



## **An Examination of the Effects of Organizational Norms, Organizational Structure, and Environmental Uncertainty on Entrepreneurial Strategy**

Robert D. Russell

*The Pennsylvania State University-Harrisburg*

Craig J. Russell

*Louisiana State University*

*Investigators have examined the impact of organizations' structural and environmental characteristics on innovation. We developed a measure of the innovation management process, specifically organizational norms toward innovation, and examined its relationship to innovation (as measured by effective entrepreneurial strategy) in combination with measures of organizational structure and environment. Survey responses from respondents within 77 strategic business units were analyzed. Innovation norms, degree of decentralization in organizational structure, and environmental uncertainty explained significant and meaningful variance in entrepreneurial strategy. Interestingly, correlations between success of entrepreneurial strategy and (a) organizational structure and (b) environmental uncertainty approach zero when innovation-related norms are partialled out. Implications are discussed for the integration of this previously unexamined process variable—innovation norms—to extend theories of innovation and corporate entrepreneurship.*

Burgelman (1984) defined corporate entrepreneurship as "extending the firm's domain of competence and corresponding opportunity set through internally generated new resource combinations" (1984:154). Schumpeter (1934), in his seminal work on entrepreneurship, viewed innovation as the creation of "new combinations of resources" (5). Combining these two perspectives, the practice of corporate entrepreneurship may be seen as the improvement of organizational competencies through innovation.

Van de Ven (1986) argued for a wide-ranging definition of innovation as the "development and implementation" (590) of a variety of new ideas, including

---

The authors would like to thank Jeff Pinto, John Wagner, Brian Uzzi, and Gerald Zaltman for their comments on earlier drafts of this article.

Address all correspondence to Craig J. Russell, Department of Management, College of Business, Louisiana State University, Baton Rouge, LA 70803-6312.

Copyright 1992 by the Southern Management Association 0149-2063/92/\$2.00.

technical, product, process, and administrative innovation. Adding Van de Ven's perspective on innovation to the definition of corporate entrepreneurship further broadens the scope of corporate entrepreneurial activities. Corporate entrepreneurship now includes the initiation and implementation of a wide range of innovation as a means of creating and exploiting opportunities perceived in competitive environments.

Some successful firms formalize this process, persistently gaining a competitive advantage through "new resource combinations" (innovation) as their main strategic thrust (i.e., 3M) or as a major element of a grand strategy (i.e., GE). Such an "entrepreneurial strategy" entails the proactive search for new opportunities as well as the ongoing management of the process of innovation. This approach to entrepreneurial strategy creates a distinction between entrepreneurship as an ongoing process versus one-time only efforts to adopt innovation. Hence, *corporate entrepreneurship* is broadly conceived here to include firms engaging in single, infrequent efforts to gain advantage through innovation and firms engaging in persistent patterns of innovation. In contrast, an *entrepreneurial strategy* involves a persistent, organizationally sanctioned pattern of innovation-related activities and resource allocations that compose one component of the firm's comprehensive corporate strategy. A *successful* entrepreneurial strategy would produce innovations that add value to the firm. Thus, a corporation could be conceived of as pursuing an entrepreneurial venture but not following an entrepreneurial strategy.

Although entrepreneurial strategies are often associated with the persona of the individual entrepreneur, they do not necessarily exist only in the mind of a powerful chief executive. Entrepreneurial strategies may be associated with groups of organizational members who focus their day-to-day efforts on producing a stream of innovations. Organizations such as 3M or Johnson and Johnson are good examples of how entrepreneurial strategies are successfully implemented over the tenures of numerous chief executives (Mitchell, 1989).

Despite a recent surge of interest in entrepreneurship and its sub-topic, corporate entrepreneurship, little progress has been made in developing empirically supported theories. Wortman (1987) reported that most research efforts have concentrated on individual characteristics of entrepreneurs and that "in terms of macro organizational behavior, few studies have been attempted" (1987:266). Wortman's review of the entrepreneurship literature contains no models or theories, concluding that a shift from exploratory to causal research is just starting. He cites a "continuing need to develop a comprehensive theoretical framework of entrepreneurship that includes theoretical variables and the relationships between those variables" (1987:268). This view is echoed by Low and MacMillan (1988) who critiqued existing studies for a lack of conceptual clarity and weak theory development. In light of these critiques, the current study attempts to contribute to the literature in two ways. First, we present a preliminary model of known macro-level antecedents to corporate entrepreneurship that also contains a possible micro-level "process variable" explanation for the generation of within-firm innovation-supporting behaviors. With one notable exception, this model is a simple summary of previously established relationships in the literature. Second, we re-

port the results of an initial empirical test of relationships hypothesized by the model.

## Model Development

### *Entrepreneurial Strategy*

As defined above, entrepreneurial strategy is conceived of as a component of corporate strategy promoting the persistent search for competitive advantages through innovation. These efforts may compose a firm's main strategic thrust or may be a minor element of a broader grand strategy.

Successful entrepreneurial strategies require the effective management of innovation processes. Zaltman, Duncan, and Holbek (1973) described innovation processes as being highly uncertain; innovators are unable to predict final outcomes and are unable to define the appropriate means of achieving any desired innovation prior to engaging in the process. Due to these uncertainties, entrepreneurial strategies cannot be formulated and controlled in the rational, deliberate fashion described in many strategy textbooks. Mintzberg (1983) describes innovation-based strategies as emerging from an often chaotic process of trial and error. Specific strategies coalesce around promising innovations only at the end of the development process. Because of this difficulty in planning and controlling innovation, entrepreneurial strategies appear to be "process" oriented: that is, they seem to focus on the management of the context within which innovation occurs in order to create innovation-conducive structures and to stimulate innovation-producing behaviors (Mintzberg, 1983).

Burgelman (1986) points out a similar role for strategy in entrepreneurial firms. Corporate entrepreneurship occurs because of the "autonomous strategic behavior" of operational level participants (i.e., through the innovative behavior of organizational members). The primary role of strategic decision-makers according to Burgelman is "to select appropriate entrepreneurial initiatives, and to give them meaning in an enlarged concept of strategy of the firm" (1986:5).

