

UNDERSTANDING THE RELATIONSHIP BETWEEN ENTREPRENEURIAL ORIENTATION AND STRATEGIC LEARNING CAPABILITY: AN EMPIRICAL INVESTIGATION

BRIAN S. ANDERSON,^{1*} JEFFREY G. COVIN,¹ and DENNIS P. SLEVIN²

¹Kelley School of Business, Indiana University, Bloomington, Indiana, U.S.A.

²Katz Graduate School of Business, University of Pittsburgh, Pittsburgh, Pennsylvania, U.S.A.

This research explores the relationship between strategic learning capability—a firm's proficiency at generating, and then acting on, strategic knowledge—and entrepreneurial orientation (EO). While theory posits the inevitability of building strategic learning capability from behaving entrepreneurially, there is little empirical research to validate this proposition and even less understanding of how and why EO contributes to strategic learning capability. Empirical results from 110 manufacturing firms confirm the direct effect of EO on strategic learning capability, and support is found for three constructs—structural organicity, market responsiveness, and strategy formation mode—that fully mediate the EO-strategic learning capability relationship. Copyright © 2009 Strategic Management Society.

INTRODUCTION

Strategic learning capability can be defined as a firm's proficiency at deriving knowledge from past strategic actions and subsequently leveraging that knowledge to adjust firm strategy (Pietersen, 2002; Thomas, Sussman, and Henderson, 2001). Broadly speaking, strategic learning capability falls under the rubric of organizational learning, defined by Levitt and March (1988) as the acquisition of knowledge that precedes changes to key elements of an organizational system. The concept of strategic learning capability has garnered increased attention in the strategic management literature (e.g., Kuwada, 1998; Voronov and Yorks, 2005), in part due to its

centrality to the question of how firms develop and adapt strategically over time. While the broader concept of strategic learning has been recognized in the scholarly literature for several decades (e.g., Mintzberg and Waters, 1985), researchers only recently have begun in-depth investigation of the contributors to, and the contexts that enhance, strategic learning capability (e.g., Barr, 1998; Thomas *et al.*, 2001).

More developed in the literature is the concept of entrepreneurial orientation (EO) (e.g., Covin and Slevin, 1991; Lee, Lee, and Pennings, 2001; Lumpkin and Dess, 1996). As originally conceived by Miller (1983), EO is a strategic construct that reflects the extent to which firms are innovative, proactive, and risk taking in their behavior and management philosophies; or stated more concisely, are entrepreneurial in their strategic posture (Covin and Slevin, 1989). The rapid development of the EO literature reflects its centrality to both the strategic management and entrepreneurship fields. Specifically, there exists ample anecdotal and empirical evidence of a

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*Correspondence to: Brian S. Anderson, Kelley School of Business, Indiana University, 1309 East Tenth Street, Bloomington, IN 47405, U.S.A. E-mail: ba7@indiana.edu

positive relationship between EO and firm performance—firms that exhibit entrepreneurial behavior generally outperform firms that are more conservative. A recent meta-analysis of 53 samples from 51 published studies bears out the positive correlation between the most common measures of EO and various firm performance metrics (average $r = 0.24$) (Rauch *et al.*, 2004).

As the EO literature has evolved, scholars have begun to explore the relationship between EO and other organizational phenomenon, including learning. Liu, Luo, and Shi (2002), for example, suggested that an entrepreneurial orientation and a learning orientation are theoretically congruent. Wiklund and Shepherd (2003) provided empirical evidence that EO enhances the relationship between knowledge-based resources and the exploitation of entrepreneurial opportunities. Zahra, Nielsen, and Bogner (1999b) postulated that corporate entrepreneurship (CE) behaviors—fostered by the presence of an entrepreneurial orientation—generate knowledge through both internal (technologies, processes, and tasks) and external (market knowledge) means. Dess *et al.* (2003) expanded on the Zahra *et al.* (1999b) model and argued that organizational learning mediates the relationship between CE behaviors and knowledge.

While prior research has suggested a conceptual and empirical linkage between EO and various manifestations of learning (e.g., Wang, 2008), what is underexplored is whether behaving entrepreneurially actually improves a firm's *capability* to learn. The knowledge gap is not so much whether a firm learns from entrepreneurial actions; rather the critical question is whether being entrepreneurial will make the firm a *better* learner. In recognition of the paucity of knowledge pertaining to this matter, the current study addresses a research question at the intersection of strategic management and entrepreneurship: does a firm's proclivity to behave entrepreneurially enhance its strategic learning capability? More specifically, are firms that are more entrepreneurial in nature better at: (1) generating knowledge from strategic successes and failures stemming from entrepreneurial behaviors; and (2) making subsequent adjustments to strategy based on this newly acquired knowledge? Furthermore, assuming EO does enhance strategic learning capability, what intervening mechanisms facilitate this relationship? In other words, how and why does behaving entrepreneurially make the firm a better strategic learner?

The purpose of this study is to answer the questions posited above and, in the process, make a threefold contribution to the literature. First, this study tests the assumption that strategic learning capability is built through behaving entrepreneurially—a notion often posited in theory (e.g., Slater and Narver, 1995), but lacking in empirical validation. Second, it explores the causal adjacency of EO and strategic learning capability, providing clarification on whether it is EO *per se* that increases strategic learning capability, or if other organizational phenomena are necessary facilitators of the relationship. Lastly, and building on the previous point, this study identifies and tests three theoretically meaningful mediators that illuminate the proverbial black box between behaving entrepreneurially and being a proficient strategic learner.

The following sections present the theoretical basis for the EO-strategic learning capability relationship, followed by hypotheses for the proposed research model. A discussion of the research methodology and the empirical results follow. The article concludes with a discussion of the research findings and their implications.

