JOURNAL OF MANAGERIAL ISSUES
Vol. XIV Number 4 Winter 2002: 452-469

Enhancing Performance With Product-Market Innovation: The Influence Of The Top Management Team

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Powerful competitors and rapid technological change have made the quest for competitive advantage more difficult and its accomplishment less sustainable (D'Aveni, 1994). Corporate entrepreneurship in general and innovation in particular are frequently regarded as important means of achieving superior performance in such competitive environments. Corporate entrepreneurship has been variously conceptualized as the strategic renewal of established corporations, and innovation and venturing within established corporations (Guth and Ginsberg, 1990), and innovation within existing businesses (Sandberg, 1992). Lumpkin and Dess (1996) argue that innovation is a key element of a firm's entrepreneurial orientation, and Covin and Slevin (1991) note that innovation is an important dimension of a firm's *repertoire* of entrepreneurial behaviors. In fact, innovation is so important to corporate entrepreneurship that it may be considered the *essence* of such activity (Covin and Miles, 1999). Hence, the management of innovation has become a subject of significant research interest (e.g., Hitt *et al.*, 1999).

The research question examined in this article asks what impact top management team (TMT) demography has on the effectiveness of firms' product-market innovations. As Lumpkin and Dess (1996) note, top management team characteristics are a key contingency factor influencing the relationship between firm-level innovation and firm performance. Contingency models advance our understanding of organizational phenomena because they move beyond bivariate relationships and explicitly recognize the need for increased model specification (Rosenberg,

1968). Hence, to enhance our understanding of how innovation may contribute to performance outcomes, we examine the impact of management team characteristics upon that relationship.

However, TMT demography is generally modeled as an independent or dependent construct rather than in a contingency model (Finkelstein and Hambrick, 1996). Briefly, upper-echelons research frequently posits that the decisions of top management are primary drivers of firm performance, and those decisions are influenced by the demographic makeup of the top management team. The upper-echelons literature has met with equivocal results (c.f., Finkelstein and Hambrick, 1996), particularly when attempting to link TMT demography directly to firm performance (e.g., Murray, 1989; West and Schwenk, 1996). We believe that a perspective that recognizes an interaction effect between strategy and the top management team may more accurately reflect the strategy formulation and implementation process. We discuss and test that perspective in this study.

The article is organized as follows. In the next section we provide the theoretical background and development for two hypotheses regarding 1) the direct effect of innovation on firm performance and 2) an interaction effect between innovation and top-management team characteristics on firm performance. Next, we discuss the sample, data and statistical procedures. The article concludes with a discussion of the results of our hypotheses testing, implications of this study for practitioners and scholars, limitations of the study, and avenues for future research.

CONCEPTUAL BACKGROUND AND HYPOTHESIS

Miller and Friesen (1978) cite product-market innovation, that is, innovation comprised of product design, market research, and other marketing-related activities, as an important element of a successful innovation strategy. Other authors (e.g., Maidique and Patch, 1982) discuss technological innovation—an emphasis on research and development, and technical expertise related to new or improved products and processes—as the driver of a successful innovation strategy. Lumpkin and Dess argue that while the distinction between product-market innovation and technological innovation may provide a useful means to conceptualize innovation, in practice the distinction between the two is frequently blurred, ". . . as in the case of technologically sophisticated new products designed to meet specific market demand" (1996: 143). Furthermore, making such a distinction unnecessarily fragments the classification of innovation (Van de Ven, 1986). Other authors have developed definitions that comprise both elements of innovation. For instance, Morris and Sexton's definition of innovativeness as ". . . the seeking of creative, unusual, or novel solutions to problems or needs" seems to encompass both technological and product-market innovation (1996: 6).