The purpose of the model described herein is to capture some of the external and internal characteristics that prior research indicates are likely influences on entrepreneurial strategy. In Mintzberg's (1983) terms, the model addresses which contextual factors must be managed to stimulate effective innovation. In Burgelman's (1986) terms, the model addresses which factors prior research indicates are likely to be associated with motivating "autonomous strategic behavior." The external and internal influences hypothesized to impact entrepreneurial strategy are described below, followed by presentation of an integrated model.

### *Environmental Uncertainty*

Both the entrepreneurship and the innovation literatures were surveyed for guidance in developing a model of corporate entrepreneurship. One of the few sets of consistent findings in the innovation literature is that organizational innovation is positively correlated with environmental uncertainty (conceptualized in terms of complexity and dynamism, cf. McGinnis & Ackelsberg, 1983; Tornatzky, Eveland, Boylan, Hetzner, Johnson, Roitman, & Schneider, 1983). There are at least two possible explanations for this finding: high levels of uncertainty

generate more innovation through opportunity-seeking and adaptation to change (Baldrige & Burnham, 1975; Miller & Friesen, 1984; Utterback, 1971) or increased levels of innovation create the perception of increased uncertainty among managers (Starbuck, 1976).

Both dynamics are likely at work. For the entrepreneurial firm, however, uncertain environments are likely to provide a richer source of innovation opportunity than relatively certain ones (Utterback, 1971). Changes in customer demand, industry-related technology or strategic relationships between competitors offer corporate entrepreneurs an increased range and frequency of potential innovation. Thus, entrepreneurial organizations residing in relatively uncertain environments may be expected to adopt a greater number of innovations than those in relatively certain environments. Moreover, this is likely to be true of both entrepreneurial and conservative firms residing in uncertain environments (Miller & Friesen, 1982, 1984). Suggesting a reciprocal relationship, Miller and Friesen (1984) submit that entrepreneurial firms will naturally tend to seek out and exploit the richer innovative opportunities of dynamic environments. More conservative firms are likely to be forced into innovation in rapidly changing environments as a form of strategic adaptation (March & Simon, 1958; Miller & Friesen, 1982, 1984).

### *Organizational Structure*

Regardless of how external uncertainties affect the level of innovation, organizations must be capable of managing an inherently uncertain and ambiguous process to be successful at implementing an innovation-based strategy (Van de Ven, 1986; Zaltman et al., 1973). Zaltman et al. (1973) described the innovation process as being highly ambiguous in terms of the ability of innovators to predict the final outcome of the process *and* the ability to define appropriate means of achieving the desired innovation.

Van de Ven (1986) described innovation as a complex, ambiguous process that requires the management of an extensive network of personal and group interactions as a new idea moves from conception to implementation. The corporate entrepreneurship and the innovation literatures indicate that one method of managing the uncertainties of innovation is through organizational structure (Burgelman, 1983, 1984; Nielsen, Peters, & Hisrich, 1985; Tornatzky et al., 1983). Results generally indicate a link between higher levels of innovation and more organic structures characterized by decentralization, lack of formalization, and high levels of complexity (Burns & Stalker, 1961; Pierce & Delbecq, 1973; Tornatzky et al., 1983).

*Decentralization.* Given the uncertainties in creating successful innovation, firms following an entrepreneurial strategy cannot afford to rely on only a few innovation projects. They must generate and develop a large number of new ideas to realize even a few successful innovations. A relatively decentralized structure is likely to provide a context in which more new ideas are generated than a centralized one (Burns & Stalker, 1961; Thompson, V., 1961). Specifically, with a decentralized structure, managers have more autonomy and more control over resources, enabling them to initiate and test a greater number of creative new ideas that eventually result in a larger number of innovations (Kanter, 1983). Cohn

(1981), Hage and Aiken (1970), and Kim (1980) have operationalized decentralization in terms of the degree of participation in decision-making. These studies indicate a positive relationship between innovation and degree of participation. The authors conjecture that increased participation in innovation decisions increases participants' commitment to the new idea, making implementation more effective.

In the centralized organization, new ideas must travel an extended chain of command before receiving approval and/or resource support. Centralized organizations increase the likelihood that promising new ideas will be screened out or that resources will be denied, reducing the number of innovations successfully adopted (Pierce & Delbecq, 1977).

*Formalization.* Kanter (1983) and Van de Ven (1986) argued that the uncertain problems characterizing innovation are best solved through mutual adjustment and informal information exchange. The intense exchange of information between innovation participants is likely to be facilitated by informal structures that permit innovation team members ready access to needed information or skills (Zaltman et. al, 1973). Moreover, no formal procedure or set of rules can guide organizational members in solving the ambiguities of innovation because, *by definition*, innovation represents a new activity where rules and procedures have not been devised.

*Complexity.* Van de Ven (1986) noted that innovation is a collective activity requiring a set of diverse skills that are more likely to be found in a complex organization. Complexity is likely to be associated with increased innovation, creating an increased pool of diverse ideas generated by specialized personnel. These ideas become sources of potential innovation (Hage & Aiken, 1970; Wilson, 1966).

Although an organic structure (decentralized, informal, complex) is likely to facilitate the process of innovation, it does not explain how the entrepreneurial process is motivated and guided. Structural forms alone cannot solve the ambiguous and unpredictable problems generated by the process of innovation. For example, no rule or procedure exists defining the "right" way to be creative. Further, experience does not necessarily provide managers with guidelines for effective innovation that can be passed on to others. Organic structures can only contribute an internal context that permits the social interaction and information exchange necessary for innovation to occur without constraints.