THEORETICAL DEVELOPMENT AND HYPOTHESES

The entrepreneurial orientation and strategic learning capability relationship

This study defines strategic learning capability as a firm's proficiency at deriving knowledge from past strategic actions and subsequently leveraging that knowledge to adjust firm strategy. As such, the focus of this research is neither the quantity of strategic knowledge accumulated (i.e., an increase or decrease in knowledge stock) nor the type of knowledge acquired (e.g., tacit versus explicit knowledge).¹ Rather, this study explores how *good* the firm is at generating strategic knowledge and how *good* the firm is at using that knowledge to improve its competitive position. As such, for a firm to excel in strategic learning capability it must be proficient at generating strategic knowledge *and* it must *act* on that knowledge through strategic changes aimed

¹ In this context, strategic knowledge is defined as knowledge that relates to the firm's overall competitive position, that is, the knowledge derived from the decisions, actions, processes, and outcomes that relate to firm strategy (Zack, 2002).

ostensibly at improving the firm's competitive position.

From a theoretical perspective, the generation of strategic knowledge does not *per se* have to lead to strategic change. Indeed, strategic knowledge may be equally likely to result in strategic persistence. Nonetheless, the most common conceptualizations of strategic learning capability stress the strategic change component of the construct. For example, Voronov and Yorks (2005: 14) state that strategic learning involves 'a process of continuously crafting and *reformulating* [italics added] strategies.' Likewise, Ambrosini and Bowman (2005: 493) note that strategic learning 'relates directly to the key management question of how organizations *change* [italics added] their strategy to develop and maintain their competitive advantage.' Additionally, within the strategic learning literature, the exhibition of strategic change is commonly interpreted as evidence that strategic learning has occurred (e.g., Pietersen, 2002; Thomas *et al.*, 2001). Thus, what distinguishes strategic learning capability from other manifestations of learning (or of learning capability) is the dual *knowledge* and *change* components of the construct.

Given the preceding observations, when considering antecedents to strategic learning capability, we must identify strategic-level constructs that are likely to have both: (1) the creation of new, strategically relevant knowledge; and (2) the likely enactment of strategic change as their consequences. One such construct that fulfills these requirements is a firm's entrepreneurial orientation, or the firm's proclivity to exhibit entrepreneurial versus conservative strategic behaviors.

While scholars have posited a variety of definitions of EO, generally speaking, entrepreneurial orientation can be characterized as a strategic construct that captures a firm's strategy-making practices, management philosophies, and firm-level behaviors that are entrepreneurial in nature (e.g., Covin, Green, and Slevin, 2006; Dess and Lumpkin, 2005; Lumpkin and Dess, 1996). Consistent with Miller (1983), a high-EO firm is expected to exhibit certain strategic behaviors including taking risks, being proactive in entering new market arenas, and focusing heavily on product and process innovation. The three dimensions of EO—risk taking, proactiveness, and innovativeness—are herein argued to collectively contribute to strategic learning capability. As discussed below, strategic knowledge is generated through the experimental and exploratory actions

that are inherent to entrepreneurial behavior, and strategic change is prompted in cases where those entrepreneurial experiments falter.

Lumpkin and Dess (1996) argued that experimentation is inherent in the innovativeness dimension of EO—a characterization also supported by Miller (1983) and Covin and Slevin (1989). Innovativeness, as Lumpkin and Dess (1996: 142) define the term, '... reflects a firm's tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, or technological processes.' Likewise, exploratory action is implicit to the proactiveness dimension of EO (Covin and Slevin, 1991). According to Miller (1983), proactiveness relates to the competitive nature of the firm, or more specifically, to the proclivity of the firm to preempt its competitors by introducing new products, entering new markets, or aggressively changing competitive tactics. Notably, experimentation and exploration are associated with the generation of information that is new to the firm (i.e., new knowledge) and with the realization of organizational learning (e.g., March, 1991; Slater and Narver, 1995; Wang, 2008). Given that innovativeness and proactiveness, as dimensions of EO, involve strategic-level experimentation and exploration, it is logically consistent that the type of new knowledge generated by EO would be strategic in nature. Importantly, the argument that knowledge generation is a consequence of EO is consistent with the common observation in the entrepreneurship literature that entrepreneurship facilitates learning through the processes of experimentation and exploration (e.g., Atuahene-Gima and Ko, 2001; Dickson, 1992; Zahra *et al.*, 1999b).

Yet with all forms of experimentation—strategic or otherwise—there is the possibility of failure; that is, the entrepreneurial action may not yield the intended result. Indeed, a cultural proclivity to—and perhaps acceptance of—failure is inherent to EO generally, and to the risk-taking dimension of EO specifically. Research has suggested that firms high in EO may be more likely to experience venture failure (Lumpkin and Dess, 1996; McGrath, 1999). Dess, Lumpkin, and Covin (1997) further identified a negative relationship between failure avoidance and entrepreneurial strategy making, suggesting that high-EO firms are more accepting of the implicit likelihood that their entrepreneurial initiatives will fail. However, strategic failures may not have entirely negative consequences. As Slater and Narver (1995) note, entrepreneurial firms tend to subject the

failures of their entrepreneurial initiatives to intensive analysis for the purpose of gleaning information and insight on the causes of those failures. Moreover, entrepreneurial failure tends to be a much stronger impetus for learning than does entrepreneurial success (Maidique and Zirger, 1985). Thus, while particular entrepreneurial initiatives may fail, such failures are often the basis from which valuable strategic knowledge is generated.

Importantly, EO not only promotes the knowledge generation component of strategic learning capability, it also promotes the strategic change component. The possibility that EO drives strategic change is suggested by at least two arguments. First, the introduction of product-market innovations, as would be characteristic of high-EO firms, is a recognized catalyst for competitive interactions (e.g., Schumpeter, 1934; Schnaars, 1994). More specifically, as the high-EO firm innovates and proactively enters new markets, the reaction of customers and of competitive rivals to such behaviors typically prompts strategic adjustments by the firm as information is gathered on the effectiveness and appropriate positioning of their entrepreneurial initiatives (Schindehutte, Morris, and Kocak, 2008). Second, EO by nature results in a firm's entry into novel business arenas where the rules of engagement and bases for competitive excellence will not always be well understood. When such is the case, it is likely that some entrepreneurial initiatives will miss their intended mark and either fail or need to be strategically repositioned. In either case, strategic adjustments on the firm's part will be necessary to correct for poor performance. Consistent with the arguments that EO may link to strategic learning via the latter construct's strategic change component, in their study of 233 firms operating in a wide range of industries, Dean and Thibodeaux (1994) reported a strong, positive correlation ($r = 0.50$) between their measures of EO and strategic adaptation.