Nohria and Gulati (1996) note that prior research has not yet developed a definitive measure of innovation. Accordingly, these authors adopted a very broad definition of innovation that includes "any policy, structure, method or process, product or market opportunity . . . perceived to be **new**" (Nohria and Gulati, 1996: 1251,

emphasis added). The Austrian perspective also emphasizes **new** actions carried out by firms in an effort to disrupt the competitive *status quo,* causing disequilibrium (*status quo* and equilibrium are defined here as ordinary competitive behavior). By contrast, Nelson and Winter argued that "non-new" or commonplace actions are ". . . regular and predictable business behavior plausibly subsumed under the heading 'routine,' especially if we understand that term to include the relatively constant disposition and strategic heuristics that shape the approach of the firm" (1982: 15). Our definition of *product-market innovation* is consistent with these definitions: **the firm's realized product-market actions that go beyond the *status quo* of the market process and are perceived to be new.**

Innovation has been associated with improved firm performance in both theoretical and empirical research. For instance, Nelson and Winter (1982) posit that firms need not engage only in radical innovation but may also undertake many incremental innovative activities as a means to success. Caves and Ghemawat (1992) found a positive linkage between new products and new processes, and firm performance. Rapid and frequent new product introduction can significantly enhance organizational performance by facilitating the acquisition of market share, providing pricing power, and permitting the company to establish industry standards (Zahra and Covin, 1993). Ravenscraft and Scherer (1982) and Smith *et al.* (1992) found that R&D efforts were more strongly associated with firm performance than were marketing efforts. Finally, Banbury and Mitchell (1995) linked the introduction of product innovations to market share acquisition.

In sum, despite some conflicting evidence (Nelson and Winter, 1982), theory and empirical research suggest a positive relationship between innovative activity and firm performance. Accordingly, we propose the following hypothesis:

H1: Product-market innovation will be positively associated with firm performance.

Top Management Teams and Decision Making

While we expect that innovation will be directly associated with firm performance, we also expect that the nature of the management team will influence the innovation-performance relationship. Contingency modeling such as that performed here allows a ". . . more precise and specific understanding" (Rosenberg, 1968: 100) of the relationship between product-market innovation and performance by increasing model specification. The mechanisms by which TMT demographic heterogeneity enhances the impact of product-market innovation on performance are discussed in the following paragraphs.

The nature of the top management team is central to the type and quality of firms' strategic choices (Andrews, 1971; Hambrick, 1989), including decisions regarding entrepreneurial posture (Khandwalla, 1987). Upper-echelons theory posits that managers make strategic choices based upon their values, cognitions, and perspectives, and that organizational activities or outcomes reflect the collective cognitive biases and abilities of the TMT (Hambrick and Mason, 1984).

A significant body of research concerning innovation and organiza-

tional leadership has examined the link between the management team and innovative or creative behavior on the part of the management or the firm. For example, Bantel and Jackson (1989) found that demographically diverse management teams were associated with higher levels of creativity and innovation. Similarly, Wiersema and Bantel (1992) linked top-management team heterogeneity and propensity to engage in strategic change. Other researchers, such as Murray (1989), have attempted to directly link TMT characteristics to firm performance.

This study takes a different approach to the question of how leaders matter to firm innovation by incorporating firm performance into a model of TMT characteristics and firm-level innovation. Other authors have recently examined the link between TMT heterogeneity and performance (e.g., Hambrick *et al.*, 1996). These authors examined the direct effects of TMT heterogeneity on various characteristics of firm competitive actions and rivals' responses, and the direct effect of TMT heterogeneity on firm performance. They sum up the relevance of the top management team to competitive activity by noting that ". . . undertaking competitive actions is foremost a function of being able to create, or generate, those actions" and call for research on the antecedents of competitive behavior ". . . to include the characteristics of the decision makers, in particular, the company's top management team" (1996: 665). Our study explores how the interaction between innovation and TMT heterogeneity influences the relationship between innovation and performance.

High-quality decisions spring from both the collective cognitive capability of the team and the decision-making process used by the team (Amason, 1996). The collective mental capability of a demographically heterogeneous top management team provides the "requisite variety" (Ashby, 1956) necessary for the team to cope with complex, ambiguous, and multifaceted decisions such as those associated with developing strategy (Mintzberg *et al.*, 1976). The alternatives considered by a demographically heterogeneous top management team are likely to be characterized by "diversity, novelty, and comprehensiveness" (Wiersema and Bantel, 1992: 96). "In other words, cognitive diversity is a valuable resource. The presence of people with differing points of view ensures consideration of a larger set of problems and a larger set of alternative potential solutions" (Bantel and Jackson, 1989). For instance, Bantel and Jackson (1989: 109) found that top management teams that were heterogeneous in terms of educational background made more innovative decisions than less diverse teams. Hence, demographic heterogeneity among the members of the top management team is an indicator of creativity in decision making.