### *Innovation Norms*

Kimberly (1981) noted that effective innovation requires not only external stimulants but also internal receptivity to change. He observed that many attempts to innovate fail because of internal resistance to change. The innovation is simply perceived by organizational participants as incompatible with "existing configurations of interests and resources" (Kimberly, 1981:84). In order to overcome innate resistance to change, entrepreneurial strategies require a context in which participants value innovation and believe that it is an accepted and expected response to environmental challenges. Specifically, organizational members involved in entrepreneurial ventures must value and practice the behaviors that

compose the complex social process that produces innovation. A complete model of corporate entrepreneurship must provide a means of explaining how such beliefs and behaviors become valued and integrated into the ongoing routine of entrepreneurial organizations.

Ouchi (1980) and Wilkins and Ouchi (1983) described a system of organizational direction and control that might provide such an explanation. They viewed "clan" or cultural control as a way of managing interpersonal transactions in uncertain situations where formal organizational or market controls are absent. Clan control operates through value and belief systems that are imparted to organizational members through various socialization processes. Reinforcing these systems are implicit rules of behavior (norms) that define appropriate and inappropriate actions. In uncertain contexts such as innovation, norms and shared beliefs become the primary source of guidance because formal organizational procedures become ineffective.

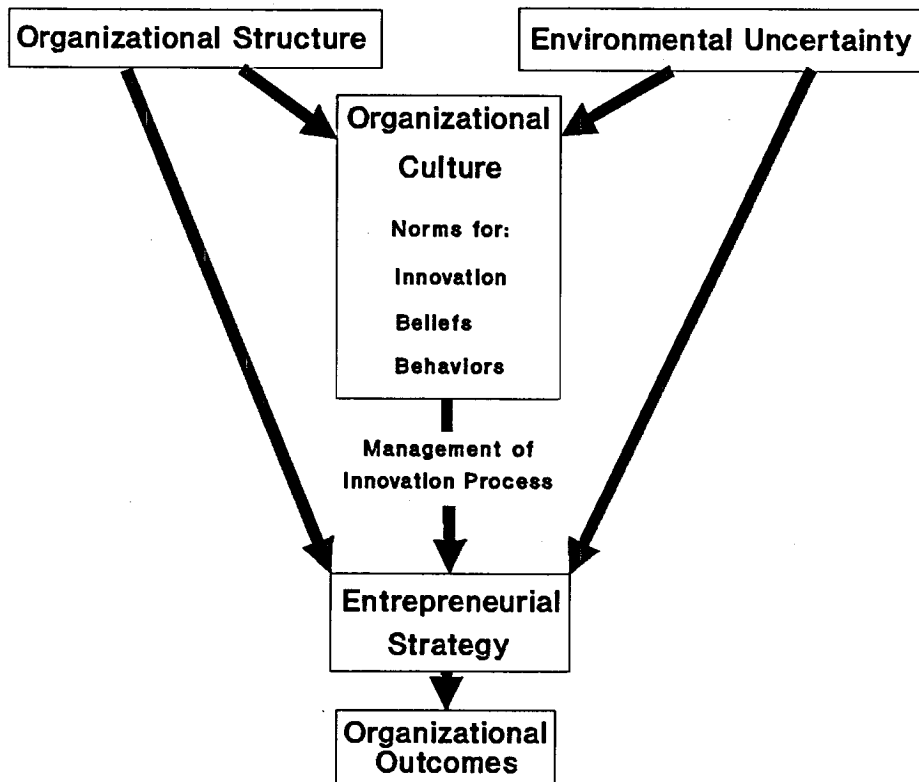
The relevance of such an implicit control system to an entrepreneurial strategy was illustrated by Weick (1987), who viewed strategy as analogous to a map. Strategies, like maps, are effective when they generate purposeful actions in unknown environments. According to Weick, these actions serve to create meaning and impose order on ambiguous circumstances by generating outcomes that are rationalized post hoc by organizational participants. In this sense, strategies create self-fulfilling prophecies that define order through organizationally sanctioned action rather than actions being defined a priori through a pre-existing sense of order. This perspective is especially useful when applied to entrepreneurial strategies that are inherently uncertain because of the nature of innovation. Organizational culture is influential in this situation because it can create an expectation of appropriate order that sanctions entrepreneurial activities. In turn, the entrepreneurial actions of organizational participants create the innovations that are turned into the sources of competitive advantage for the firm.

In the entrepreneurial organization, culturally-derived norms and beliefs are likely to establish a setting where innovation is an accepted and appropriate response to organizational problems. Innovation-supporting behaviors are encouraged through norms, whereas innovation-resisting behaviors are discouraged. Current models of corporate entrepreneurship contain no variables that measure this influence.

### *Model Statement*

Figure 1 provides a partial summary of the relationships discussed above. Organizational structure and environmental uncertainty variables have a history of demonstrated relationships with innovation as described above. The purpose of the current study is to evaluate the relative contribution of a process variable, innovation-related norms, to the explanation and prediction of entrepreneurial strategies and their organizational outcomes. Hence, entrepreneurial strategy is seen as a direct function of organizational structure, environmental uncertainty, and innovation-related norms. Organizational structure and environmental uncertainty are also hypothesized to have an indirect effect on entrepreneurial strategy through their impact on innovation norms. However, the innovation process itself

Figure 1.  
An Initial Model of Corporate Entrepreneurial Strategy



is motivated and directed primarily by the values, beliefs and norms of the organization's culture. This initial model views entrepreneurial strategies as process-oriented rather than content-oriented (cf. Mintzberg, 1983). The content of entrepreneurial strategies emerges as a sequence of innovation attempts resulting from a culturally-directed process driven by innovation-supporting norms. Culture affects innovation by (a) motivating organizational members to pursue innovation as an ongoing practice and (b) defining expected, appropriate innovation-related behaviors.

This initial model of corporate entrepreneurship considers formal structural context as a constraint or aid in the innovation process. Organic structures (decentralized, informal and complex) facilitate innovation by allowing participants access to power, resources, and information needed to initiate and develop new ideas. The external environment provides ideas and opportunities to organizational innovators and is the final judge as to whether an innovation succeeds or fails.