To summarize, strategic learning capability has two critical elements—the generation of strategic knowledge and the exhibition of strategic change based on that newly acquired knowledge. Thus, when considering the antecedents to strategic learning capability, it is necessary to identify strategic-level constructs with: (1) the generation of strategic knowledge; and (2) the likely exhibition of strategic change as their consequences. EO is a plausible generator of strategic knowledge because of the strong association between the exhibition of experimental and exploratory behavior. Furthermore, EO is a

plausible generator of strategic change because the entrepreneurial initiatives spawned by high-EO firms often induce competitive interactions during the course of which strategic adjustments are made by the initiating (i.e., high-EO) firms. Moreover, entrepreneurial initiatives are risky by definition and, as such, they cannot all be expected to succeed. When some of these initiatives inevitably fail, adjustments to strategy may be called for. Given this conceptual relationship between EO and strategic learning capability, it is hypothesized that:

Hypothesis 1: There is a positive relationship between entrepreneurial orientation and strategic learning capability.

Mediators of the EO—strategic learning capability relationship

Broadly speaking, the organizational learning capability literature provides a number of frameworks that posit various contributors to improving general learning capability. For example, Jerez-Gómez, Céspedes-Lorante, and Valle-Cabrera (2005) suggest four dimensions of organizational learning capability: (1) managerial commitment, or promoting a culture of learning; (2) a systems perspective, or a shared vision and clear strategic intent; (3) openness and experimentation, or a willingness to try new things and to respond to changes in the market; and (4) knowledge transfer and integration, or the ability to disseminate knowledge easily and rapidly across the organization. Similarly, in their seminal work on market orientation and organizational learning, Slater and Narver (1995) argue for five contributors to learning—entrepreneurial behavior, a market orientation, an organic structure, decentralized strategic planning, and facilitative leadership.

In looking for commonalities between the models listed above and others in the relevant literature (i.e., DiBella, Nevis, and Gould, 1996; Yeung *et al.*, 1999), arguably there are at least four broad organizational phenomena that may contribute to building strategic learning capability: (1) an organizational structure that encourages the free flow of information across geographic and firm boundaries (e.g., DiBella *et al.*, 1996; Yeung *et al.*, 1999); (2) responsiveness to changes in the market—being close to customers, suppliers, and partners and responding quickly to the ebbs and flows of market exchanges (e.g., Jerez-Gómez *et al.*, 2005; Slater and Narver, 1995); (3) a decentralized and flexible planning

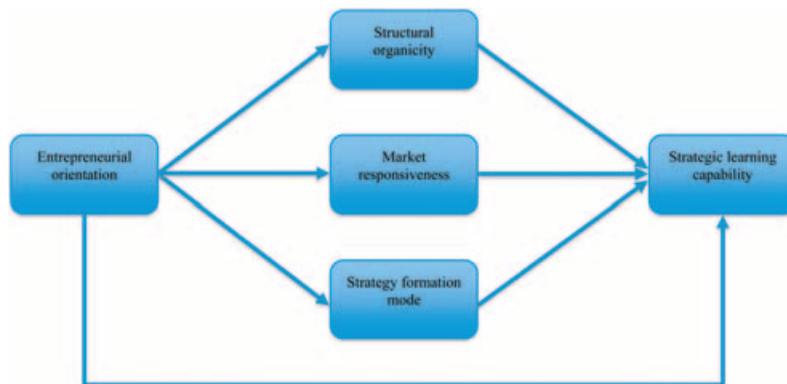


Figure 1. Research model

process (e.g., Slater and Narver, 1995; Yeung *et al.*, 1999); and (4) an environment/culture that encourages risk taking and learning from past successes and failures (e.g., Jerez-Gómez *et al.*, 2005; Slater and Narver, 1995).

Using these organizational phenomena as a guide, the three constructs of structure, responsiveness, and strategy formation were examined in this study as possible means through which EO translates into greater strategic learning capability. Specifically, the structure construct—termed structural organicity—was defined as the extent to which a firm’s organizational structure is organic or mechanistic in nature (Burns and Stalker, 1961). The responsiveness construct—termed market responsiveness—was defined as the extent to which a firm reacts quickly to changing market conditions (Day, 1994; Kohli and Jaworski, 1990). Finally, the strategy formation construct—termed strategy formation mode—was defined as the degree to which firm strategies emerge over time or are formulated in advance (Mintzberg and Waters, 1985). Regarding the possibility that strategic learning capability is influenced by organizational culture, past research has often suggested a cultural dimension to EO (e.g., Kaya and Syrek, 2005; Lee *et al.*, 2001). For example, Dess and Lumpkin (2005: 147) referred to EO as ‘... a frame of mind and a perspective about entrepreneurship that are reflected in a firm’s ongoing processes and corporate culture.’ In another instance, Sapienza, DeClerq, and Sandberg (2005: 444) posited that ‘entrepreneurial orientation represents the rules and norms by which a firm makes decisions, its *organizing principles*.’ Thus, the EO construct itself likely accounts for, at least in part, the cultural antecedent to strategic learning capability in the current study.

The resulting research model, diagrammed in Figure 1, shows strategic learning capability as the criterion variable, EO as the predictor variable, and structural organicity, market responsiveness, and strategy formation mode as potential mediators of the direct effect relationship.²

Structural Organicity. Drawing from the work of Burns and Stalker (1961), a mechanistic structure can be characterized by, among other criteria: (1) extensive vertical communication and limited horizontal communication within the organizational hierarchy; (2) greater importance placed on line authority than on individual experience and capability; (3) adherence to formal job descriptions; and (4) formalized operational processes. By contrast, an organic structure is typified by: (1) open lines of communication vertically and horizontally across the organizational hierarchy; (2) greater importance placed on experience and broad-based knowledge; (3) loose, informal job descriptions; and (4) a focus

²Importantly, the three proposed mediators of the EO-strategic learning capability relationship—structural organicity, market responsiveness, and strategy formation mode—have been shown variously as antecedents, correlates, and outcomes of entrepreneurship (e.g., Lumpkin and Dess, 1996; March, 1991; Slater and Narver, 1995). However, as Zahra, Jennings, and Kuratko (1999a: 53) note, ‘... because [prior] studies have not examined the lag effect that might exist between antecedent variables and entrepreneurship, and between entrepreneurship and outcomes (e.g., performance), the causal sequence among these variables is unclear.’ The debate over the causal sequence of the antecedents and consequences of EO, while important to the field, is beyond the scope of this article. However, given the causal ambiguity in the current literature, it is not inconsistent with previous research to characterize the mediators of interest in the current research as potential consequences of EO behavior if logical arguments are offered in support of this position.

on broad organizational outcomes as opposed to specific, regimented tasks.

