goal consensus is low, both collaboration and decision quality suffer. These findings suggest that simultaneous agreement and disagreement during the decision-making process has a direct and positive effect on decision quality for heterogeneous teams (Fiol, 1994; Moscovici and Doise, 1994), but also has an additional indirect effect through collaboration.

Contrary to expectations, the results of our analyses revealed that collaboration only partially mediated the interactive effects of goal consensus and informational diversity on decision quality. This finding suggests that although goal consensus had a positive influence on the collaborative efforts of these top-level teams, other dimensions of interpretive framing or content may have been present that influenced the decision process. Another possibility is that power differentials may have influenced the decision process. Although we attempted to control for power centralization by having the CEO designate the executives involved in making the decision, it may be that power relations among the teams influenced team member involvement (Bunderson, 2003) and opinions regarding the decision outcome by overriding individual role-based beliefs (Gray, 1989; Fiol, 1994). Thus, future research in this area should examine other dimensions of simultaneous agreement and disagreement and may need to include different methods for controlling or measuring power differentials.

Taken together, the theory and results we present in this article may help to explain the equivocal results of previous research attempts to link TMT diversity and consensus on organizational goals to successful performance outcomes. It is commonly argued that demographic diversity will impede a team's ability to set priorities and agree on common goals (Hambrick, 1994) and that heterogeneous teams find it difficult to develop a shared purpose and an effective group process (Van de Ven, 1986). Our results suggest that some top-level teams with diverse informational backgrounds can achieve a level of consensus on organizational goals that enhances the teams' collaborative efforts and improves the quality of their decisions.

Practical implications

The practical implications of this study point toward a need for managers to set in motion both divergent and convergent thinking during the strategic decision-making process. As Moscovici and Doise (1994) point out, if group decision-making is attempted without convergent thinking, then group discussion might be abandoned altogether and no common solution discovered. If divergent thinking is censored, then decision-makers are susceptible to routine stereotyping and "groupthink" ensues. Increasing informational diversity among top-level team members provides the potential for cognitive conflict or divergent thinking about the possibilities and pitfalls surrounding a strategic decision. Emphasizing consensus on organization-wide goals provides a form of convergent thinking that leads to collaborative conflict resolution and better decisions. Our findings indicate that if managers want to reap the benefits of teams with members from different functional and educational backgrounds, they

must instigate some aspect of shared framing among team members, such as consensus on broad organizational goals.

Limitations

Despite efforts to address the constraints inherent in conducting a field study, several limitations regarding the generalizability of our results should be noted. First, the research design required aggregating our sample of 450 individuals into 85 teams, which greatly reduced the sample size and limited the complexity of the models that could be tested. Second, our sample was limited to top management groups facing a strategic decision in the health care industry. Therefore, the process and demographic variables we studied may not be those needed for less complex tasks in more stable environments (Jehn, 1995; Hambrick, 1994). One previous study by Jehn *et al.* (1999) found similar results for the interactive effects of information and value diversity on workgroup performance, which indicates that our findings may apply to decision-making groups at lower organizational levels as well. Third, the study lacks an objective rating of decision quality. Although objective measures are a desirable alternative, Amason (1996) suggested that the best method for evaluating a specific decision is to ask those who understand the context in which the decision was made. He argued that finding a reliable objective measure to isolate the performance of a single decision across organizations is not feasible, particularly in situations where teams must choose between less than optimal alternatives. A major concern with subjective evaluations is that teams may be biased towards high quality ratings of their own decision, regardless of the decision's actual merit. Our results show that aggregate group member ratings ranged from 4.2 to 7.0 and that over 20 percent of the decisions fell into the lower half of these ratings. Thus, while there was an overall tendency among the TMTs to give their decisions high quality ratings, there was also evidence that groups made discernable quality differences among these decisions. Fourth, the cross-sectional design of the study limits our ability to state with certainty that the causal nature of the relationships among these variables was in the predicted direction. The retrospective nature of our data collection captured the essence of the decision-making process over time, but future research using longitudinal or experimental designs is needed to confirm the validity of our findings. And finally, as previously mentioned in the design section of this article, we cannot completely rule out the possibility that our results may be biased due to common-method variance. Therefore, the results of this study must be viewed against the steps taken to mitigate the potential impact of common-method variance and the challenges involved in obtaining data of this type.

Future research

In addition to addressing the limitations mentioned above, future studies of top management teams should examine further the potential moderating and mediating roles of team process variables. For example, decision speed, commitment, or comprehensiveness, could be tested as possible mediators of the interactive effects of diversity and consensus on decision quality. Other forms of shared framing, such as consensus around perceptions of uncertainty (Fiol, 1994), could be considered as potential moderators of the effects of TMT informational diversity on decision processes and outcomes. It would also be interesting to assess the degree to which consensus on organizational goals moderates the effects of TMT informational

diversity on other outcome variables, such as organizational learning, corporate innovation, and strategy implementation. As management scholars attempt to move beyond archival data in TMT studies, developing research models that include both moderating and mediating variables can provide many possibilities for future exploration in this area (Simons *et al.*, 1999).

Conclusion

This research was an attempt to move beyond statistical associations between TMT demography and organizational performance caused by unaccounted for chains of mediating variables. Intuitively, we know that group decision-making can be greatly enhanced when decision makers with diverse perspectives and knowledge are willing to collaborate and share information (Fiol, 1994; Hambrick, 1994). Providing empirical evidence to support this theory has proved to be a difficult challenge, as indicated by the conflicting results of previous studies concerning TMT diversity and organizational outcomes. Examining the interactive effects of cognitive diversity and consensus on decision-making processes is one approach to accomplishing this challenging task. Despite its limitations, the results of this study may help to account for the equivocal findings of past research involving the effects of TMT diversity and goal consensus on organizational outcomes and processes.

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