Finally, we must describe this model as a partial summary of relationships suggested in the literature for at least two reasons. First, many relationships among these constructs have been demonstrated in the literature but do not have a hy-

pothesized relationship with entrepreneurial strategy or innovation (e.g., the impact of organizational environment on organizational structure). Although important to a broader understanding of organizations, relationships not directly or indirectly tied to innovation and entrepreneurial strategy have been excluded from the model. Second, any comprehensive model of innovation through entrepreneurial strategy must incorporate notions of reciprocal influence and/or feedback loops over time. The current study is cross-sectional: hence, issues of reciprocal causation over time cannot be examined. We develop a measure of innovation-related norms and evaluate its relationship to entrepreneurial strategy in the limited context of two demonstrated antecedents, organizational structure and environmental uncertainty.

The relationships expressed in this preliminary model will be tested using the following hypotheses:

H1: There will be a positive association between effective entrepreneurial strategies and the existence of a set of organizational norms that support innovation.

H2: There will be a positive association between effective entrepreneurial strategies and the existence of organic organizational structures (measured in terms of decentralization, complexity and informality).

H3: There will be a positive association between effective entrepreneurial strategies and environmental uncertainty.

Note that each of these hypotheses employs effective entrepreneurial strategy as the dependent variable. Due to real limitations in our access to subjects, independent measures of entrepreneurial strategy and organizational outcomes were not feasible. Hence, we chose a dependent measure that subsumes both the entrepreneurial strategy and organizational outcome constructs in the model, tapping the effectiveness of just those organizational outcomes (innovations) that can be traced to an entrepreneurial strategy.

Finally, innovation norms, structural variables, and environmental uncertainty are hypothesized to have an indirect effect on entrepreneurial strategy (via their influence on innovation-related norms). This leads to a fourth hypothesis:

H4: Innovation-related norms will have a mediating effect on the relationship of organizational structure and environmental uncertainty to the effectiveness of entrepreneurial strategies.

## Method

### *Sample*

Two hundred and sixty-seven firms were randomly selected from four industrial directories containing firms in Western Pennsylvania and the Delaware Valley region of New Jersey and Pennsylvania. Questionnaires were sent to the chief executive officers of each firm. The CEOs were invited to complete a questionnaire and were given extra copies to distribute to SBU managers who had recent experience with the initiation or adoption of any of the following types of innovation: (a) new products or services, (b) new processes, (c) new organizational systems, (d) new market applications of existing products or services, and, (e) new



organizational structures. Each firm selected for the sample competed within a distinct industry.

Forty-two respondents were necessary to achieve a statistical power of .90 and a Type I error probability of .05 in the detection of a small effect size (i.e., .5 standard deviations from the population mean; Kirk, 1982). In light of response rates reported by Heberlein and Baumgartner (1978), 267 firms were chosen to ensure that at least 42 firms responded. Usable responses were received from 77 organizations. Multiple responses were received from 36 of the 77 firms. These were averaged in order to obtain an overall organizational profile.<sup>1</sup>

Subjects' descriptions of their job responsibilities indicated that most were managers actually involved in recent innovative ventures. However, it was impossible to determine every respondent's role in the organization because providing information about job content was optional for purposes of confidentiality. The average number of employees per respondent firm was 1755, and the median annual sales were \$46 million.

### *Measures*

*Independent variables.* The questionnaire contained instruments measuring the following hypothesized antecedents to successful entrepreneurial strategy: (a) innovation-related norms, (b) organizational structure (centralization, formalization, and complexity), and, (c) environmental uncertainty. Respondents were instructed to answer each question using their current SBU as a reference. Organizational structure and environmental uncertainty were measured using existing scales that were slightly modified to fit the domain of the research design. The origin of these scales is as follows:

1. centralization (Aiken & Hage, 1970)
2. formalization and complexity (Van de Ven & Ferry, 1980)
3. environmental uncertainty (Miller & Friesen, 1983)

The Aiken and Hage (1970) centralization instrument was modified to contain only items dealing with the frequency and importance of participation in innovation-related decisions. Items related to participation in promotion and selection decisions were deleted because they did not affect the domain of innovation decisions with which this study is concerned. The resultant item pool asked for three responses: (a) the degree of autonomy in innovation-related decisions, (b) the frequency of participation in innovation-related decisions, and, (c) the amount of influence in innovation-related decisions. The Van de Ven and Ferry instrument measuring formalization and complexity were not modified in the current study.

Duncan (1972), Thompson, J. (1967), and Utterback (1971) conceptualized environmental uncertainty as the degree of complexity in external relations and the rate of change among important elements of the external environment. Miller and Friesen (1983) operationalized uncertainty using 10 items to capture these two di-

<sup>1</sup>It is impossible to know for certain whether the additional 36 responses came from distinct SBU's or from a single SBU. Hence, a conservative estimate of relationships that reflect hypotheses 1-4 is obtained when multiple responses from a single firm are averaged. Two responses from managers in truly different SBU's should be viewed as independent observations. The average of the two responses should simply increase random error in the measures.

mensions. Two items concerning the predictability of raw material supplies and financial capital were added. Raw materials and capital are important inputs for most firms and any unpredictability in their supply is likely to increase a firm's perception of uncertainty. Moreover, the process of acquiring financial capital and raw materials is part of a firm's value chain (cf. Porter, 1985) and, therefore, offers the opportunity for creation of innovative practices that may become sources of competitive advantage.

No measures of organizational norms regarding innovation could be found in the literature. To develop a norm measure, we used the Zaltman et al. (1973) model of innovation processes as a framework to survey the literature for examples of behavior related to the innovation process. We identified eight dimensions of innovation-related behaviors and cognitions around which organizational norms might be likely to exist (see Table 1). A number of specific norm statements were generated referring to each dimension of innovation-related behavior. Items drawn from these eight dimensions may embody a nondeficient sample of a uni-dimensional construct domain (i.e., a global innovation-related norm construct) or may reflect eight distinct innovation-related norm constructs. Because no previous attempts to operationalize innovation-related norms could be located, no a priori expectations concerning the nature of this construct domain can be drawn.