Research has demonstrated a positive, significant correlation between structural organicity and an entrepreneurial orientation (e.g., Barrett and Weinstein, 1998; Lumpkin and Dess, 1996). Covin and Slevin (1989) suggested that small firms operating in hostile environments are more likely to adopt both an entrepreneurial posture and an organic structure to improve performance. The association of EO and structural organicity is also supported by Khandwalla (1976: 426), who noted that ‘wherever there is a strong [entrepreneurial] orientation, there ought to be an organic orientation.’ Indeed, Miller (1983) and Covin and Slevin (1991) have suggested that the dimensions of EO and an organic structure may, in fact, be reciprocally related. However, as Chandler (1962) observed, organizational structure may likely be more reflective—as opposed to formative—of top management’s strategy-making philosophy. Therefore, the managers of high-EO firms might be more likely to form organic structures as the organizational consequences of engaging in risk taking, proactive, and innovative behaviors. The previous statement implies a structure-follows-strategy approach and is consistent with structural organicity as a consequence of EO in the current research model.

As Burns and Stalker (1961) also note in their seminal work on organizational structure, a differentiating characteristic of an organic structure is the rapid diffusion of information both vertically and horizontally in the firm. This rapidity of information sharing is a critical element in building a broader learning capability (e.g., DiBella *et al.*, 1996; Yeung *et al.*, 1999), as Slater and Narver (1995: 69) observed, ‘The necessity of effective information sharing in the learning organization demands that systematic or structural constraints on information flows be disbanded (Woodman, Sawyer, and Griffin, 1993).’ From a strategic perspective, an organizational structure is expected to contribute to greater strategic learning capability for two key reasons. First, as Yeung *et al.* (1999) note, an organic structure facilitates multiple paths of knowledge flow to senior managers. In this way, senior managers are able to tap diverse sources of strategic knowledge, thereby increasing the quantity of strategy knowledge available. Second, structural organicity has been linked to greater strategic adaptation, that is, firms with more organic structures tend to exhibit greater strategic flexibility and higher levels of

strategic change (Fredrickson, 1986; Jennings and Seaman, 2006). Collectively, the preceding arguments suggest that structural organicity taps both antecedents to strategic learning capability—the generation of strategic knowledge and the exhibition of strategic change.

In summary, structural organicity may be a consequence of EO as the organizational vehicle chosen by senior managers through which EO behaviors manifest in the organization. Structural organicity, in turn, may be an antecedent to strategic learning capability by increasing the quantity of strategic knowledge and by encouraging greater levels of strategic change. It follows then that:

Hypothesis 2: Structural organicity mediates the relationship between EO and strategic learning capability.

Market responsiveness. Entrepreneurial firms are often attracted to the opportunities inherent to uncertain, ambiguous, and changing business domains (Miller and Shamsie, 1996). Nonetheless, the exhibition of entrepreneurial actions is frequently the basis on which competitive and product-market uncertainties are resolved inasmuch as entrepreneurial initiatives prompt competitive and market reactions that have information value to the entrepreneurial firm. With this new information, entrepreneurial firms are able to adjust their strategies in response to the newly understood realities of their market contexts. Consistent with this point, Grinstein (2008) argues that high-EO firms are able to recognize and accurately interpret market signals—abilities that facilitate firm responsiveness to market opportunities. Likewise, decades of empirical research on the relationship between EO and marketing orientation has confirmed that market responsiveness is a quality commonly associated with entrepreneurial firms (see, for example, Atuahene-Gima and Ko, 2001; Miles and Arnold, 1991; Morris and Paul, 1987; Zahra, 2008).

Being responsive to market opportunities necessitates the active and aggressive collection of strategically relevant information from the firm’s external environment (Kohli and Jaworski, 1990; Day, 1994). The gathering of strategic information enriches the firm’s knowledge base, enhances knowledge diversity, and forces the firm to continuously evaluate the efficacy of prior strategic knowledge (Slater and Narver, 1995). These points suggest that market responsiveness affects the two components of strategic learning capability—strategic knowledge

generation and strategic change. Specifically, market responsiveness encourages the acquisition of strategic knowledge that informs senior managers of the efficacy of their firms' strategies (Sinkula, 1994). Moreover, market responsiveness encourages strategic adaptation to evolving and potentially clarifying environmental exigencies (Grewal and Tansuhaj, 2001).

To summarize the causal sequencing, high-EO firms are likely to exhibit greater levels of market responsiveness as a consequence of the insights gleaned, changes provoked, and opportunities uncovered through their entrepreneurial actions. Market responsiveness, in turn, encourages both the acquisition of strategic knowledge and rapid adjustments to firm strategy, which contribute to improved strategic learning capability. Therefore, it follows that:

Hypothesis 3: Market responsiveness mediates the relationship between EO and strategic learning capability.

Strategy formation mode. Proactiveness, innovativeness, and risk taking—the dimensions of EO behavior—are theoretically congruent with an exploration *modus operandi*—one favoring experimentation, flexibility, and discovery (Covin and Slevin, 1991; Miller, 1983; Miller and Friesen, 1982; Schumpeter, 1939). Importantly, exploring new markets and experimenting with new product offerings, strategies, and processes necessitate a measure of flexibility in the strategy formation process (Bhide, 1994; Covin *et al.*, 2006). Indeed, as Mintzberg (1990) noted, when the future is unpredictable, as in most environments favoring an entrepreneurial orientation, the value of planned strategies diminishes because of the potential for flawed assumptions and incomplete or inaccurate data. Such flexibility in strategy formation processes is reflective of emergent strategies—characterized by Mintzberg and Waters (1985) as strategies that evolve over time—as opposed to formulated or premeditated strategies.

