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Temporal Dimensions of Opportunistic Change in Technology-Based Ventures

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Opportunity recognition and opportunity-directed behavior are at the core of entrepreneurial efforts in both new and existing ventures. This study examines characteristics and behaviors related to future time orientation and their association with the pursuit of entrepreneurial opportunity. We find that strategic change in young technology-based ventures is associated with top management teams who are perceived as being more future-oriented. Communication patterns linking future- and present-oriented managers are also associated with strategic change. The findings of this empirical study indicate that technology-based ventures should place substantial emphasis on identifying, embracing, and widely communicating ideas that challenge the *status quo*. Out of this process the entrepreneurial approach is reinvigorated with new opportunities for proactive strategic change and growth. Ways in which new venture management may take steps to recognize and move proactively on emerging new opportunities are suggested.

One of the most pressing issues confronted by top management of growing entrepreneurial companies is the need to continue recognizing new opportunities over time. Nowhere is the need to continue recognizing new opportunities of greater importance than for ventures competing in technology-based industries. Here, rapid advances in technology development cause faster obsolescence of products and services upon which such ventures were originally established (Anderson & Tushman, 1990). Widespread entrepreneurial activity in such industries also tends to emphasize the competitive importance of remaining on the cutting edge, of addressing emerging trends successfully, and of doing so in a timely fashion.

It is particularly important for young technology-based ventures in rapidly changing competitive environments to identify emerging opportunities. Dynamic conditions present many strategic options and possibilities to competitors. Younger companies are believed to suffer from a liability of newness (Stinchcombe, 1965) and lack accumulated organizational slack (Cyert & March, 1963) to weather any encountered problems for long. Pursuing an obsolete or irrelevant direction in a changing marketplace may be an error from which many such firms cannot recover. Firms competing in dynamic and growing industries might entertain many strategic possibilities and have little margin for error. Survival and growth of such enterprises places a premium on correctly anticipating the market with its emerging opportunities, and then implementing change strategies.

Empirical and theoretical research on strategic and organizational change (Miller & Friesen, 1980; Tushman & Romanelli, 1985) does not offer much help for those interested in effectively managing the needed change in younger technology-based ventures. Such studies have tended to examine large established firms over extended periods of time, and often in competitive environments not as turbulent as those found in technology industries. Moreover, theory tends to embrace a dichotomous view of change as being either incremental or revolutionary, where both its causes and effects are poorly understood (Ginsberg, 1988). Firms cannot afford to drift (Johnson, 1988)

through periods of incremental adjustments when competitive contexts are rapidly evolving. And in light of evidence that the other dichotomous change alternative — large-scale change — does not enhance performance (Ginsberg, 1988), younger ventures in technology industries are left to find a route to success without much of a road map.

Integral to the success of new ventures are changes in strategic direction initiated progressively throughout stages of their life cycle development. Following Kazanjian's (1988) model, the problems faced by technology firms change significantly from one life cycle stage to the next. Thus a number of studies have concluded that both organizationally and strategically, technology-based firms must often change in order to achieve continued growth and success (Jelinek & Schoonhoven, 1990; Moore, 1995).

While new ventures ordinarily arise out of opportunity recognition by insightful entrepreneurs amidst uncertain environments (Cooper, Folta, & Woo, 1995; Palich & Bagby, 1995), theory and evidence suggest that entrepreneurs become less effective in recognizing and pursuing new opportunities once their companies have passed through the start-up phase. For example, founding entrepreneurs in technology companies may ultimately constrain their firms' effectiveness because of an unwillingness to shed a narrow technical mindset in managing (Meyer & Dean, 1990). More generally, top managers of growing ventures tend to focus on existing strategies and existing life cycle dynamics, rather than adeptly anticipating upcoming challenges, next-stage problems, and related strategies with which their firms must engage (Lyles & Schwenk, 1992; West, 1992; West & Wilson, 1995). Thus the real question for new ventures — and for technology-based new ventures in particular — is represented in the question "how does a growing venture overcome resistance to change and remain entrepreneurial?" A key challenge for any young technology venture appears to be its ability to recognize an emerging competitive environment and proactively modify or change its strategy in order to survive and flourish.

Proactive strategic behavior is a critical dimension of entrepreneurship at the firm level. Lumpkin and Dess (1996) refer to the propensity to act on market opportunities (entrepreneurial orientation) and entry into new or existing markets (act of entrepreneurship) as firm-level constructs. Key dimensions that underlie an entrepreneurial strategic posture (Covin & Slevin, 1991; Slevin & Covin, 1995) or an entrepreneurial strategy-making mode (Dess, Lumpkin, & Covin, 1997) include the willingness to be aggressive in pursuing new opportunities, innovation, and experimentation, and proactivity in being first among competitors to initiate actions. What is clearly portrayed by these descriptions of firm strategic behavior is the identification or recognition of opportunity and its proactive pursuit. Importantly, however, and reflecting earlier findings on life cycle development, Dess et al. (1997) find that proactive entrepreneurial strategic behavior serves a firm well only as long as the firm's strategy is coaligned with demands on the firm from the competitive environment. As the interface between the firm and the market changes, so too must the firm's strategy change. Thus, recognition of the need for strategic change is again highlighted, and those firms that are more entrepreneurial — recognizing and pursuing strategic change proactively — will flourish.

This research focuses on conditions underlying the ways in which younger ventures behave entrepreneurially related to strategic change. We focus herein on anticipatory change within young technology-based ventures, and associate anticipatory change directly with the foundation of entrepreneurship, that is, with opportunity recognition. The ability to recognize opportunity is often ascribed to individual entrepreneurs whose *prior* experience enables them to see patterns of activity and viable niches within these patterns (e.g., Herbert Simon's (1984) "50,000 chunks" idea). In contrast, entrepreneurial firms are often seen as detecting opportunity by scanning the *present* environment and by creating an open systems structure that fosters a dialog between the firm and the environment. This study adopts an alternative view of entrepreneurial opportunity recognition by firms, one that focuses on cognitive characteristics of its managers related to *future* perception and on related communication patterns between members within the firm. It is hypothesized that the seeds of anticipatory strategic change spring from the ideas of members of top man-

agement teams who better perceive evolving and future competitive environments and the new opportunities these environments present. By successfully identifying ideas for new business and emerging competencies which will in the future become increasingly current, and by identifying them sooner rather than later, these ventures may move proactively in the present to initiate change. Therefore, this study measures managerial future time orientations and their relationships to change. The importance of transforming perceptions and ideas within top management teams into change direction also yields hypotheses regarding effective communication patterns among managers within the technology-based ventures.