The content validity and reliability of the norm statements were examined using a retranslation exercise (cf. Smith & Kendall, 1963). A panel of faculty and doctoral students at a large northeastern university was asked to sort each of the norm statements into the appropriate stage of the Zaltman et al. process model. Thirty-four items met the 60% agreement criteria commonly used in retranslation procedures for instrument development. (cf. Smith & Kendall, 1963). The 34 items were then placed in a Likert-type format where respondents indicated the degree of approval or disapproval for each item in their organization.

*Dependent variable.* Effectiveness of entrepreneurial strategy was measured using a scale developed by Miller and Friesen (1982). It measures the perceived importance and relative frequency of successful product innovation within a busi-

Table 1  
Dimensions of Innovation-Related Behaviors and Cognitions\*

I. Knowledge-Awareness of Potential Innovations	
1.	Recognition of the creative activities of individual organizational members.
2.	Search for innovative ideas outside of the organization that may be applied inside the organization to gain competitive advantage.
II. Attitude-Formation Toward the Innovation	
3.	Free and open exchange of information within the organization.
4.	Recognition of innovation as an important organizational activity.
5.	Open-minded consideration of new ideas regardless of their source.
III. The Innovation Decision Process	
6.	Support for moderate risk-taking in new ventures.
7.	Stimulation of commitment for promising new ideas by providing emotional and resource support to idea champions.
IV. Implementation	
8.	Support for initial and sustained implementation of innovations.

\*Based on the stages of the innovation process as defined in the Zaltman, Duncan and Holbeck (1973) model.

ness unit. For the purposes of this research, the Miller and Friesen scale was expanded to include measures of the frequency and importance of innovations in organizational processes, systems, structures, and market applications. (All scales are available from the authors upon request.)

### *Analyses*

Confirmatory factor analyses were performed to examine the underlying structure of the 34 innovation norm items that survived the retranslation procedure. Eight dimensions of innovation-related behavior had been derived from the innovation literature and subsequently used to generate the items in the innovation norm instrument. Factor analysis was used to test for the presence of these eight dimensions. Because there is some disagreement in the literature regarding the appropriate factor model to use in evaluating construct validity issues (Ford, MacCallum, & Tait, 1986), both common factor analysis and principal components analysis were performed.

Simple correlations were derived to examine the relationship of the innovation norm scale and the other independent variables to entrepreneurial strategy (Hypotheses 1-3). Multiple regression analyses were conducted to examine the relationship of the five independent variables—innovation norms, organizational structure (centralization, formalization, and complexity) and environmental uncertainty—to the entrepreneurial strategy measure (also addressing Hypotheses 1-3). Partial correlations were derived between the dependent measure and measures of organizational structure and environmental uncertainty, thus controlling for the effects of the innovation-related norms scale (Hypothesis 4).

### **Results**

Both principal components analysis and common factor analysis of the innovation norm statements indicated the presence of eight factors with eigenvalues greater than one. Both solutions indicated that three of the items had extremely low communalities with any of the factors. These items were dropped from further analyses. The presence of eight factors with eigenvalues greater than one might tend to lend support to the validity of the innovation norm instrument. However, a scree test (Cattell, 1966) performed on the rotated common factor analysis loadings and principal factor analysis loadings clearly indicates the dominance of one factor over the others. In both solutions all items load highest on this factor: hence, the innovation norms scale appears to represent a single generalized dimension of shared innovation-related beliefs and behaviors (coefficient  $\alpha = .91$  for the remaining 31 items). Rotated factor loadings for the norm items and the eigenvalue for the one-factor principal components solution are reported in Table 2.

One concern in performing common or principal components factor analyses is the ratio of sample size to number of items. The lower this ratio the more likely it is that resulting item loadings will vary across different samples derived from the same population. Hence, an item loading dominantly with 10 other items on factor 2 in one small sample might load dominantly with 15 *different* items on factor 3 in a second small sample. Although no one has empirically determined

Table 2  
Principal Components Analysis Matrix for Items of the Innovation-related Norm Scale

Response set: 7 = strongly approved to 1 = strongly disapproved	
Item	Factor Loading
14. Attempt to discover original ways of improving organizational products and processes	.883
3. Believe that change is a necessary response to dynamic business environment	.840
7. Be creative in finding improved ways of carrying out organizational processes	.823
11. Conscientiously carry out change so that a new idea may be given a fair chance	.813
10. Evaluate new ideas in terms of how they might be advantageous to your organization	.807
12. Do not willingly assume new tasks even if implementation might benefit the organization (reversed)	.802
1. Provide time and resources to group members searching for original ways of improving organizational performance	.794
25. Do not show enthusiasm for new ideas even if they may help improve organizational performance	.792
29. Reward organizational members who find creative ways of improving organizational performance	.777
24. Accept a moderate amount of risk in the decision to adopt a new idea if it may benefit the organization in the long run	.775
26. Provide material support for the development of new ideas that are compatible with organizational goals	.765
32. Provide time and resources to organizational members who wish to develop potentially promising new ideas	.753
30. Explore all sources of information that may provide an innovative solution to a complex organizational problem	.746
19. Do not look beyond your own group for new ways of solving organizational problems (reversed)	.733
27. Evaluate new ideas on the basis of how they might benefit the whole organization, not on the basis of how they might affect you or your work group	.731
4. Do not volunteer to assist in the implementation of new ideas if the idea did not originate in your work group	.726
6. Do not actively seek out innovations that may help to improve performance discrepancies in making decisions	.716
2. Look for new, never-been-tried products and processes that may give your organization an advantage over your competitors	.705
23. Seek information about successful new ideas from members of other organizations that are not in direct competition with your organization	.677
18. When evaluating possible innovations consider their long-term benefits as more important than short-term risks	.667
31. Determine the worth of a possible innovation in terms of how it affects you rather than how well it fulfills organizational needs	.664
20. Think of innovation as an appropriate way of solving organizational problems	.651
17. Do not criticize new ideas until they have been thoroughly analyzed in terms of how well they meet organizational needs	.644
13. Show tolerance during the development of new ideas that may have the potential of increasing work unit performance	.623
15. Do not express skepticism about new ideas until you have thoroughly assessed them in terms of their possible contribution to organizational performance	.620
16. Suggest improvements during the trial of new ideas if your experience suggests a better way to implement the idea	.597
22. Do not consider new kinds of products or processes as effective ways of gaining a competitive advantage for your organization (reversed)	.595
5. Collaborate with your contemporaries in making decisions about new ways of doing things	.588
28. Keep information about new ideas to yourself rather than sharing it with other organizational members (reversed)	.563
9. Request information from members of professional associations about promising new ideas that may improve your organization's performance	.542
33. Make decisions about possible innovations only after evaluating all of the information relating to them	.373
34. Suggest complex new solutions for difficult organizational problems	.154*
21. Decide to adopt new ideas only on the basis of their relative costs and benefits to the organization	-.142*
8. Do not believe that innovation is an effective means of improving organizational performance	.255*