Demographic diversity also impacts decision-making processes (Jackson *et al.*, 1995). As Simons *et al.* note, demographic ". . . diversity represents a potential for more thoughtful decision making" (1999: 664). There is substantial research that suggests that decision-making processes that synthesize the diverse knowledge bases, values, and perspectives of demographically dissimilar team members enhance decision quality. The members of a demographically and cog-

nitively diverse group are likely to view strategic decisions differently from one another (Mitroff, 1982), engendering debate regarding the most appropriate alternative. Schweiger *et al.* note that such decision-making processes have the twin benefits of preventing ". . . the uncritical acceptance of the seemingly obvious and (tapping) the knowledge and perspectives of group members" (1989: 747). In an empirical study, they found that dialectical inquiry (DI) and devil's advocacy (DA) techniques produced closer evaluation of competing assumption bases, and faster, higher quality decisions. The benefits of conflict over consensus in strategic decision making are shown in Schweiger and Sandberg (1989). Those authors found that DI/DA techniques applied to strategic decision making were significantly more effective than consensus-seeking techniques in exploiting the different capabilities of team members. Thus, conflict among team members regarding the most appropriate course of action can enhance decision making by unearthing the assumptions underlying each potential course of action and causing management to critically evaluate the merits of each alternative. Indeed, such conflict is vital to the development of high-quality decisions (Amason, 1996).

Overall, we expect the conflict, debate, decision comprehensiveness, etc. engendered by TMT heterogeneity to improve environmental scanning and decision-making quality relating to product-market innovations. This, in turn, should lead to enhanced firm performance because improved decision making should enhance the efficacy of realized firm actions. Demographic diversity may be particularly important for decisions regarding innovative products or processes, as these are outside of the organization's standard operating procedures, and thus by definition, necessitate alternative perspectives (Nelson and Winter, 1982). Thus, the following hypothesis is proposed:

> H2: Top management team (TMT) demographic heterogeneity will interact with product-market innovation. To the extent that firms engage in product-market innovation, firms with heterogeneous TMTs will exhibit higher performance than firm with homogenous TMTs.

METHOD

Sample

Consistent with the behavioral model of corporate entrepreneurship (Covin and Slevin, 1991; Zahra, 1993), an effective way to develop large sample, multivariate research designs is through content analysis of published histories about firms (Ginsberg, 1988). Because the strategies of the largest, market-leading firms are likely to be the most observable (Fombrun and Shanley, 1990), we first drew a sample of market leading firms that were members of the *Fortune 500* and were number one or number two in their industry in terms of U.S. market share. We cross-validated these market share rankings with the industry rankings list of *Ward's Business Directory*. Second, to ensure that news accounts of firm strategies and product-innovation actions pertain to the line of business on which these firm are most highly dependent (Chen, 1996), only those firms having Rumelt's (1974) specialization ratios greater than 0.70 (dominant or single business firms) were selected. Finally, firms were eliminated from the sample if they did not have top management team data

listed consistently in *Dun & Bradstreet Reference Book of Corporate Managements* during 1987-1993. Thus, the sample includes the largest, relatively non-diversified U.S. firms so as to be certain that their competitive actions are carried out to improve their respective competitive positions in their primary industries.

This sampling process is consistent with that used in prior research (e.g., Ferrier *et al.*, 1999) and yielded a final research sample consisting of a pooled, seven-year cross sectional database for the two largest single business firms across 33 industries with the firm-year being the unit of analysis.