ANTICIPATING OPPORTUNITY: AN ORIENTATION TOWARD THE FUTURE

For our purposes in the present article, firm entrepreneurship is defined as recognizing the need for and initiating strategic changes in anticipation of rapid technological and market discontinuities. Two implications for young, growth-oriented ventures are derived from this definition. First, this focus places a premium on new venture managers who can better perceive and understand the future. Proactive strategic change efforts thus cut directly to the concept of managerial future time orientations, which refers to new venture managers' preferential orientation toward events in the future (Nuttin, 1985) and their capability of "visualizing, comprehending, and grasping the distant future" (Das, 1987, p. 205). Managerial future time perspective is at the very foundation of this paper.

But merely peering ahead further or more accurately is only half of the picture. Venture managers must then act to take advantage of their insights. Recent empirical evidence shows that the communication among top management team members of new strategic ideas that challenge the *status quo* is related to improved performance (West & Meyer, 1998). Thus, the second implication of a focus on anticipatory change is the need to better understand the behaviors of managers in sharing their insights across the management team, and in translating their insights into an organization-wide change mandate.

Evidence suggests that those with greater future time perspectives tend to appear more entrepreneurial. In their summary of research on applications of the Myers-Briggs Type Indicator to management, Gardner and Martinko (1996) draw two conclusions regarding "intuitives," who are described as being more future-oriented and who see meanings, associations, and possibilities. Intuitives seem to excel at disembedding abstractions from complex backgrounds. Moreover, their holistic outlook helps them to better consider relevant opportunity costs in resource-allocation decisions. In contrast to Fortune 500 top managers who are extremely present-oriented and devote less than three percent of their time to building a future perspective for their organizations (Hamel & Prahalad, 1994), Das (1987) finds that managers with greater futurity have significantly longer planning horizons. Achamamba (1990) also finds a significant positive correlation between greater future orientation and high achievement value.

These findings on future orientation parallel previous research findings on and our intuitive understanding of entrepreneurs. Those who are more future oriented are portrayed as being better able to identify alternatives and plan further out into the future. Ropo and Hunt (1995), for example, describe the process of virtuous entrepreneurship in Finnish banks as centrally involving contextual opportunity detection by more future-oriented individuals. Future-oriented individuals are also similarly identified with high achievement motivation, as are entrepreneurs (McClelland, 1965). Like entrepreneurs, future-oriented individuals detect opportunity, act with a longer planning period in mind, and are highly motivated. In fast-changing technology environments these qualities may be especially valuable to have represented in the management of younger firms.

Anticipatory strategic change emphasizes more than just peering further forward and seeing opportunity more easily, however. Such change also involves a set of behaviors that enables new ideas and opportunities to become substantively a part of the new venture's agenda. Relying in part on expectancy theory, Nuttin (1985) describes how individuals with greater future time perspec-

tive attach high valence to goals for the future. As a result, those with greater futurity have a greater interest in and anticipation of emerging trends and events yet to be experienced. Such interests and anticipation are formally captured in their goals/means structures (Nuttin, 1985), resulting in sets of actions and behaviors taken in the present to work toward the perceived future.

This work on future time perspective parallels the tie that Bird (1988) makes between entrepreneurs and time orientation. One of the unique aspects of entrepreneurship is the stronger connection that entrepreneurs make between a more distant future and the present; this "temporal tension" guides their goal setting and is manifest in their intentions (Bird, 1988; 1992). Moreover, temporal tension heightens entrepreneurial motivation, such that their intentions more powerfully direct behavior aimed at achieving their goals (Bird, 1992). Confirming these theoretical ideas, Crant (1996) finds a strong relationship between entrepreneurial intentions and proactive behavior taken to act on identified opportunities.

TOP MANAGEMENT TEAM FUTURE ORIENTATION AND ITS EFFECTS

Future orientation among top managers may affect the opportunity to identify the need for new and changing directions for new ventures. Just as Fishbein and Azjen (1975) emphasized the direct behavioral effects of an attitude, the natural organization-based time perspectives of top managers might be expected to affect their attention, interest, and activity surrounding strategic issues related to firm growth and development. Short-term or present-oriented operations managers may not be supportive of downtime to pilot test production of prospective new products; operations managers more future-oriented may aggressively assist in scheduling such efforts. CEOs of public ventures may be compelled to make decisions compromising longer run opportunities in order to "make the numbers" reported in the quarterly SEC filings. Despite nominal commitment to the future, a marketing executive with discretionary extra spending available may funnel it into additional brand development for the existing business, producing an immediate return, instead of incrementally investing in R&D with an uncertain future return.

Characteristics of top management team members may therefore affect the organization's ability to seek out and attend to compelling information about future conditions and competitive environments. Hambrick and Mason (1984) suggest that the interpretations that lead to strategy are a function of principles, values, and cognitive biases each top manager possesses. These biases include "knowledge or assumptions about future events, knowledge of alternatives, and knowledge of consequences attached to alternatives" (Hambrick & Mason, 1984, p. 195). Subsequently some of their propositions have found mixed support in empirical research examining strategic change, when using observable demographic characteristics as proxies for underlying values and biases (Lant, Milliken, & Batra, 1992). It is for this reason that Hambrick and Mason acknowledge that demographic variables may serve as "muddied indicators" of only "broad tendencies" (1984, p. 196).

Hurst, Rush, and White (1989) argue that cognitive style differs markedly from demographic description, and that it is crucially important in understanding the process of change. In particular, these authors hold that cognitive style is manifested by the natural inclinations of top management team members to sense the future and "see unrealized potential within the stream of events which surround them" (p. 91). Differences among team members in cognitive style may thus contribute to the ability of the firm to produce variegated views of the emerging competitive environment.

More specifically, the future orientations among top managers may affect strategic change. Research evidence in the field of strategy can inform our view of top management team dynamics related to strategy creation in new ventures, and indicates that many top managers are not particularly attentive toward the corporation's future. Where managers have explicit strategic agendas or hold a priority of strategic agenda items in mind, these tend to be much more present-oriented (Bowman & Bussard, 1991). Attention and resources are thus devoted to more present-oriented matters. If a strategic agenda includes more distant, future items, these tend to come toward

the end of the list of agenda items (Bowman & Bussard, 1991). Dutton (1988) does not even consider how more future-oriented issues become part of the strategic agenda, because executives find these issues to be time-distant, too abstract, too complex. In contrast, we would expect top managers who are more future-oriented to more actively attend to emerging information about changing competitive contexts, resulting in greater degrees of change.

Hypothesis 1: Top management teams with greater average future time orientations will be positively associated with strategic change.