Eigenvalue = 15.765 (next highest eigenvalue was 1.930)

\*eliminated from further analysis

the relationship between sample size and instability of item loadings, Nunnally (1978) recommended a ratio of 3 to 1 as a minimal rule of thumb to avoid spurious interpretations of item loadings. The current sample to item ratio is 2.3 to 1: hence we had some initial concern about stability of item loadings and the appropriateness of any subsequent interpretation.

Fortunately, Humphreys and Montanelli (1975) and Bobko and Schemmer (1984) presented proofs demonstrating that the *number of factors* and their *eigenvalues* are stable across a wide range of sample sizes. Indeed, Bobko and Schemmer (1984) found that sample to item ratios of less than 1 would yield consistent estimates of eigenvalues. In the current analysis we can be confident that a factor solution yielding *one dominant factor* is likely to be found in any future analyses conducted on samples derived from the same population. Item loadings on this single factor may vary across items within factor over different samples. However, the special case where one factor dominates precludes variability in item loadings across factors because there is only one factor to begin with.<sup>2</sup> Because the current results yield one dominant factor, a scale score derived from a unit-weighted combination of item responses is likely to be stable across other samples drawn from the same population. We used the current factor analysis results to derive an innovation norms scale score from a unit weighted combination of the 31 innovation norm items.

Means, standard deviations, standardized coefficient alphas, simple correlations among all variables, and select partial correlations are presented in Table 3. Degree of decentralization, environmental uncertainty, and innovation norms are significantly related to effective entrepreneurial strategy. Thus, hypothesis 1 is answered in the affirmative: a significant positive relationship exists between innovation-related norms and effective entrepreneurial strategy ( $r = .73, p < .001$ ). The significant positive correlations between decentralization and effective entrepreneurial strategy ( $r = .57, p < .001$ ) partially confirms hypothesis 2 (formalization and complexity are not significantly related to effective entrepreneurial strategy). The significant correlation between environmental uncertainty and effective entrepreneurial strategy ( $r = .31, p < .01$ ) supports prior findings; the lack of significant correlations between effective entrepreneurial strategy and (a) formalization or (b) complexity are inconsistent with prior research. Further, it should be noted that decentralization and innovation norms are highly correlated ( $r = .61, p < .001$ ).

When the effectiveness of entrepreneurial strategy was regressed onto all independent variables, the multiple  $R$  increased by .03 over the simple  $r$  obtained between innovation-related norms and effectiveness of entrepreneurial strategy (adj.  $R = .76, F = 16.905, p < .001$ ). Degree of decentralization and innovation norms were the only independent variables with regression coefficients significantly different from zero.

Partial correlations, controlling for the effect of innovation-related norms, be-

<sup>2</sup>We would like to thank Dr. Philip Bobko of Rutgers University for his comments on stability of items loadings in the current factor analysis. Note that if more than one interpretable factor had resulted from the analysis, instability of loadings across factors would have prevented interpretation and derivation of an innovation norms scale score.

Table 3  
Descriptive Statistics and Simple Correlations

Variables	<i>M</i>	<i>SD</i>	<i>Alpha</i> <sup>a</sup>	1	2	3	4	5	6: Partial <i>r</i> <sup>b</sup>
1. Innovation Norms	5.463	.913	.91	-					-
2. Decentralization	3.883	.821	.92	.61**	-				.23
3. Complexity	62.460	100.509	n/a	.13	.23	-			.02
4. Formalization	2.800	.858	.90	-.11	-.15	.06	-		-.01
5. Env. Uncertainty	3.519	.803	.82	.24*	.15	.08	-.14	-	.14
6. Entrpl. Strategy	2.335	.527	.88	.73**	.57**	.11	-.09	.31**	-

<sup>a</sup>"Alpha" is standardized coefficient alpha. <sup>b</sup>correlations between variables 2 - 5 and variable 6 after the effects of variable 1 have been partialled out.

*N*=77

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

tween effectiveness of entrepreneurial strategy and measures of organizational structure and environmental uncertainty are reported in the last column of Table 3. None are significantly different from zero, suggesting that the main effects of decentralization and environmental uncertainty on entrepreneurial strategy operate through informal, innovation-related norms and have no independent main effects.

### Discussion

The current findings indicate that a previously unexamined characteristic of the informal organization, innovation-related norms, is strongly related to a successful entrepreneurial strategy. Further, multiple regression results indicate that innovation-related norms and decentralization are significant independent correlates of effective entrepreneurial strategy, though decentralization contributes very little above and beyond the variance explained by innovation-related norms. The current results also replicate previous findings relating decentralization and environmental uncertainty to innovation (cf. Burns & Stalker, 1961; Daft & Becker, 1978; Hage & Aiken, 1970; Tornatzky et al., 1983). The results fail to replicate prior findings relating formal and complex structures to entrepreneurial strategy.

It is interesting to note that the simple correlation between successful entrepreneurial strategy and innovation-related norms was .73. When all other independent variables are examined in a multiple regression analysis, multiple *R* increases by only .03 (the addition of 2-way interaction terms did not contribute meaningfully to *R*<sup>2</sup> either). Further, partial correlations indicate that innovation-related norms have a mediating effect on the influence of decentralization and environmental uncertainty on effective entrepreneurial strategy. It would appear that, in the current sample, innovation-related norms provide both a necessary and sufficient explanation of successful innovation strategies.