Significantly, the accumulation of strategic knowledge and the exhibition of strategic change—the dimensions of strategic learning capability—are more likely to be a consequence of an emergent, rather than a planned, strategy formation mode. The enactment of emergent strategies suggests that managers are making their firm's strategic decisions as they become aware of and comfortable with the advisability of particular strategic choices. In other words, the firms' strategies form as the strategists acquire strategic knowledge that suggests which

courses of action are most appropriate. More importantly, as strategies unfold in an emergent fashion, managers' attentiveness to their firms' actions and the consequences of those actions will provide the fodder for building strategic learning capability. This is not to suggest that firms with planned strategies will not generate strategic knowledge, too, as their strategies are being implemented. However, with emergent strategies the opportunities to accumulate strategic knowledge may be more sustained and continuously apparent (versus sporadic or episodic as a function of the planning and/or control cycles), with ongoing strategic awareness being exhibited as a catalyst for learning.

Regarding the likely relationship between strategy formation mode and strategic change, planned strategies commit firms to particular courses of action. A bias often exists in favor of adhering to planned strategies given that their existence suggests a prior determination was made that those plans represent desirable courses of action (Hambrick, Geletkanycz, and Fredrickson, 1993). Moreover, to deviate from the plan—that is, to exhibit strategic change within the context of a planned strategy—is often interpreted as a strategic failure (Mintzberg, 1990). By contrast, no such constraints or stigma are associated with changing course as emergent strategies unfold. Emergent strategies operate without expectations pertaining to what course of strategic action the firm should be following. As such, emergent strategies may be particularly conducive to the exhibition of strategic change.

In summary, a high-EO firm will likely favor emergent strategy as the strategy formation mode most consistent with experimentation and exploration. Relative to planned strategies, emergent strategies may both generate higher quantities of strategic knowledge and be more conducive to strategic change—factors which contribute to greater strategic learning capability. It follows then:

Hypothesis 4: An emergent strategy formation mode mediates the relationship between EO and strategic learning capability.

METHODS

Sample and data collection

The Southwestern Pennsylvania Industrial Resource Center—a regional economic development organization—cooperated with and provided partial support

for the data collected for this research. A total of 418 firms in the organization's tristate area (Pennsylvania, Ohio, and West Virginia) were selected for this study using the criteria that they be nondiversified business units (as classified by the sponsoring organization and verified by the respondents), manufacturing based, and have 50 or more employees. Nondiversified businesses were chosen because multi-industry firms might exhibit different levels of both strategic learning capability and entrepreneurial orientation across business units, thereby creating interpretational difficulties. The selection of manufacturing firms over multiple industry segments effectively provided a control for macroindustry effects. Finally, (small) size related biases on the research variables were avoided by selecting firms with 50 or more employees.

Consistent with the procedure followed by Greer and Ireland (1992), two questionnaires were sent (along with self-addressed, stamped, return envelopes) to the senior-most executive in each of the 418 firms selected for the study. The senior-most executive (e.g., President/CEO in the case of an independent firm; Division President/General Manager in the case of a subsidiary), considered the primary respondent, was asked to complete one questionnaire personally and select another senior executive to serve as a secondary respondent. The secondary respondent was chosen by the primary respondent based on the former's overall understanding of the business and involvement in the firm's strategic processes. Data from the secondary respondents were used solely for measure corroboration purposes. Firms that did not respond to the initial request for data were contacted a second time via telephone one month after the initial contact.

Two approaches were used to test for systematic differences between data provided by the primary and secondary respondents. First, a multivariate Hotelling's T^2 test was conducted comparing the values of the primary and secondary respondents on the variables of interest in this study, the results of which revealed no statistically significant difference between the two groups ($T^2 = 2.90$, $p > 0.10$). Thus, there is no discernable measurement bias attributable to the particular respondent within the firm. Second, a MANOVA test revealed that between-firm differences on the research variables are significantly greater than the within-firm differences ($T^2 = 184.35$, $p < 0.001$). This finding suggests that systematic firm-level differences are adequately captured by the variable measures, and that primary and

secondary respondents within firms perceive their firm's attributes at a level of similarity that would not likely be predicted by chance alone. Collectively, these tests suggest that the use of primary respondent data accurately reflects the firm's situation.

Usable responses were received from 170 respondents (115 primary, 55 secondary) representing 115 total firms for a response rate of 27.5 percent (115 out of 418). The current study focuses on 110 of the 115 firms—five firms were omitted because of missing response data on the study variables (including control variables) or the firm's size had dropped below the pre-established cutoff of 50 or more employees. The 110 firms in the final sample represent 77 different four-digit SIC codes, with no more than six firms representing any one four-digit code. Seventy-two firms in the sample are privately held, 38 are publicly traded, 47 are divisions (nondiversified business units) of larger firms, and 63 are independently owned. Firms within the sample reported mean sales of \$122.08 million (s.d. = \$420.26 million), an average age of 47.7 years (s.d. = 30.5), and a mean size of 743 employees (s.d. = 2,375).

T-test comparisons of the average size (measured in terms of both number of employees and annual sales revenue) and age of the responding firms with these same data for the nonresponding firms (when available through secondary sources, e.g., Ward's Business Directory of U.S. Private and Public Companies) revealed no statistically significant differences ($p > 0.10$) between these two subgroups. Thus, the sample appears to be representative of the population from which it was drawn based on these fundamental organizational attributes. Similarly, *t*-test comparisons of the early respondents (those firms that returned the questionnaire before being contacted a second time) and late respondents (those firms that returned the questionnaire only after being asked a second time) revealed no statistically significant differences ($p > 0.10$) in terms of number of employees, annual sales revenue, firm age, or any of the variables of interest.