Measures

Product-market Innovation. We first adopted a general definition of product-market actions consistent with research in competitive dynamics: **externally directed, specific, and observable competitive moves initiated by a firm to enhance its relative competitive position** (Ferrier *et al.*, 1999; Young *et al.*, 1996). This definition is also consistent with corporate entrepreneurship research, which views competitive action as behavior that is overt, demonstrable, and aggressive towards competitors and is carried out to improve competitive position and to outperform competitors in the marketplace (Covin and Slevin, 1991; Lumpkin and Dess, 1996).

Using structured content analysis (Jauch *et al.*, 1980), we categorized the competitive actions of each firm into six *specific* action categories (i.e., pricing actions, marketing actions, new product actions, capacity-related actions, service actions, and overt signaling actions) based on the appearance of one of the keywords listed in Table 1 in the headlines and abstracts of news reports found in the U.S. series of *F&S Predicasts.* This procedure and resultant action categories are consistent with that used in previous competitive dynamics research (Chen *et al.*, 1992; Ferrier *et al.*, 1999; Young *et al.*, 1996) and are consistent with the view within corporate entrepreneurship that business strategy involves a firm's collection of competitive tactics that includes, among other things, new products, service, warrantees, advertising, price policy, etc. (Covin and Slevin, 1991). Internal actions such as layoffs, restructurings, etc. are not considered "competitive actions" by competitive dynamics researchers and were not included in our sample. The final data set contains a total of 4,617 product-market actions. Table 1 contains a list of these keywords and several sample news headlines across the six action type categories.

We tested the reliability of our coding process using Perreault and Leigh's (1989) index of reliability. Using the key words listed in Table 1, two academic experts separately recoded a representative sample (N = 300) of actions into each of the six categories listed above. This approach yielded an index value of 0.91, which indicates a high degree of reliability in categorizing these actions (Rust and Coil, 1994).

To distinguish *innovative* product-market actions among all ordinary product-market actions across five of the six action type categories (all but "product actions"), we further coded actions as *innovative* if the news headline or abstract also contained a keyword describing the overall level of innovativeness surrounding the action (e.g., new, innovative, unique,

Table 1

Coding Keywords and News Examples for Individual Action Types

Variables	Content Analysis Coding Scheme	Examples of Headlines
Pricing Actions	Key words: price, rate, discount, fares, etc.	"FedEx offers **rate discounts** on 2nd-day short haul service."
Marketing Actions	Key words: ads, spot, promote, distribute, campaign, markets, pushes, sales force, pitches, distribute, package, bundle	"United launched **ads** to counter American's campaign."
Product Actions	Key words: introduce, launch, unveil, roll out, offer, line, version, etc. (**with** some concrete product or service)	"Merck **introduces Mevacor**, to reduce serum cholesterol."
Capacity Actions	Key words: raises, boosts, increases **with** capacity- or output-related keywords like plant, capacity, output, production level, line, etc.	"Mobil **raises** lube stock **capacity** 10% via recent improvements."
Service Actions	Key words: service, warrantee, guarantee, financing, after-sale, customer training, help line, tech-help, customer service, etc.	"Sears offers KidVantage frequent buyer **warrantee** program."
Signaling Actions	Key words: vows, promises, says, seeks, aims, declares, to focus on, targets, etc. (**with** some strategically salient statement, not just a promise of better returns, etc.)	"Reebok's Fireman **vows** to retake lead in athletic shoe market by end of 1995."
Product-Market Innovation Actions (see Covin & Slevin, 1991; Lumpkin & Dess, 1996; Austrian literature in corporate entrepreneurship, etc.)	a) Product actions or b) Pricing, marketing, or service actions qualified by presence of key words: new, unique, experimental, test, innovative, creative, first-ever, radical, change, pioneer, next-generation, etc.	"Nike's **creative** air shoe ads to illustrate gravity." "Boeing launches **first-ever** global ad campaign to encourage business air travel." "American Airlines **radically alters** pricing structure." "Fed Ex introduces **new** software and hardware package to help clients track shipments." "Wal-Mart **experiments with** innovative environmentally friendly supercenter in Nebraska." "Alcoa unveils **next-generation alloys** for aero-space industry." "IBM tries **unique** incentive program to boost high-end PS/2 sales."

first-ever, etc.). Consequently, we created a tally of *innovative product-market actions* each firm carried out over each year of the time panel (1987-93). This tally represents the sum of the number of *product actions* which are, by their very nature, innovative, and the number of *innovative product-market actions* among the other five action type categories. The tally represents our measure of **product-market innovation**, whereby higher values

represent higher levels of product-market innovation.