These results hold interesting implications for the process underlying the relationship between organizational structure and entrepreneurial strategy. Pierce and Delbecq (1977) argued that increased rates of innovation are associated with decentralized structures because managers have more autonomy to initiate and test new ideas. Hage and Aiken (1970) and others have argued that increased participation in innovation decisions in decentralized structures leads to increased commitment to the innovation, thereby permitting more effective implementation.

These explanations have intuitive appeal. However, just because individuals are free to be entrepreneurial does not mean they will spontaneously burst forth with new ideas and agendas. Similarly, although participation may increase commitment to innovation, what generates innovative ideas in the first place? A decentralized structure may facilitate successful entrepreneurial strategy. However, the current results suggest innovation norms contribute the vast majority of variance in explaining successful entrepreneurial strategy.

Specifically, a set of innovation-related norms, as an expression of organizational values and beliefs regarding innovation, may play a gate-keeping role, providing motivation and direction to pursue entrepreneurial strategy. It also should be noted that the high positive correlation between innovation-related norms and decentralization indicates that, at least in this research sample, organizations characterized by entrepreneurial norms also tend to have decentralized structures.

As noted earlier, innovation is an unstructured process. Individuals may have difficulty evaluating their innovation-related activity in terms of its effect on desired short-term outcomes or by its conformity with established procedures. However, individuals can evaluate their activities in terms of consistency with organizational norms and values. Although norms may not solve any specific, technical problem associated with an innovation, they may guide organizational members into appropriate organizationally-sanctioned behaviors that are believed to be effective means of carrying-out an entrepreneurial strategy.

Although the correlation between environmental uncertainty and successful entrepreneurial strategy is consistent with prior research, it cannot be determined from the simple correlation whether the association is due to (a) increased innovation as a result of richer opportunities in dynamic, complex environments *or* (b) increased rates of innovation, causing perceptions of greater uncertainty among respondents. Interestingly, when innovation norms are partialled out, there is no significant relationship between environmental uncertainty and entrepreneurial strategy. This finding suggests that the association between uncertainty and increased innovation in entrepreneurial firms exists only when innovation-supporting norms are present. Once again, an entrepreneurial culture, acting through innovation-related norms, may be serving a gatekeeping role. Less entrepreneurial firms may tend to screen out or fail to perceive potential innovation opportunities presented by changing, complex environments, thereby perceiving those environments as relatively certain. In contrast, entrepreneurial firms are characterized by norms and values that support risk-taking and the external search for new opportunities. Hence, respondents in entrepreneurial firms may perceive their environments as richer sources for innovation and more uncertain than their counterparts in less entrepreneurial firms.

The apparent role of innovation-related norms and entrepreneurial culture as a gatekeeper or prime motivator for the innovation process and innovative ideas may have important implications for research on archetypes of innovative firms (Miles & Snow, 1978; Miller & Friesen, 1984). Much of this research has emphasized the role of environmental and formal structural decision-making variables in defining a prototypical entrepreneurial firm. The current findings suggest that

more attention needs to be focused on informal influences that shape and direct entrepreneurial behavior in organizations.

Future research needs to examine the generalizability of the current findings and examine the process by which innovation norms develop. The response rate in the current effort is just large enough to insure internal validity, but too small for strong inferences of external validity: hence, it is premature to draw implications for practice. However, the results do provide initial support for one explanation of successful entrepreneurial strategy—innovation-related norms. This leads to a host of interesting research questions. Specifically, how do efforts at instilling innovation-related norms at top levels of the organization affect line managers and professionals who are expected to act more entrepreneurial? Do managers at different levels or in different units of the organization have different perspectives of what is appropriate innovative behavior? Perception and receptivity to innovation-related norms may vary depending on organizational level and innovation-related norm. What are the mechanisms through which innovation-supporting norms and beliefs are generated? How are the entrepreneurial activities of diverse individuals and groups integrated? What processes not included in the scope of this study serve to co-ordinate entrepreneurial activities? For example, do some managerial styles or leadership practices enhance or inhibit entrepreneurial behaviors (Bass, 1985)? How do superior-subordinate interactions, peer interactions and group processes relate to innovation norm sets? Longitudinal studies of the process of norm evolution are needed to determine the interaction effects between structure, leadership style, and the norm set through time.

Obviously, measures of innovation-related norms need to be taken from multiple respondents at multiple levels of the organization. Further, studies need to examine how innovation-related norm sets evolve over product life cycles. Models of organizational innovation and entrepreneurship demonstrating relationships between decentralization, environmental uncertainty, and innovation offer little to the entrepreneurial manager until such questions are answered.

### References

- Aiken, M., & Hage, J. 1971. The organic organization and innovation. *Sociology*, 5: 63-82.
- Arnold, H., & Evans, M. 1979. Testing multiplicative models does not require ratio scales. *Organizational Behavior and Human Performance*, 24: 41-59.
- Baldrige, J., & Burnham, R. 1975. Organizational innovation: Individual, organizational, and environmental impacts. *Administrative Science Quarterly*, 20: 165-176.
- Bass, B. 1985. *Leadership and performance beyond expectations*. New York: Free Press.
- Birley, S. 1985. The role of networks in the entrepreneurial process. *Journal of Business Venturing*, 1: 107-117.
- Bobko, P., & Schemmer, F. M. 1984. Eigenvalue shrinkage in principal components based factor analysis. *Applied Psychological Measurement*, 8: 439-451.
- Burgelman, R. 1983. A process model of internal corporate venturing in the diversified major firm. *Administrative Science Quarterly*, 28: 223-244.
- Burgelman, R. 1984. Designs for corporate entrepreneurship in established firms. *California Management Review*, 26: 154-166.
- Burgelman, R. 1986. Managing corporate entrepreneurship: New structures for implementing technological innovation. In M. Horwitch (Ed.), *Technology and the modern corporation*: 112-153. New York: Pergamon Press.
- Burns, T., & Stalker, M. 1961. *The management of innovation*. London: Tavistock.
- Cattell, R. 1966. *Handbook of multivariate experimental psychology*. Chicago, Ill.: Rand-McNally.