The role of differences in future time perspectives among top managers may also have a direct bearing on strategic change in new ventures. As has been documented in both the psychology literature (Cottle, 1968; Cottle & Klineberg, 1974; Jaques, 1982) and the management literature (Bluedorn & Denhardt, 1988; Das, 1986, 1991; Jaques, 1976; McGrath & Rotchford, 1983; Vinton, 1992), different individuals have differing time perspectives and future orientations. Some suggest that these differences affect interdepartmental coordination (Lawrence & Lorsch, 1969; Thompson, 1967) and may contribute to problems in achieving consensus and unified action. On the other hand, Hambrick and Mason (1984) hold that differences among managers on cognitive dimensions may be valuable. Such differences will ensure that multiple points of view are considered, and thus that due consideration is given to a variety of change alternatives. In contrast, a team composed homogeneously of present-oriented managers may never consider alternatives, while a team composed homogeneously of future-oriented managers might never find themselves able to conclude on any one change alternative as new alternatives are continually presented.

Hypothesis 2: Heterogeneity of time orientations among top managers will be positively associated with strategic change.

Having produced different world views, cognitive style heterogeneity also suggests patterns of communication and interaction among top management team members in the assembly of a unified view. The "patterns of interaction amongst the contributors to strategic actions, who interacts with whom and how they interact, will be a critical aspect" in transcending the diversity that heterogeneous cognitive styles presents (Hurst et al., 1989, p. 89).

Effective communication of innovative new ideas and knowledge occurs in sequenced patterns. Hägerstrand (1967), for example, finds a "neighborhood effect" in information diffusion, whereby information spreads first to nearby geographic locations and then later to more remote locations. Within organizations we might expect to find that the natural path that new ideas about emerging conditions follows is first between individuals whose points of view are closer together and who share similar concerns, and then to individuals whose points of view are different. Rogers (1983) discusses how communication between "homophilous" groups is easier because of shared ideas, and because of shared language. It is for this reason that cliques of more frequently communicating members form as "subsystems" within an organization (Rogers & Kincaid, 1981).

Substantive communication among top managers with similar time perspectives may be particularly important in the change process in new ventures. In discussing how new (strategic) agendas are created, Kingdon (1984, p. 130) concludes that the "origins of ideas are less important than the process of mutation and recombination that occur as ideas continuously confront one another and are refined." Sharing a common language and similar interpretive point of view, for example, managers with similar time perspectives may be more easily able to surface underlying assumptions bearing on a new idea (Mason & Mitroff, 1981) and thus to augment such ideas with adaptations more appropriate for the organization.

Hypothesis 3: The intensity of communication among top managers possessing future time orientations will be positively associated with strategic change.

A critical juncture in top management team communications occurs at a point where information about new ideas and alternatives is transferred from one subsystem to another. Management research on change promotion often focuses on the location of power within top management teams or the politics of managing teams and agenda building. In contrast, in the current study the critical juncture would seem to involve the transfer of ideas between different cognitive styles (Hurst et al., 1989). It is through communication between cognitive styles that important new knowledge about strategy in emerging conditions is transferred from a more future-oriented group into a more present-oriented group, and becomes linked more substantively to facets of the organization's current strategy. Thus it is through communication between cognitive styles that new ideas for change are given excitement and urgency for the organization, by becoming central to the deliberations of the entire organization. Research in social networks highlights the importance of connections between different social groups within a system as particularly salient in the diffusion of new information and innovations (Granovetter, 1973; Rogers, 1983; Rogers & Kincaid, 1981). While communication between "heterophilous" groups is more difficult as a function of differences in beliefs, language, world view and shared meaning, it becomes "especially important for carrying information about innovations" (Rogers, 1983, p. 275).

Hypothesis 4: The intensity of communication between future-oriented managers and present-oriented managers will be positively associated with strategic change.

METHODOLOGY

Surveys and interviews were conducted among CEOs and top managers of technology-based firms or operating divisions of technology-based firms in three related SIC codes (computers, micro-electronics, software) in one western state across a two-year period. CEOs who agreed to participate in a study of consensus among top managers on strategy designated the names of managers in their companies who were involved in discussions and decisions on strategy and strategy-related issues as those who should be surveyed. The unit of analysis in this study is at the firm level; after two years 22 usable sets of surveys (including both CEOs and top managers) were available for longitudinal analysis. At the beginning of the study the average age of the participating firms was 8.1 years, and the average life cycle stage of development was the growth stage (Kazanjian, 1988). The average number of respondents per firm in both years of the study was 4.9 managers, inclusive of the CEO. The average self-reported size of participating firms during the final year was 168 employees and \$41.5 million sales. Following the administration of mail surveys, a limited number of unstructured interviews were conducted with a random sample of participants.

Time Orientation

The measurement of managerial time orientation is an emergent area in organizational research. Organizations and individuals have very different temporal characteristics. Organizations are considered to have "event-based" controlling temporalities, as opposed to the chronological clock and calendar timeline to which individuals are accustomed (Clark, 1985). New venture development is framed by particularly meaningful events (Gersick, 1994), such as first sale, first hire, major new customer, introduction of a second product line, and raising funds through a venture capitalist or an IPO. In addition, within organizations the need for rationality (Cyert & March, 1963) conflicts with individual perspectives on the future. Where critical life events for individuals (such as marriage, birth of a child, or retirement) are not strongly connected to the present in a cause-effect manner (Cottle, 1968; McGrath & Rotchford, 1983), the rationality that pervades organizational behavior demands cause-effect thinking between present actions and future impact (Weick, 1969). Since individuals may need to adjust their uses of time

Table 1

Correlation of Peer-Based Time Orientation Measure with Managers' Own Responses

Survey Items	Correlation With Time Orientation
I feel other top managers have a shorter term view than I do	.2304**
This company does everything possible to maximize long-term value	.2365**
I have detailed knowledge of product/services, processes, & markets	.2883**
Industry functional experience/training in marketing or R&D	.2775**
Age	-.0178
Education	.1774

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

and their conceptions about appropriate norms for considering time when entering an organization (Schriber & Gutek, 1987), the need to understand the dimensions of time orientations of "managers-in-organization" becomes evident.

While there have been developed a number of instruments to measure individual future time orientation (Bird & Jordan, 1987; Daltrey, 1982), none would "address critically the temporal perspectives that organizational participants bring with them and the social rhythms to which they respond" (Bluedorn & Denhardt, 1988: 303) in an organizational setting. To date there has not been developed a reliable, validated means for measuring this dimension of managers in organizations (Bluedorn & Denhardt, 1988), and recent research that attempts to measure time orientations of managers has not produced consistent findings. Therefore, this study measures managerial future time orientation using a combination of methods designed to be externally valid and internally consistent.

First, a measure of managerial future time orientation based on others' ratings was developed for each respondent. Survey respondents were asked to rate the time orientation of every other member of their top management team who was a part of this study. The instructions asked each respondent to indicate "what you believe to be the natural time orientation which [named colleague] brings to the consideration of strategy and strategic issues in your company." A seven-point rating scale was used, with the endpoints anchored as "present-oriented" (1) and "future-oriented" (7). The average of the ratings of a manager's colleagues was used as a measure of the manager's time orientation. The mean time orientation for the complete sample of managers across all companies is 3.897 with a standard deviation of 1.176.