Top Management Team Heterogeneity. We adopted Wiersema and Bantel's (1992) approach to measure educational background heterogeneity, functional background heterogeneity, and industry tenure heterogeneity. To calculate TMT educational heterogeneity, we used Blau's (1977) index of heterogeneity and included each TMT member's highest degree received across six different degree categories: business, science, liberal arts, engineering, law, and other. We also used Blau's index to calculate functional background heterogeneity, whereby functional experience was categorized as engineering/R&D, finance/accounting, legal, human resources management, manufacturing, logistics, purchasing, public relations, and general management. Since industry tenure is a continuous variable measured in years, we calculated industry tenure heterogeneity using the coefficient of variation, defined as the standard deviation divided by the mean for the number of years each of the TMT members was active in the focal industry.

Because TMT heterogeneity may be considered as a meta-construct that is manifested along a number of different, yet correlated dimensions, we employed a parsimonious composite measure of TMT heterogeneity calculated as the sum of the three standardized individual TMT heterogeneity measures noted above (see Ferrier, in press; Ferrier, 2000). Also, to avoid placing disproportional weight on time/experience, we included only one time-related TMT dimension (i.e., industry tenure heterogeneity) in our composite measure. Consistent with the individual TMT measures, high scores for our composite TMT measure indicate that the TMT possesses, overall, a diverse set of experiences, cognitive perspectives, and backgrounds.

Performance. Firm performance is a multi-dimensional construct. Since corporate entrepreneurship may influence various dimensions of firm performance differently (for instance, the expenditure of resources necessary to grow revenues or market share may adversely impact short-term profits), multiple measures of performance are preferable to single measures of performance (Chakravarthy, 1986; Lumpkin and Dess, 1996; Zahra and Covin, 1995). Accordingly, we tested our hypothesis using two different performance measures: Altman's Z-score and market share gain.

Altman's Z-score is a weighted composite of profitability, efficiency, slack, and stock market performance factors, calculated as:

$$Z = 0.012\,X_1 + 0.014\,X_2 + 0.033\,X_3 + 0.006\,X_4 + 0.999\,X_5,$$

where X_1 = Working Capital / Total Assets, X_2 = Retained Earnings / Total Assets, X_3 = Earnings Before Interest and Taxes / Total Assets, X_4 = Market Value of Equity / Book Value of Liabilities, and X_5 = Sales / Total Assets (see Altman, 1968; Chakravarthy, 1986). Chakravarthy argued that although the Z-score was "essentially constructed to predict bankruptcy, it can also be a valuable index of the company's overall well-being. By measuring distance from bankruptcy, Z-score could be a surrogate index of strategic performance" (1986: 446). The use of a composite performance measure that captures multiple dimensions of firm well-being is consistent with prior research in corporate

entrepreneurship (e.g., Covin and Slevin, 1986; Zahra and Covin, 1995). Z-scores greater than 3.0 indicate a condition of strong performance, whereas Z-scores lower than 1.8 indicate poor performance.

Consistent with several other studies exploring the effect of competitive strategy on market share, we calculated **market share gain** as the positive year-to-year change in percent of firm sales to total industry sales in the focal firm's primary industry (e.g., Ferrier *et al.*, 1999). This measure also accounts for market share erosion, measured as the negative annual change in market share. Data for both performance measures were collected from *Compustat* and *Ward's Business Directory*.