Measures

This study uses 11 total variables, focusing on five theoretical constructs. Table 1 provides the summary statistics (means, standard deviations, and Cronbach alpha coefficients where appropriate) and the correlation matrix. As indicated, the alpha coefficients for all multi-item scales exceed the 0.70 levels as recommended by Nunnally and Bernstein (1994). The

Table 1. Summary statistics and correlation matrix^a

Variable	Mean	s.d.	α	1	2	3	4	5	6	7	8	9	10
1. Strategic learning capability	4.70	0.93	0.83										
2. Entrepreneurial orientation	4.01	1.09	0.84	0.18†									
3. Structural organicity	4.98	1.26	0.88	0.26**	0.24*								
4. Market responsiveness	4.92	1.33	0.88	0.27**	0.18†	0.16							
5. Strategy formation mode	4.07	1.31	0.89	0.28**	0.41***	-0.05	0.12						
6. Environmental dynamism	3.79	1.21	0.73	-0.09	0.23*	0.01	0.06	0.10					
7. Firm age (years)	47.70	30.50	n.a.	-0.12	-0.03	0.00	0.05	0.17†	-0.12				
8. Firm size (employees)	743.00	2375.00	n.a.	-0.04	0.13	-0.05	0.09	0.17†	-0.01†	0.24			
9. Public/private	1.35	0.48	n.a.	-0.01	0.12	-0.14	0.00	0.26**	-0.02	0.07	0.30***		
10. Division/independent	1.57	0.50	n.a.	0.03	-0.15	-0.00	0.04	-0.40***	0.07	-0.07	-0.22*	-0.65***	
11. Industry tech. sophistication	0.30	0.46	n.a.	0.05	0.18†	0.08	0.05	0.12	0.09	0.00	0.20*	0.11	-0.12

N = 110.

^aNon logged-transformed firm age and firm size reported.

†p < 0.10.

*p < 0.05.

**p < 0.01.

***p < 0.001.

Table 2. Principal component analysis results^a

	EO	SFM	SLC	ORG	MR
MR1	0.060	0.063	0.165	0.071	0.885
MR2	0.068	0.078	0.149	0.076	0.870
EO1	0.719	0.114	0.031	0.162	-0.154
EO2	0.732	0.129	-0.039	-0.072	0.143
EO3	0.662	0.106	0.032	-0.178	0.225
EO4	0.518	0.228	0.123	0.201	0.287
EO5	0.422	0.124	-0.076	0.075	-0.071
EO6	0.794	0.114	0.030	0.111	0.005
EO7	0.762	0.176	0.105	0.104	0.093
EO8	0.692	0.103	0.197	0.220	-0.041
ORG1	0.185	0.040	0.162	0.765	-0.069
ORG2	0.295	-0.078	0.202	0.793	0.173
ORG3	0.011	-0.139	-0.033	0.869	0.146
ORG4	0.010	-0.023	0.138	0.868	-0.013
SFM1	0.251	0.665	0.102	-0.069	-0.169
SFM2	0.109	0.745	0.188	-0.062	0.140
SFM3	0.196	0.852	0.048	0.002	0.206
SFM4	0.217	0.833	0.023	-0.035	-0.042
SFM5	0.191	0.858	0.103	-0.038	0.068
SLC1	-0.011	0.351	0.684	0.041	-0.080
SLC2	-0.039	0.269	0.761	0.048	-0.109
SLC3	0.154	0.262	0.691	0.173	0.062
SLC4	-0.023	-0.024	0.727	-0.032	0.147
SLC5	0.051	-0.163	0.657	0.139	0.244
SLC6	0.138	-0.021	0.742	0.196	0.196

^aEO = Entrepreneurial orientation; SFM = Strategy formation mode; SLC = Strategic learning capability; ORG = Structural organicity; MR = Market responsiveness.

specific items that comprise each scale are reported in Appendix A, and Appendix B provides a discussion of actions taken to assess each scale's internal response consistency, thereby providing evidence of the scale's convergent validity.

Before hypotheses testing, measures of the five variables comprising the research model were subjected to a principal component analysis with Varimax rotation. As shown in Table 2, all items loaded cleanly on their intended construct, with no significant crossloadings.

Strategic learning capability—criterion variable. A six-item, seven-point scale measured strategic learning capability. Three of the items of this scale are from the Covin *et al.* (2006) strategic learning from failure scale. Three additional items were added to the Covin *et al.* (2006) scale to better capture the notion that strategic learning capability is composed both of the ability to generate strategic knowledge and to make adjustments to firm strategy based on that strategic knowledge (e.g., Barr, 1998;

Thomas *et al.*, 2001). As is the case for all multi-item scales in this research, the combined mean of the individual item scores is the scale score. Higher scores on this measure indicate higher levels of strategic learning capability.

*Entrepreneurial orientation—predictor variable.*³ An eight-item, seven-point scale based on the nine-item scale proposed by Covin and Slevin (1989) measured entrepreneurial orientation. Containing items adapted from Khandwalla (1976) and Miller and Friesen (1982), the scale is constructed to adequately capture the three dimensions of EO—innovativeness, proactiveness, and risk taking (Covin *et al.*, 2006). Higher scores on the scale indicates a more entrepreneurial orientation, while lower scores represent a more conservative orientation.

Structural organicity—mediator variable. A four-item scale adapted from Khandwalla's (1976) seven item, seven-point scale was used to measure the construct of structural organicity. A higher score on the scale indicates a more organic structure; a lower score indicates a more mechanistic structure.

Market responsiveness—mediator variable. A two-item, seven-point scale, consistent with the definition of this construct as an organizational competency that enables a firm to react quickly to changing environmental stimuli, measured market responsiveness. A higher score indicates greater market responsiveness.

Strategy formation mode—mediator variable. Slevin and Covin's (1997) five item, seven-point scale measured strategy formation mode. Lower scores on the scale indicate an emergent strategy formation mode; higher scores indicate a planned strategy formation mode.