Next, the time orientation measures developed through others' ratings were compared for convergent validity with managers' own responses on other question items in the administered survey. Table 1 presents correlations of their time orientation ratings as described above with managers' own responses to these other theoretically derived time-related items. The first three items in Table 1 were derived from Laverty (1993), who also found positive correlations for these items with factors representing greater futurity. Functional backgrounds in marketing and R&D have previously been associated with longer term perception of problems (Dearborn & Simon, 1958) and longer time span of feedback (Lawrence & Lorsch, 1969). While the time orientation measure is not significantly correlated with other theoretically expected variables such as age or education (Bantel & Jackson, 1989; Hambrick & Mason, 1984), the significant correlations with the first four measures offer convergent validity with managers' own described orientation. This lends credibility to

the face validity of the measure itself. Table 1 also lends support to Hambrick and Mason's (1984) suggestion that observable demographic measures, such as age and education, may be suboptimal proxies for underlying cognitive characteristics.

Finally, for those respondents whose time orientation was not rated by at least two colleagues, a measure was computed based on a regression model developed using responses to a selection of the measures in Table 1. Regressing time orientation against independent variables listed in Table 1 yielded significant results (adjusted $R^2 = .225$, $F(5, 63) = 3.67$, $p < .01$) and indicates that predicted time measures are good approximations for observed time measures. The regression equation was therefore used to predict time orientation measures for as-yet-unrated top managers.

The hypothesis tests call for time orientation measurements at the organizational level. Average top management team time orientation is operationalized as the mean of individual top manager time orientation measures within each company. Heterogeneity of top management team time orientations is operationalized as the standard deviation of top manager time orientation measures within each company. It is possible that team time orientation heterogeneity may also be represented by the proportion of futures on the team. Therefore, a second measure of overall time orientation heterogeneity of each top management team is the percent of members of the team who have above-average individual time orientation measures.

Communication

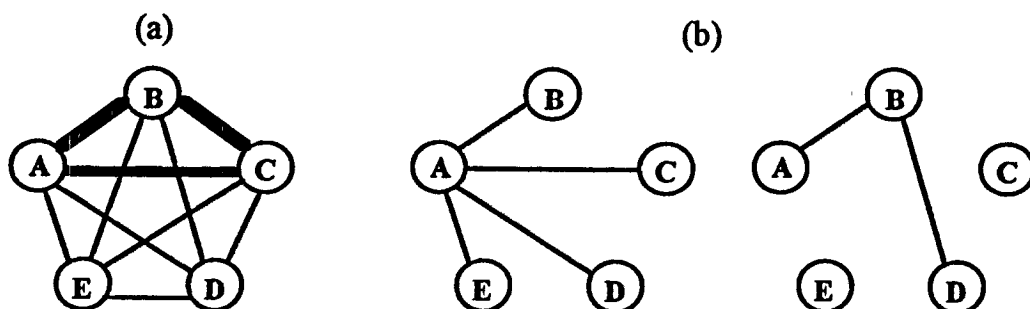
Network analysis focuses on the relationships between elements in a system (Rogers & Kincaid, 1981). It can be used to analyze the patterns of participation and levels of interconnectivity among people in organizations (Laumann, Marsden, & Prensky, 1983), and more specifically among smaller groups of people within formal subdivisions of organizations (Krackhardt & Stern, 1988). Each top manager here was presented with a roster of other top managers in the firm. Each was asked to rate the communication frequency and the importance of communication that he or she had with every other manager regarding the company's strategy and strategic issues (Monge & Contractor, 1988; Wasserman & Faust, 1994). A seven point rating scale was used for each question. The endpoints were anchored as "extremely infrequently" (1) or "extremely frequently" (7) for communication frequency, and "extremely unimportant" (1) or "extremely important" (7) for importance of communication; graduated descriptions were used for other points in the scales. The results of these questions were two matrices for each team of top managers — one showing frequency of communication, one showing importance of communication. Next, a matrix of communication intensity was derived for each firm, reflecting a multiplicative interaction between the frequency and importance ratings by each manager (Richards, 1985). Finally, in order to compare communication intensity across firms, each matrix was standardized, with a maximum value of 1 and a minimum value of 0 for each communication relationship between two individuals.¹ Each cell in the resulting standardized matrix thus represents the communication intensity one manager (the row identity) perceives he or she has with another manager in the team (the column identity).

Two measures of communication network activity were developed: density and centralization. Density describes the general level of linkage or cohesion among all members of a communication network (Scott, 1991). The measure of density represents an average of the communication intensity among managers in the network, and because of different size networks, is expressed as a percentage of the total possible across the entire network (Borgatti, Everett, & Freeman, 1992; Scott, 1991). Density variables for team subgroups were developed based upon classifying each manager as "future-oriented" or "present-oriented" using the mean time dimension score for the

1. A series of studies by Bernard, Killworth, and Sailer (1980; referred to as the BKS studies) challenges the validity of self-report network data, such as are used in this study. In the BKS studies there is no close correspondence between self-report and objectively gathered network data. Freeman and others, however, find that differences are particularly evident when respondents are asked to report on specific situations or interaction, or definitive points in time. Self-report data tend to reflect the typical or routine network activity rather than specific situations (Wasserman & Faust, 1994).

Figure 1

Illustration of Network Properties



entire sample as a dichotomizing point. One measure represents communication strictly among “futures.” A second measure represents communication strictly among “presents.” A third measure represents communication between futures and presents.

The centralization of a network is a measure of the extent to which the network is organized around a particular focal point (Scott, 1991), in this case around a particular individual. An individual is more central if he or she has a larger number of adjacent connections with others in the network (as opposed to having a connection through someone else). Centralization for a network is calculated by summing the differences in the number of adjacent connections between the most central individual in the network and all others in the same network. The sum of differences is then standardized through dividing by the maximum number of adjacent connections possible in the network. Centralization is thus a measure of the variability in centrality scores, with a higher measure of centralization indicative of a more centralized network.² Measures were calculated for the “futures” subgroup and for the “presents” subgroup.

Figure 1 may help clarify the meaning and operationalization of the network measures density and centralization. Assume a top management team is composed of five members A through E. If they all have communication relationships with one another, their communication network is represented in Figure 1 (a). Each dyadic pair has two relationships (for example from A to B and from B to A) and thus in this network there are ten possible adjacent connections and twenty possible relationships. The intensity of the relationships is not uniform throughout the team; the heavier bars between A, B, and C indicate their dyadic relationships with each other are more intense than are their relationships with members D and E and more intense than the relationship between D and E. If the stronger relationships each have an intensity of 0.7 on the standardized scale in both directions dyadically, and the weaker relationships each have an intensity of 0.4 in both directions dyadically, then the density of the network would be $[(6 * 0.7) + (14 * 0.4)] / 20 = 0.49$.