Control Variables. Previous research suggests that several industry-and firm-specific variables influence firm performance. For the sake of parsimony, we calculated a composite measure for **barriers to entry**, represented by the sum of the year-by-year pooled industry means for investments in R&D, selling activities, and total assets, respectively (see Ferrier *et al.*, 1999; Young *et al.*, 1996). We measured **industry concentration** using the Hirschman-Herfindahl Index, one of the most widely used measures of this construct (Scherer and Ross, 1990). We controlled for the effect of **industry growth** on firm performance by including the year-to-year percentage change in gross industry sales. Finally, because TMT size may affect cognitive heterogeneity, social integration, and consensus in the decision-making process (see Finkelstein and Hambrick (1996), we also included **TMT size** as a control, measured as the number of manager-members that comprise the TMT. Table 2 reports the means, standard deviations, and correlations among all variables in our analyses.

ANALYSIS AND RESULTS

To control for potential bias due to serial correlation and industry-specific factors, we used the PROC MIXED regression technique found in SAS, which allowed us to model the linear regression error term into separate components: a) the first-order autoregressive function (AR1), b) random industry-level factors, and c) and random error (Wolfinger *et al.*, 1991). We report the covariance parameter estimates for both industry random error and serial correlation in Table 3.

Table 3 reports the results of the moderated hierarchical mixed regression analyses. In stage 1 of each model, we entered 1-year lagged product-market innovation, TMT heterogeneity, and TMT size, as well as the current-year industry controls. We lagged the models by one year to allow time for the product-market innovations to impact performance. We limited the lag time to one year because research using datasets of this type (e.g., action counts) shows that once an innovative marketing campaign, unique new product, and so on hits the market, rivals tend to initiate a countervailing response within, on average, 18 months (Smith *et al.*, 1992). With regard to the direct effects for the variables of interest, we found that product-market innovation was positively and significantly related to market share gain ($b = .002$, $p < .01$). Hence, hypothesis one (H1) was partially supported. Top management team heterogeneity was not significantly related to either performance variable.

TABLE 2

Descriptive Statistics and Correlations (N = 462)

Variables	Mean	Standard Deviation	1	2	3	4	5	6	7
1. Z-Score	4.16	3.28							
2. Market share gain	.02	1.84	.16						
3. Product-market innovation	.14	.28	.25	.09					
4. TMT heterogeneity	.57	1.77	-.01	.06	-.07				
5. TMT size	5.44	2.11	-.07	-.09	.36	.19			
6. Industry concentration	.22	.15	-.02	-.10	-.01	-.05	-.04		
7. Industry growth	.18	.18	.14	-.03	.02	-.01	.04	-.07	
8. Barriers to entry	2,598	3,561	-.17	-.06	.28	-.12	.19	.08	-.15

NOTE: All underlined correlations are significant at $p < .05$ level or better.

TABLE 3

Hierarchical Regression Results of Firm Performance on Product-Market Innovation and Top Management Team Heterogeneity (N = 462)

	Model 1: Z-Score		Model 2: Market Share Gain	
Stage 1: Main Effects [a]	Non-Std. Coefficients	Std. Error	Non-Std. Coefficients	Std. Error
Product-market innovation [b]	.001	.002	.002	.001 **
TMT heterogeneity [b]	.018	.053	-.240	.207
TMT size [b]	.116	.046 **	-.068	.061
Industry concentration	-.028	1.585	-1.256	.867 †
Industry growth	.134	.281	-1.252	.681 *
Barriers to entry [c]	-.499	.326 †	-.199	.114 †
Intercept	3.558	.592 ***	1.290	.607 *
–2 Log Likelihood [d] =	1238.400 *		1250.700 **	
Est. of Industry Random Error =	12.785 ***		.047 *	
AR(1) =	.655 ***		.196	
Stage 2: Interaction Term [a]				
Product-market innovation × TMT heterogeneity [b]	.169	.090 *	.015	.006 **
–2 Log Likelihood [e] =	1225.100 *		1263.500 *	
Est. of Industry Random Error =	13.084 ***		.003	
AR(1) =	.652 ***		.239 *	

Values reported are non-standardized coefficients accompanied by standard errors. One-tailed tests were used, which were directionally predicted in the hypothesis: † $p < .1$; * $p < .05$; ** $p < .01$; *** $p < .001$.