Control variables. There are six control variables for this study. First is firm size, measured as the total number of employees of the firm as provided by the primary respondent. Second is firm age, also provided by the primary respondent, measured as the number of years the firm has been in business. Because of the inherent skew in the size and age data, both variables were log transformed. Third is a dummy variable, which controlled for ownership

of the firm (i.e., publicly or privately held). Similarly, a dummy variable controlled for whether the firm was a nondiversified division of a larger firm or was independent. Fifth, due to variations in factors such as technology diffusion rates and knowledge appropriability regimes, learning from entrepreneurial initiatives may be variously challenging across firms operating in high-tech versus low-tech industries (see, for example, Helfat, 1997; Pouder and St. John, 1996; Teece, 1998). As such, industry technological sophistication was controlled for in this research. Following the procedure recommended by Certo *et al.* (2001), a dummy variable representing the high-tech/low-tech industry distinction based on the first two digits of the firm's SIC code was included in the research model. Consistent with Certo *et al.* (2001), the two-digit SIC codes associated with high-tech industries are: computer hardware (SIC 35), computer software (SIC 73), semiconductors and printed circuits (SIC 36), biotechnology (SIC 28), telecommunications (SIC 48), pharmaceuticals (SIC 28), specialty chemicals (SIC 28), and aerospace (SIC 37). In the current sample, 33 of the firms operate in industries having a high-tech SIC code designation. The remaining 77 firms operate in low-tech industries. Lastly, research has suggested that the relationship between EO and strategic learning capability may vary significantly under different levels of environmental dynamism (see, for example, Karagozoglu and Brown, 1988), thus necessitating dynamism's inclusion as a control variable. The environmental dynamism construct was measured using a slightly modified (altered response format) of Miller and Friesen's (1982) four-item dynamism scale. Higher scores reflect environments that are more dynamic; lower scores reflect more stable environments.

Analytical techniques

Hypothesis testing followed the procedure recommended by Baron and Kenny (1986). Step 1 establishes the relationship between EO and each prospective mediator—structural organicity, market responsiveness, and strategy formation mode. Step 2 establishes the direct effect relationship between EO and strategic learning capability. Finally, in step 3, each mediator enters into the direct effect model separately. For mediation to hold, EO must predict changes in each individual mediator (step 1) and must predict changes in strategic learning capability (step 2). Lastly, in step 3, each mediator must be a

³Initial factor analysis of the constructs using the Covin and Slevin (1989) nine-item EO scale and the seven-item Khandwalla (1976) structural organicity scale revealed cross-loadings on one and three measures of the scales, respectively. Thus, those measures were removed. The internal response consistency tests described in Appendix B indicate that construct validity was sufficiently maintained in the resultant eight- and four-item scales, respectively.

significant predictor of changes to strategic learning capability and must have a larger standardized coefficient than EO. If EO becomes nonsignificant in step 3, this is evidence of a fully mediated relationship (Baron and Kenny, 1986)—the mediator fully accounts for the relationship between EO and strategic learning capability. Variance inflation factors calculated at each step tested for the presence of multicollinearity. All values are within the acceptable range (i.e., $VIF < 10$; see Hair *et al.*, 1998), thus multicollinearity does not appear to be biasing the study results.

Tests for common method effects

As with all single-respondent research, the current article carries the risk of common method bias, which has the potential to underestimate (Ganster, Hennessey, and Luthans, 1983) or overestimate (Williams, Cole, and Buckley, 1989) the relationship between the constructs of interest. One test available to researchers to identify the presence of such effects is the Harman single-factor method (Podsakoff and Organ, 1986). This technique specifies that the individual measures for each construct be loaded into an exploratory factor analysis to determine if the first extracted factor accounts for the majority of variance amongst all measures—if so, it can be said that common methods bias appears to be a concern. The result of the single-factor test for the study produced six factors with eigenvalues over one, with the first factor accounting for 24.9 percent of the total variance, indicating that common method effects, if present, are immaterial.

In a more conservative method to test for common methods effects prescribed by Podsakoff *et al.* (2003), the effect of a latent methods factor on the correlations among the constructs of interest was also calculated. This technique uses a type of confirmatory factor analysis in which each survey item loads both on its intended construct and on a latent method factor intended to capture any common method variance.⁴ The resulting correlations between the constructs compare with the nonadjusted, zero-order correlations to determine if they remain of a similar magnitude while accounting for measurement error attributable to common method effects.

⁴For purposes of this analysis, the EO scale was split into its component factors of innovativeness, proactiveness, and risk taking.

The result of this analysis suggests that common methods effects, if present, do not materially influence the findings of the current research (average difference between the adjusted and nonadjusted correlations: 0.035).⁵

RESULTS

Table 3 presents the regression results for step 1 of the Baron and Kenny (1986) method—establishing the relationship between entrepreneurial orientation and each prospective mediator. Models 1 and 2 test for the EO-structural organicity relationship, with the control variables entered in Model 1 and the predictor variable in Model 2. The public/private dummy variable is statistically significant in both models, and EO is statistically significant in Model 2 ($\beta = 0.26$, $p < 0.01$). Models 3 and 4 test for the EO-market responsiveness relationship, again with the controls entered into Model 3 (none of which are statistically significant). Model 4 enters EO into the regression equation and is found to be marginally statistically significant ($\beta = 0.20$, $p < 0.10$). Finally, Models 5 and 6 test the EO-strategy formation mode relationship. Control variables are in Model 5, with firm size and the division/independent firm dummy variable found to be statistically significant. Model 6 enters EO into the regression equation. In Model 6, firm size (the division/independent firm dummy variable) and EO ($\beta = 0.34$, $p < 0.001$) are statistically significant. Collectively, Models 1–6 establish a statistically significant relationship between EO and each hypothesized mediator.

Table 4 contains the regression results for steps 2 and 3, which test for the direct effect of EO on strategic learning capability and then the indirect effects of the mediators, respectively. Models 7 and 8 contain the step 2 direct effect tests, with Model 7 including the control variables (none of which are statistically significant) and Model 8 adding EO to the Model 7 equation. Supporting Hypothesis 1,

⁵To ascertain if there were significant differences in the strength of the variable relationships between the primary and secondary respondents, the correlation matrix for the model variables provided by the primary respondent was compared to the correlation matrix for the model variables provided by the secondary respondent. The overall absolute value difference between all research variable correlations was 0.11, which is statistically insignificant. The absolute value difference of 0.03 between the predictor and criterion variables (between EO and strategic learning capability) is also insignificant.