Now assume that A has adjacent connections to all other members as in Figure 1 (b), but that B has adjacent connections to only two others in the team (i.e. B’s connection to C or E is through

2. This study employs “degree-based” measures for centralization. A degree represents the number of connections to adjacent points in a network that a person has. Degree-based measures therefore proxy levels of activity within the network (Marsden, 1990), which is central to the theory and hypotheses presented earlier. Centralization may also be calculated using “betweenness” or “proximity” measures (Monge & Eisenberg, 1987). Betweenness measures the extent to which a person acts as a gatekeeper and may control or prevent the flow of information between others in the network. Proximity measures the extent to which each individual may be reached by everyone else in the network. Degree measures may be further divided into in-degree and out-degree measures (or a combination of both), where in-degree represents connections from other network points to an individual while out-degree represents connections from the individual to the other points. Where directionality of communication flows is at issue, in-degree or out-degree measures may be appropriate. In this study the interest is in total network activity, and thus a “symmetrized” value matrix used to calculate degree-based measures has the effect of averaging in-degree and out-degree into a combined measure.

other team members, such as might sometimes be the case between a manager in field sales and one in engineering at an R&D facility). A has greater centrality than B because A has a greater number of adjacent connections. If we assume that B through E all have two connections, then the network centralization would be $[(4 - 2) * 4] / 10 = 0.80$. The difference in numbers of adjacent connections between A and each other member is two, multiplied by the four other members and divided by the total possible adjacent connections in the network. This would be a very centralized network, with A occupying a pivotal and central role.

Individual centrality measures reveal the most central individuals in both the “futures” and “presents” subgroups. The intensity of communication between the most central future-oriented manager and the most central present-oriented manager was calculated. Presuming this relationship would involve more two-way exchange than directional communication flow (Rogers & Kincaid, 1981), reciprocal communication between these two managers is measured by the absolute value of the difference between the future-to-present cell value and the present-to-future cell value in the overall communication matrix. Thus a zero value for the variable would represent perfectly symmetrical communication between the most central individuals in each subgroup; increasing values represent increasingly asymmetric communication.

Dependent Variable: Strategic Change

Measures of strategic change are developed from changes in the structure of top management thinking about strategy. Managers' perceptions about strategy represent an important mediating construct between environmental causes of change and change actions subsequently taken. Management of two ventures may view the same external events but respond differently because of the individual and collective interpretive frameworks each uses (Daft & Weick, 1984; West, 1996).

The structure of top management strategic thinking is inductively identified using quantitative factor analysis of managers' ratings of a series of strategic goals and means gathered across the two years of the study. Respondents in each survey were presented with a list of 20 possible strategic goals and 21 possible means. The list contains items originally used by Bourgeois (1980), and was supplemented with items based on a review of recent work on strategic goals and means. For each item, respondents were asked to rate its importance on a “scale of importance” ranging from 0 to 100, where 100 represented “critically important” and 0 represented “not at all important.” Factor analyses were performed separately on the study's initial year and final year goals and means ratings data. The factors in each year were named after reviewing and interpreting rotated factor matrices. Six key strategic dimensions were identified from the initial year factor analysis; six nearly identical strategic dimensions were also identified from the final year factor analysis. Factor scores for the key strategic dimensions were calculated for every respondent in each year. Company-level factor scores for each year were then calculated as the average of the factor scores of top managers within each company. Company-level factor scores on key strategic dimensions in the final year were compared to the company-level scores of the initial year nearly identical factor dimensions.

Two measures of strategic change are developed, reflecting previous findings that change may be either change in strategic direction or change in intensity around a particular direction (Morone, 1993). Change in strategic direction is calculated as the summated differences between paired company-level factor scores from the beginning of the study to the end. This variable thus represents a net change in the increasing importance of some strategic dimensions over the decreasing importance of other dimensions. Change in strategic intensity is calculated as the change in the standard deviation across all six key strategic dimensions at the company level from the beginning of the study to the end.

Control Variables

Three control variables are used in the regression tests because of their theoretical or practi-

Table 2

Descriptive Statistics and Correlations

Variable	Mean	SD	1	2	3	4	5
1 Change in strategic direction	-.26	1.65					
2 Change in strategic intensity	-.28	.06	-0.06				
3 Average team time orientation	3.90	.34	0.32	-0.37			
4 Futures as percent of team	47.95	21.37	-0.09	-0.17	0.56**		
5 Heterogeneity of team time perspective	1.10	.53	0.14	0.21	0.19	0.06	
6 Density within futures	.68	.18	0.09	-0.39	0.09	-0.23	0.13
7 Density within presents	.48	.18	0.07	-0.50*	0.21	-0.06	-0.10
8 Density of futures-to-presents	.55	.16	0.39	-0.45*	0.14	-0.32	0.07
9 Centralization of futures	.74	.16	0.01	-0.36	0.26	0.07	0.09
10 Centralization of presents	.55	.12	0.16	-0.64**	0.16	-0.15	-0.14
11 Communication symmetry between subgroup centers	.69	.25	-0.27	-0.31	0.12	-0.21	0.05
12 Past performance	67.83	17.11	0.41*	-0.09	-0.00	-0.16	-0.01
13 Scanning	4.12	.67	0.19	-0.19	0.17	-0.01	0.29
14 Environmental dynamism	4.61	.77	-0.20	-0.17	0.25	-0.03	0.07

Variable	6	7	8	9	10	11	12	13
1 Change in strategic direction								
2 Change in strategic intensity								
3 Average team time orientation								
4 Futures as percent of team								
5 Heterogeneity of team time perspective								
6 Density within futures								
7 Density within presents	0.14							
8 Density of futures-to-presents	0.45	0.01						
9 Centralization of futures	0.82**	-0.01	0.51					
10 Centralization of presents	0.19	0.86**	0.13	-0.10				
11 Communication symmetry between subgroup centers	0.12	0.07	0.52*	0.14	0.25			
12 Past performance	0.51**	0.03	0.15	0.25	0.07	-0.03		
13 Scanning	0.47**	0.50*	0.08	0.35	0.37	0.17	0.26	
14 Environmental dynamism	0.33	0.26	0.35	0.44*	0.27	0.30	-0.22	-0.07

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

cal influence on the primary relationships of interest: prior performance, scanning, and environmental dynamism.