NOTES

[a] Coefficients are reported "at stage" because the t-values for the direct effects that comprise the interaction terms are influenced by linear transformations of those variables (Cohen, 1978). Therefore, stage 2 direct effects coefficients are not reported in order to discourage unjustified interpretation of those variables.

[b] Variables were lagged by one year.

[c] Standardized measure of variable was used in analyses.

[d] Significance for –2 log likelihood obtained by comparing values to those obtained from a nested model containing only a constant.

[e] Significance for –2 log likelihood represents significant improvement of fit over Stage 1 models.

The inclusion of the product-market innovation × TMT heterogeneity interaction term significantly improved the predictive efficiency of both the Z-score and market share gain models (i.e., significant change in −2 log likelihood, see note 'e' in Table 3). Consistent with hypothesis two (H2), which predicted that product-market innovation would have a more strongly positive influence on firm performance for firms with heterogeneous TMTs than firms with homogeneous TMTs, the interaction of product-market innovation with TMT heterogeneity in stage 2 was significant and positively related to Z-score ($b = .169$, $p < .05$). The interaction term was also significant in the market share gain model ($b = .015$; $p < .01$). Therefore, hypothesis 2 is fully supported.

Post hoc Analyses. To check the validity of our results, we also ran separate models using four other common measures of firm performance as dependent variables. Other aspects of the model remained the same as in the original analysis. These models were also lagged by one year. Hypothesis one (H1) was not supported in models predicting return on sales, return on equity, or standardized net income before taxes. A model predicting return on assets was marginally significant ($b = .095$, $p < .10$). We found results consistent with hypothesis two (H2) for three out of four of these models. In particular, the product-market innovation TMT × heterogeneity interaction term was significant for models predicting return on sales ($b = .007$, $p < .05$), return on assets ($b = .667$, $p < .05$), and standardized net income before taxes ($b = .049$, $p < .10$). A model using return on equity was not significant.

DISCUSSION AND CONCLUSIONS

The results of our hypothesis testing, as well as the results of the *post-hoc* analysis, appear to affirm the basic premise of the study: a demographically heterogeneous team makes better decisions regarding innovative strategies and tactics. That is, more heterogeneous management teams appear to achieve better results with innovation strategies than less-heterogeneous teams. The results for the market share gain model suggest that innovation has a positive relationship with market share gain, but innovation pursued by a heterogeneous top management team has a stronger positive relationship. The results for the Z-score models suggest that while innovation may lead to gains in market share, it is also expensive and therefore has a negative impact on financial performance. However, when innovation is undertaken by a heterogeneous top management team, there is a positive impact on financial performance, though the relationship is not as strong as that of the market share gain model. These findings suggest that, indeed, the influence of innovation on firm performance can be contextual and, in this case, contingent upon the nature of the top management team.

While economies of scale, market power, and reputational advantages stemming from high market share have been associated with higher profits (Porter, 1980), executives may pursue market share based on a "competitor orientation," or an emotional commitment to beating competitors (Armstrong and Collopy, 1996). However, as this and other research suggests, an orientation that emphasizes beating competitors in

terms of market share is not always associated with higher profits (Armstrong and Collopy, 1996). Our findings suggest that heterogeneous teams are better able to achieve *both* market share and profitability than are more homogeneous TMTs. This may occur because heterogeneous TMTs are less subject to groupthink (Janis, 1972) and therefore are better able to balance the desire to beat competitors against the need for profitability, or because they just make better decisions, as argued above.

Future studies should expand upon these findings by examining the competitive environments where the influence of demographic heterogeneity on the innovation-performance relationship may be the most important and, conversely, those industries where heterogeneity does not provide benefits or even has adverse effects. For instance, strategic change has been shown to disrupt firm routines and decrease firm performance (Amburgey *et al.*, 1993). Likewise, innovation can disrupt organizational routines as organizations struggle to "unlearn" old ways of doing things and focus on implementing new processes or products (Nystrom and Starbuck, 1984). This effect may be particularly pronounced for firms in placid industries since those firms are likely to have well-established routines and be unaccustomed to change. Further, firms in placid industries may benefit more from TMT cohesion and its implied consequences of increased communication (Zenger and Lawrence, 1989), consensus (Dess, 1987), and decision-making speed (Eisenhardt and Schoonhoven, 1990). Hence, such firms are particularly likely to suffer the disruptive effects of innovation and change and, consequently, their performance may deteriorate during such periods (Amburgey *et al.*, 1993). Our research suggests that heterogeneous teams may be better able to cope with the disruptive consequences of innovation and change. Thus, there may be complex interrelationships encompassing environmental as well as organizational characteristics such as the nature of the top management team, or the firm's innovation implementation climate (Klein and Sorra, 1996) that more fully delineate the relationship between innovation and firm performance.