- Cohn, S. 1981. Adopting innovations in a technology push industry. *Research Management*, 24(5): 26-31.
- Daft, R., & Becker, S. 1978. *The innovative organization*. New York: Elsevier.
- Duncan, R. 1972. Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly*, 17: 313-327.
- Ford, J., MacCallum, R., & Tait, M. 1986. The application of exploratory factor analysis in applied psychology. *Personnel Psychology*, 39: 291-314.
- Hage, J., & Aiken, M. 1970. *Social change in complex organizations*. New York: Random House.
- Hage, J., & Dewar, R. 1973. Elite values versus organizational structure in predicting innovation. *Administrative Science Quarterly*, 18: 279-290.
- Heberlein, T., & Baumgartner, R. 1978. Factors affecting response rates to mailed questionnaires. *American Sociological Review*, 43: 66-71.
- Hoffman, L., & Maier, N. 1961. Quality and acceptance of problem solutions by members of homogeneous and heterogeneous groups. *Journal of Abnormal and Social Psychology*, 62: 401-407.
- Humphreys, L.G., & Montanelli, R.G., Jr. 1975. An investigation of the parallel analysis criterion for determining the number of common factors. *Multivariate Behavioral Research*, 10: 193-204.
- Kanter, R. 1983. *The changemasters*. New York: Simon and Schuster.
- Kim, L. 1980. Organizational innovation and structure. *Journal of Business Research*, 8(2): 225-246.
- Kimberly, J. 1981. Managerial innovation. In P. Nystrom & W. Starbuck (Eds.), *Handbook of organizational design*: 1: 53-97. Oxford: Oxford University Press.
- Kirk, R. 1982. *Experimental design*. Belmont, Ca.: Brooks and Cole.
- Low, M., & MacMillan, I. 1988. Entrepreneurship: Past research and future challenges. *Journal of Management*, 14: 139-161.
- March, J., & Simon, H. 1958. *Organizations*. New York: John Wiley.
- Martin, M. 1984. *Managing technological innovation and entrepreneurship*. Reston, VA: Reston Publishing.
- McGinnis, M., & Ackelsberg, M. 1983. Effective innovation management: Missing link in strategic planning. *Journal of Business Strategy*, 4: 59-66.
- Miles, R., & Snow, C. 1978. *Organizational strategy, structure, and process*. New York: McGraw-Hill.
- Miller, D., & Friesen, P. 1982. Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal*, 3: 1-25.
- Miller, D., & Friesen, P. 1983. Strategy making and environment: The third link. *Strategic Management Journal*, 4: 221-236.
- Miller, D., & Friesen, P. 1984. *Organizations: A quantum view*. Englewood Cliffs, NJ: Prentice-Hall.
- Mintzberg, H. 1983. *Structure in fives: Designing effective organizations*. Englewood Cliffs, NJ: Prentice-Hall.
- Mitchell, R. 1989. Masters of innovation: How 3M keeps its new products coming. *Business Week*, April 10, 58-63.
- Nielsen, R., Peters, M., & Hisrich, R. 1985. Intrapreneurship strategy for internal markets - corporate, non-profit and government institution cases. *Strategic Management Journal*, 6: 181-189.
- Nunnally, J. 1978. *Psychometric theory*. New York: McGraw Hill.
- Ouchi, W. 1980. Markets, bureaucracies and clans. *Administrative Science Quarterly*, 25: 129-142.
- Pierce, J., & Delbecq, A. 1977. Organization structure, individual attitudes and innovation. *Academy of Management Review*, 2: 27-37.
- Porter, M. 1985. *Competitive advantage*. New York: The Free Press.
- Schumpeter, J. 1934. *The theory of economic development*. Cambridge, MA: Harvard.
- Sexton, D., & Bowman, N. 1985. The entrepreneur: A capable executive and more. *Journal of Business Venturing*, 1: 129-140.
- Smith, P., & Kendall, L. 1963. Retranslation of expectations: An approach to the construction of unambiguous anchors for rating scales. *Journal of Applied Psychology*, 47: 149-155.
- Starbuck, W. 1976. Organizations and their environments. In M.D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*: 1069-1123. Chicago: Rand-McNally.

- Tornatzky, L., Eveland, J., Boylan, M., Hetzner, M., Johnson, E., Roitman, D., & Schneider, J. 1983. *The processes of innovation: Analyzing the literature*. Washington, DC: National Science Foundation.
- Thompson, J. 1967. *Organizations in action*. New York: McGraw-Hill.
- Thompson, V. 1961. *Modern organizations*. New York: Knopf.
- Utterback, J. 1971. The process of technological innovation within the firm. *Academy of Management Journal*, 12: 75-88.
- Van de Ven, A. 1986. Central problems in the management of innovation. *Management Science*, 32: 590-607.
- Van de Ven, A., & Ferry, D. 1980. *Measuring and assessing organizations*. New York: John Wiley and Sons.
- Weick, K. 1987. Substitutes for strategy. In D. Teece (ed.) *The competitive challenge*: 25-62. Cambridge, MA: Ballinger.
- Wilkins, A., & Ouchi, W. 1983. Efficient cultures: Exploring the relationship between culture and organizational performance. *Administrative Science Quarterly*, 28: 468-481.
- Wilson J. 1966. Innovation in organizations: Notes toward a theory. In J. Thompson (Ed.), *Approaches to organizational design*: 320-345. Pittsburgh, PA: University of Pittsburgh Press.
- Wortman, M. 1987. Entrepreneurship: An integrating typology and evaluation of the empirical research in the field. *Journal of Management*, 13: 259-279.
- Zaltman, J., Duncan, R., & Holbeck, J. 1973. *Innovations and organizations*. New York: John Wiley and Sons.