Performance. One of the primary reasons behind strategic change initiatives is past performance of the firm. In many cases where past performance has suffered, managers are prompted to consider making changes in order to effect improvements. Most participating companies were privately held; therefore, detailed financial information was not available. Firm performance is thus measured by the subjective assessment of top managers in the first year of this study about their firm's performance. The measure uses responses to three performance-related question items. One

item, based on Dess and Robinson (1984), asked for an assessment of the percent of ideal performance being achieved, where ideal performance equated to 100 percent. Two other items build on the tradition of strategy as competitive advantage leading to enhanced performance. These items, assessing growth and overall performance relative to competitors on a 7-point agreement scale, were then interpolated into a 0-to-100 range equivalent. Lumpkin and Dess employed a similar measure in evaluating the performance effects of strategy-making processes, noting that "subjective measures of performance can be consistent with objective measures" (1995, p. 1394). The overall measure used for each firm is the average of the ratings of the three items by each manager, which is then averaged across all managers in the team. The mean for the firm performance measure in this study is 67.8; the measure has a Cronbach alpha coefficient of .87.

Scanning. The extent to which environmental scanning activity is already carried out by participating firms may be a contributing factor in how much top managers are able to identify and to communicate new strategic opportunities. Five items derived from Miller and Friesen (1982) reflected the extent to which the firm gathered information from external sources such as clients, customers, and competitors. The composite measure has a Cronbach alpha coefficient of .70.

Environmental Dynamism. The perceived rapidity of change in the external environment may also affect the extent to which uncertainty is perceived and top managers see the need for changes in strategy or identify new opportunities to consider. Five items previously used by Miller and Friesen (1982) reflect the rate of market, product, and technological change faced by firms. The composite measure has a Cronbach alpha coefficient of .68.

RESULTS

Table 2 presents descriptive statistics and correlations for the variables in this study. Consistent with the overall average of all managers who participated in the study, the average team future time perspective was 3.90, just below the centerpoint on the scale provided. Correspondingly, on average 48% of a team's managers were futures while 52% were presents. Not reported elsewhere in this study, 75% of CEOs were rated as futures while 25% were rated as presents.

Table 2 also shows differences between the futures and presents subgroups. Network density of the futures group of 0.68 was significantly greater than network density of only 0.48 among presents ($p < .001$). The level of centralization among futures of 0.74 was also significantly higher than the 0.55 centralization among presents ($p < .001$).

Regarding changes in strategy, on a univariate basis past performance is positively correlated with changes in strategic direction. This is counter-intuitive to assumed logic, and thus controlling for past performance in regression analyses is well-advised. Both measures of network structure for presents groups are negatively related to changes in strategic intensity; this implies the more active and structured presents might be, the less strategic intensity will change.

Hypotheses 1 and 2 predicted that top management team future time orientation will be positively associated with strategic change. Table 3 presents the results of regressing change in direction on the three measures of team time orientation, while controlling for the effects of past performance, dynamic environments, and firm scanning activities. Approximately 42% of the variance in the direction of strategic factor change is explained by the regression equation. The F-statistic for the equation is significant below the .05 level; the F-statistic for the additional variance explained by the time orientation variables, after removing the effects of the control variables, is also significant below the .05 level.³

Table 3 also presents the results of regressing change in strategic intensity on the three mea-

3. As presented, the regression equations in Table 3 may have an overfitted solution due to the low ratio of cases to variables. Separate regressions were run rotating through the independent variables individually, while still controlling for other variables. Significance of the independent variables was not materially different in any case. Thus combined variable regression is presented here for purposes of convenience.

Table 3

Regression: Time Orientations (*t*-values in parentheses)

<i>Dependent Variable:</i>	Change in strategic direction	Change in strategic intensity
<i>Independent Variables</i>		
Average team time orientation	.666 (3.094)***	-.239 (-.956)
Percent of team who are futures	-.450 (-2.165)**	-.090 (-.375)
Heterogeneity of team time orientations	.035 (.204)	.351 (1.752)*
<i>Control Variables</i>		
Past performance	.208 (1.162)	-.101 (-.489)
Environmental scanning	.155 (.866)	-.238 (-1.139)
Environmental dynamism	-.513 (-2.852)**	-.416 (-1.987)*
Adj. R ²	.417	.212
F (6, 16)	3.62**	1.99
F Change	3.36**	1.60

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

tures of team time orientation, while controlling for the effects of past performance, dynamic environments, and firm scanning activities. The variance explained by this model is 21%. The F-statistic for the full equation, as well as for the additional variance explained by the time orientation variables after removing the effects of the control variables, is not significant.

Hypothesis 1 predicted that teams with greater average future time orientation would be positively associated with strategic change, and is partially supported in Table 3. Team time orientation is positively and significantly related to changes in strategic direction ($p < .01$). The beta coefficient of .666 for the variable indicates a relatively strong relationship between time orientation and directional change. On this basis the null hypothesis may be rejected with regards to directional strategic change. Team time orientation is not significantly related to changes in strategic intensity, however.

Table 3 also provides a measure of support for Hypothesis 2, which predicted that heterogeneity of time orientations within top management teams would be positively related to strategic change. The percent of team members who are futures is negatively related to changes in strategic direction ($p < .05$) and the beta of -.450 is strong, suggesting that a team dominated by futures does not change strategic direction. On the other hand, heterogeneity measured as variance across individual team member time orientations is not related to changes in direction, but the variable individually is significantly related to changes in strategic intensity. The positive relationship (beta = .351) indicates that greater time orientation heterogeneity within the team is related to greater change in the variance across strategic factor ratings.

Hypothesis 3 predicted that communication intensity among managers with future time orientations will be positively associated with strategic change. Table 4 presents the results of regressing strategic change dimensions on the communication density and centralization variables for the "futures" groups. Neither regression equation significantly explains the variance observed

Table 4

Regression: Within-Futures Communication Patterns
(*t*-values in parentheses)

	<i>Dependent Variable:</i>	
	Change in strategic direction	Change in strategic intensity
<i>Independent Variables – Futures</i>		
Density of futures group	-.098 (-.203)	.124 (.263)
Centralization of futures group	-.109 (-.244)	-.237 (-.541)
<i>Control Variables</i>		
Past performance	.312 (1.098)	-.410 (-1.475)
Environmental scanning	.370 (1.379)	-.032 (-.121)
Environmental dynamism	-.186 (-.692)	-.268 (-1.018)
Adj. R ²	.021	.062
F (5, 14)	1.08	1.24
F Change	.20	.17

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

in either dimension of strategic change, and the density and centralization variables are not significant in either regression. Table 4 thus indicates that the null hypothesis for Hypothesis 3 cannot be rejected. Communication intensity and organized communication within futures groups are not associated with either changes in strategic direction or changes in strategic intensity, after controlling for the effects of past performance, environmental dynamism, and scanning activity.