These results have important implications for management practice. As Hitt *et al.* (1999) note, top management teams bear final responsibility for the selection and implementation of firm actions in a manner that generates wealth. Thus, to ensure that a firm's pursuit of product-market innovation results in *profitable* market share gains — avoiding the overzealous pursuit of innovation or market share for its own sake — managers should actively incorporate open debate using more complex and diverse points of view in the strategic decision-making process. Our results suggest that management teams characterized by members with wide diversity in demographic attributes may be successful on projects that intuitively benefit from marked dispersion of attitudes, interests, and perspectives, such as those requiring the evaluation of innovative or creative ideas. Some authors have argued that high-performing management teams benefit more from the potential conflict induced by dissimilarity than from consensus. In fact, unnecessarily striving for consensus may be a waste of scarce executive time. As suggested by Katzenbach, "real teams

do not avoid conflict — they thrive on it" (1997: 85).

The results of this study have important consequences for academic research as well. They suggest that TMT demography may be useful as a moderator construct. The research implications of this reach beyond the upper-echelons literature to encompass research on executive hiring, selection, and development, as well as the strategy-making process and implementation, and other areas. The results of our study suggest that the relationship between heterogeneity and performance may be more complex than at first thought and suggests a possible explanation for the equivocal results that have plagued the upper echelons research (c.f., Finkelstein and Hambrick, 1996). For instance, while there has been some difficulty in linking demography directly to firm performance (Finkelstein & Hambrick, 1996; West and Schwenk, 1996), dispersion of demographic characteristics among the members of a TMT may enhance firm performance when tasks are undertaken that require creativity or novel thinking, such as the pursuit of an innovation strategy.

There are a number of limitations to this research. First, the inner workings of the top management team are a "black box" (Lawrence, 1997) in demography-based research. The theoretical perspective taken here is that demographic heterogeneity leads to conflict among TMT members and such conflict has a salutary effect on decision making. The demography-based perspective is well grounded in theory and has a substantial and diverse supporting literature (e.g., Hambrick and Mason, 1984; Eisenhardt *et al.*, 1997). However, there is an important alternative perspective. Specifically, that perspective assesses conflict directly, distinguishing between affective, or dysfunctional emotional conflict, and cognitive, or beneficial task-related, conflict (Jehn, 1995; Amason, 1996). If we had been able to measure and distinguish between affective and task-related conflict within the teams in our sample, we might have found a weaker, or even negative, effect on the relationship between product-market innovation and performance for heterogeneous teams whose interactions were characterized by affective conflict, and a stronger effect on performance for teams characterized by task-related conflict.

Second, and on a related note, future research should also employ more substantive measures of TMT heterogeneity such as executive power, psychographics and judgment (Priem *et al.*, 1999; Miller *et al.*, 1998) in order to generate more "fine-grained" (Harrigan, 1983) insights into the relationships described above. This will likely necessitate a sample of smaller firms where executives are relatively more accessible so that data can be collected (Hambrick and Mason, 1984).

This research was conducted to explore the relationship between innovation and firm performance in the context of the nature of the top management team. As such, it addresses an important contingency in the relationship between corporate entrepreneurship and firm performance, and takes a step towards answering the question of "how corporate entrepreneurship creates competitive advantage" (Covin and Miles, 1999: 48). Further, this research addresses an issue seldom examined in upper-echelons research—the contingency effect of top management team het-

erogeneity on the relationship between firm behavior and performance (Finkelstein and Hambrick, 1996).

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