Hypothesis 4 predicted that the communication intensity between futures and presents would be positively associated with strategic change. Table 5 presents the results of regressing strategic change dimensions on communication density between futures and presents subgroups. Approximately 35% of the variance in the direction of strategic change is explained by the regression equation. The F-statistic for the equation is significant below the .05 level; the F-statistic for the variance explained by futures-presents density, after removing the effects of the control variables, is also significant ($p < .05$). The regression of changes in strategic intensity on futures-presents group-level communication density is not significant, and the density variable is also not significant.

Table 5 also presents the results of regressions of strategic change dimensions on reciprocal communication between the futures' and presents' most central individuals. The F-statistics for the equations are not significant on an overall basis. However, after removing the effects of the control variables, the F-statistic for the additional variance in directional strategic change explained by reciprocal communication between the groups' centers is significant below the .10 level. Reciprocal communication intensity is also significant individually after removing the effects of the other variables. Changes in strategic intensity are unrelated to communication between the groups' centers.

Table 5 provides partial support for Hypothesis 4. Communication density between futures and presents is significantly and positively related to change in strategic direction, and the level of significance is quite strong ($p < .01$). The more intense the level of communication between

Table 5

**Regression: Future-to-Present Communication Patterns
(*t*-values in parentheses)**

<i>Dependent Variable:</i>	Change in strategic direction	Change in strategic intensity	Change in strategic direction	Change in strategic intensity
<i>Independent Variables – Group</i>				
Density between futures & presents	.520 (2.631)**	-.299 (-1.338)		
<i>Independent Variable – Individual</i>				
Symmetry of communication intensity between group centers			-.374 (-1.806)*	-.168 (-.755)
<i>Control Variables</i>				
Past performance	.172 (.887)	-.082 (-.373)	.301 (1.450)	-.154 (-.695)
Environmental scanning	.214 (1.133)	-.126 (-.591)	.150 (.721)	-.096 (-.430)
Environmental dynamism	-.505 (-2.504)**	-.366 (-1.610)	-.401 (-1.907)*	-.439 (-1.946)**
Adj. R ²	.354	.179	.232	.119
F (4, 16)	3.75**	2.09	2.51	1.67
F Change	6.92**	1.79	3.26*	.57

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

future-oriented groups and present-oriented groups, the greater the change in rated importance of underlying strategic factors. Table 5 reinforces the support for this hypothesis by demonstrating a significant relationship between change in strategic direction and reciprocal communication exchange among the most central future and present managers. Where communication between the groups' centers is increasingly asymmetrical, less change is in evidence.

DISCUSSION OF RESULTS

This study tracked changes in strategic thinking over a two-year period and relates those changes to the future time perspectives of top management team members and communication among temporally defined subgroups of the teams. The difficulties of conducting longitudinal survey research are evident here in the form of the small sample size available ($n = 22$). The small size of top management teams studied adds a note of caution, since the addition of new members to small teams may have a relatively large impact on network dynamics. Though the sample of firms is small, however, the significant results observed here are quite likely very strong in practice for teams this size.

Before discussing the findings and implications of the regression tests, it is worth commenting first on the nature of the time variables that lay the essential foundation for these tests. A key requirement for regression analysis is the use of normally distributed variables, and the assumption that such distributions observed through sampling are representative of their underlying populations. Across the 108 top managers participating in this study, their rated future time orientations were in fact normally distributed. In this study the mean of future time orientation ratings

was then selected as a point from which to dichotomize the total sample into “futures” and “presents.” This mean was selected in part as a matter of convenience, but more substantively in response to the theoretical perspective advanced earlier. That theoretical perspective holds that futures and presents attend to different informational cues and stimuli in their environments, set different goals with different temporal qualities and valences, and then behave in different ways guided by their intentions toward the future. While not advanced as a formal hypothesis here, the results *post hoc* do indicate that futures and presents subgroups differ markedly on communication activity even though they appear to be normally distributed in the population.

The results of the first regression test provide strong support that changes in strategic thinking in young technology-based ventures are associated with higher *average* top management team future time orientation. This relationship was highly significant ($p = .004$). However, at the same time, a higher *percentage* of team members with future orientations is negatively related to this type of strategic change. Together, these results suggest that a balance is needed for strategic change: some futures are necessary, but the presence of too many futures may have adverse effects on change capability. Teams that are composed only of “presents” may not be able to make strategic adjustments because no real opportunities are identified, while teams composed primarily of “futures” may not be able to coalesce on a current strategy or on any new opportunities proposed. This conclusion is supported by Houghton (1993), who finds that a few key individuals brings the cognitive diversity necessary into top management teams and results in the generation of new ideas and perspectives. Some appropriate level of competition of ideas may create an efficient and effective balance wherein new ideas are heard but the useful present practices can anchor the change decision process.

This research also provides strong evidence that particular types of communication patterns within top management are associated with changes in strategic direction. The type of communication significantly associated with strategic change is that which occurs between more future-oriented individuals and more present-oriented individuals. There is a significant and positive relationship between strategic direction change and communication at the group level between futures and presents. Together with the significance of symmetrical communication between the groups' centers, the results in total imply that strategy changes build on flows between these two subgroups of management teams. Transformation through a diffusion-like process thus appears to be at the heart of new strategic initiatives. New ventures that do not support or that dampen this type of process may find it difficult to anticipate demands from the ever-changing competitive environment. While new venture management is particularly attentive to products and foundation strategy, the results here offer evidence of the need for equal attention on the management of the new idea generation process (West & Meyer, 1998).

One might speculate as to why communication intensity within each orientation's subgroups is not related to changes in strategic direction. Within futures groups there is a significantly higher level of communication intensity than there is within presents groups, as well as a significantly higher degree of centralization. Amongst themselves, futures appear to communicate frequently and importantly about a wide range of ideas. One of the interviewed CEOs who scored as a future on the time measurement variable, for example, discussed the need to try to clarify the fuzziness of the future through regular discussions with a subset of his top managers. The clarification of ideas and alternatives among futures perhaps leads to a new alternative or limited set of alternatives proposed to the broader organization. Thus the clarification process among futures would become less important for change than the set of alternatives emerging from the clarification process.

Communication intensity is much lower among presents. Presents are perhaps more concerned with operating smoothly according to existing strategy, relying more on routine and direction (Grant, 1993) than on intense discussion about strategy. The lower level of centralization among presents tends to reflect this. Venture managers who are present-oriented are more transactional than transformational (Kuhnert & Lewis, 1987). Furthermore, the correlations show that

higher density and centralization of a presents group is quite strongly associated with a lower amount of change in strategic intensity. The implication is that if present groups are highly organized around central figures in their communication behavior, due consideration of strategic alternatives may not occur. This may represent a significant and potentially fatal flaw for companies operating in dynamically changing competitive environments, and should be explored further.

There could be agenda effects at work within top management teams, and these effects may both promote and impede entrepreneurial firm behavior. More central individuals in presents groups may interfere with diffusion mechanics promoting change. Because most CEOs in this study were categorized as future-oriented, it suggests that influence to forestall change may therefore be exerted from others within the management team. On the other hand, one quarter of the CEOs fell in the presents subgroups, leaving potential change initiatives to develop in and emanate out of the futures groups to others. Thus there may be some interaction between individual power and communication centralization and density, and such an interaction may promote or inhibit change efforts. Clarifying interactions between power and communication patterns, and better understanding the influences other top managers may have on change in newer ventures, will be an important area for future research.

The communication pattern regression tests emphasize again the importance of time orientations of managers within organizations. Communication dynamics between different time-oriented groups are critically associated with changes in strategy. Without more future-oriented individuals significant ideation may not occur in organizations in the first place, nor would the apparent clarification process occur as futures mull over new ideas, combine them, and refine them. In addition, because even intense levels of communication among presents is not associated with change, little opportunity for change promotion would then be available. In fact, some evidence here suggests that highly organized present groups may inhibit change.

IMPLICATIONS

In sum, the results indicate that managerial future time orientations might have significant influence on the direction and shape of strategic change efforts in young technology-based ventures. But the utility of managerial future time orientation as a research variable goes beyond its simple association with strategic change. It can be used to partition and better dimensionalize other aspects of top management actions and process related to change and innovation. This research evaluated communication processes within teams in part based on temporal partitions. In another study the ability to manage a time-horizon-dimensionalized portfolio of R&D initiatives has been found to be an important dimension of successful strategy in technology-based firms (Judge & Spitzfaden, 1995). Laverty (1993) also makes the suggestion that the ability to make appropriate intertemporal choices is an important dimension of successful strategy, a dimension that appears to be particularly important for growth ventures in rapidly changing technology industries. Thus, future time orientations may be related directly to entrepreneurial firm behavior (Covin & Slevin, 1991) in a variety of important ways.

Together the significant findings relating managerial time orientations to strategic change argue for further investigation of top managers' biases and perceptual filters affecting strategy (Hambrick & Mason, 1984) in new and growth-oriented young ventures. Rather than relying on observable demographic traits (Cooper & Dunkelberg, 1987; Gartner, 1989) as proxies for underlying psychological dimensions, such work may be particularly insightful on group process dynamics within top management teams for these types of firms.

Our findings also have implications for venture managers interested in creating conditions that encourage change in anticipation of emerging opportunities. These implications include a new focus on team composition and a new focus on team process. Regarding team composition, top management positions in growing organizations are often filled by those who have proven ability in similar functional areas. While functional expertise may contribute to successful strategy, what

is overlooked is the new balance of cognitive perspectives achieved with the introduction of another top manager. For founder CEOs who are building their top management teams, and for venture capital firms who fund technology-based ventures, a method to accurately assess the potential cognitive dynamics within teams may be particularly valuable. Validated methods and instruments may not only identify new candidates who could create a better balance within a team related to time orientations, but may also be used to assess time orientation balance within tenured teams. The development of a validated instrument for assessing time dimensions may thus be useful for diagnosing the need for greater futurity within teams (Hamel & Prahalad, 1994), and potentially for assistance in key hiring or promotion decisions (Hurst et al., 1989). Discovering more precisely what is an optimal balance between futures and presents also remains a challenge for future research in new venture management.

What if new venture managers believe that sufficient time orientation variation is not present, or that the exchanges between different time orientation subgroups lack substance? Short of new hires and the acceptance of validated time orientation measurement instruments, are there steps that venture managers may take now? Earlier, we suggested that time orientations of people in organizations is theoretically different from those of people without regard to the organizational context. This implies that the goals, mission, and culture of the organization may interact with a manager's natural time orientation. Thus, one possible way to reorient managers more toward the future might lie in the retooling of the organizational culture. As described at the outset, many technology-based companies in their early years are extremely focused on the science and technology that were their foundation. Top managers in new ventures moving out of this stage of development should seek to infuse their organizations with a new understanding of their mission in the context of changing circumstances.

Both symbolically and practically, a broadening away from a narrow focus may encourage top managers to adopt a broadened view of sources of new opportunity. The practical side may involve greater emphasis on reward systems based on setting and achieving distant goals. This artificial construction of temporal tension (Bird, 1992) may over time cultivate a higher comfort level of time-distant thinking and attention. It may also serve to create more common ground between futures and presents, such that communication and idea sharing become easier. Similarly, rotation of top managers through different positions may also serve to make each more appreciative of different sets of temporal demands and contingencies within the organization, facilitating between-group communication.

The need to manage team communication processes differently and over different time periods is indicated, as well. Here we find that team members who are responsible for important strategic decisions have varying levels of communication interaction among themselves, some that encourage ideation and change and some that do not. It is interesting to see these variations within relatively small groups where we would imagine all members know each other fairly well and see each other regularly. We know from position descriptions gathered in the study that these communication pattern variations have no relationship to formal structure and hierarchy. Therefore, resorting to reengineering organizational structure would probably not work in enhancing communications of the kind that inspire and promote new opportunities (West & Meyer, 1997). Instead, CEOs of technology ventures need to consider new ways of encouraging ongoing exchange between futures and presents over continuous periods and about continuing issues. They should consider ways of promoting such exchanges both formally and informally. The need for such exchanges in all likelihood increases dramatically as organizations develop sophisticated systems and routines that institutionalize selected communication patterns.

One tentative conclusion drawn from these perspectives is that opportunistic strategic change in young ventures may not be facilitated by customary strategic planning efforts. While most new ventures have developed well thought-out business plans, opportunistic change depends on a continual flow of ideas and reciprocal and refining exchanges among managers. The planning process — initiated as a routine process, occurring within a defined period of time, and often directed in

terms of information search — may in fact prevent the flow and exchange from occurring. This emphasizes the need for growing young ventures to develop group communication processes that extend over time and space, and to make these a normal part of organizational life. Examples might include regularly scheduled times to practice creative or lateral thinking (de Bono, 1971) and the use of methods that focus on generating alternatives (Delbecq, Van de Ven, & Gustafson, 1975).

This is essentially an argument that new ventures continue to behave entrepreneurially as they develop over time by routinely seeking out new ideas and opportunities that challenge the *status quo*. West and Meyer (1998) find that enhanced performance is associated with the presence of idea diversity; out of the uncertainty represented by many possibilities, better opportunities are discovered. Not unlike the conditions under which identification of an opportunity initially leads to the founding of a new venture, successful growth of new ventures also relies on the embracing of uncertainty in manageable ways.

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The authors are grateful to two anonymous reviewers for their insightful comments on earlier versions of this paper. An earlier version of this paper was presented at the 1996 Babson College Kauffman Foundation Entrepreneurship Research Conference.