Table 3. Regression analysis results—mediator variables^a

	Structural organicity		Market responsiveness		Strategy formation mode	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Control variables:						
Log firm age	-0.04	-0.00	0.06	0.08	0.05	0.09
Log firm size	0.02	-0.03	0.00	-0.03	0.22*	0.16†
Environmental dynamism	0.00	-0.05	0.05	0.01	0.11	0.04
Public/private	-0.26†	-0.25†	0.03	0.04	-0.10	-0.09
Division/independent firm	-0.16	-0.13	0.06	0.08	-0.38**	-0.35**
Industry tech. sophistication	0.08	0.05	-0.05	0.02	-0.04	-0.00
Predictor variable:						
Entrepreneurial orientation		0.26**		0.20†		0.34***
Model <i>R</i> ²	0.05	0.10	0.01	0.04	0.22	0.32
Adjusted <i>R</i> ²	0.00	0.04	-0.05	-0.02	0.18	0.27
Model <i>F</i>	0.93	1.71	0.18	0.68	4.92***	6.88***

N = 110.

^aStandardized coefficients reported.

†p < 0.10.

*p < 0.05.

**p < 0.01.

***p < 0.001.

Table 4. Regression analysis results—strategic learning capability^a

	Model 7	Model 8	Model 9	Model 10	Model 11
Control variables:					
Log firm age	-0.15	-0.13	-0.13	-0.15	-0.16†
Log firm size	0.08	0.05	0.05	0.05	-0.01
Environmental dynamism	-0.12	-0.16	-0.15	-0.16†	-0.17†
Public/private	-0.17	-0.16	-0.11	-0.17	-0.13
Division/independent firm	-0.04	-0.02	0.01	-0.04	0.11
Industry tech. sophistication	0.06	0.04	0.03	0.03	0.04
Predictor variables:					
Entrepreneurial orientation		0.20*	0.15	0.15	0.09
Structural organicity			0.20*		
Market responsiveness				0.26**	
Strategy formation mode					0.35**
Model <i>R</i> ²	0.05	0.09	0.12	0.15	0.17
Adjusted <i>R</i> ²	0.00	0.02	0.05	0.09	0.10
Model <i>F</i>	0.92	1.38	1.76†	2.27**	2.54*

N = 110.

^aStandardized coefficients reported.

†p < 0.10.

*p < 0.05.

**p < 0.01.

there is a positive and statistically significant direct effect between EO and strategic learning capability in Model 8 ($\beta = 0.20$, $p < 0.05$).

To complete step 3, the prospective mediators enter the direct effect model (Model 8) to determine the extent of any indirect effects. Given that there is an established relationship between EO and each prospective mediator (Models 1–6) and a direct effect of EO on strategic learning capability (Model 8), for mediation to hold, each mediator must now be a significant predictor of changes to strategic learning capability in the presence of EO and must have a larger standardized coefficient than EO.

In the first test for mediation, Model 9 enters structural organicity into the Model 8 equation. In Model 9, structural organicity is statistically significant ($\beta = 0.20$, $p < 0.05$) and EO is nonsignificant. Thus, structural organicity fully mediates the EO-strategic learning capability relationship and Hypothesis 2 is supported. Model 10 adds market responsiveness to the Model 8 equation. Market responsiveness is statistically significant, confirming Hypothesis 3 ($\beta = 0.26$, $p < 0.01$). EO again becomes nonsignificant in Model 10, indicating full mediation, with environmental dynamism also found to be statistically significant. Lastly, Model 11 enters strategy formation mode into the Model 8 equation and is statistically significant ($\beta = 0.35$, $p < 0.01$). EO is nonsignificant in Model 11 and this is, again, evidence of full mediation, with firm age and environmental dynamism also found to be statistically significant. However, the positive coefficients for both the EO-strategy formation mode relationship (Model 6) and for the strategy formation mode-strategic learning capability relationship (Model 11) indicate that, contrary to expectations, a *planned* strategy formation mode—and not an emergent strategy formation mode—functions as the mediator. Therefore, Hypothesis 4 is not supported.

Summarizing the results from steps 1–3, there is a positive relationship between EO and strategic learning capability. Moreover, structural organicity, market responsiveness, and a planning approach to strategy formation act as full mediators of the direct effect relationship.

Supplementary analysis

In a more conservative test for mediation outlined by Preacher and Hayes (2007), a bootstrapping method tested for the effect of all the mediators in a single-specified model. Bootstrapping is a

computationally intensive methodology used to test for multiple mediation that involves sampling from the dataset repeatedly—at least 1,000 times—and estimating the indirect effect of the mediators in each resultant dataset. The results of the bootstrapping analysis support the original findings. In a single specified model, structural organicity, market responsiveness, and strategy formation mode were statistically significant mediators of the EO-strategic learning capability relationship ($\beta = 0.23$, $p < 0.05$; $\beta = 0.21$, $p < 0.05$; $\beta = 0.37$, $p < 0.001$, respectively). Further, the direct effect between EO and strategic learning capability was not significant ($p > 0.10$) in the single-specified model (supporting the fully mediated results found in the primary analysis) and the total explained variance of the single specified model is substantial: $R^2 = 0.27$ (Adjusted $R^2 = 0.19$; $F = 3.59$, $p < 0.001$). Thus, the supplementary analysis results support the original findings.

DISCUSSION

As hypothesized, there is a positive, statistically significant relationship between EO and strategic learning capability. Behaving entrepreneurially—taking risks, being innovative, and being proactive—generates strategic knowledge *and* encourages strategic change, thereby contributing to greater strategic learning capability. Furthermore, three constructs—structural organicity, market responsiveness, and strategy formation mode—fully mediate the EO-strategic learning capability relationship. However, the coefficient sign of strategy formation mode indicates that a planning approach to developing strategy—opposed to an emergent approach as hypothesized—functions as the mediator.

As predicted, this research finds evidence of a causal relationship between EO and structural organicity and between structural organicity and strategic learning capability. While both EO and structural organicity were predicted to generate increased levels of strategic knowledge and strategic change, the finding of full mediation suggests that structural organicity may be the enabling mechanism in the EO-strategic learning capability relationship. Specifically, structural organicity may be the vehicle through which the strategic knowledge generated by behaving entrepreneurially disseminates throughout the organization and then reaches senior decision makers responsible for changes to firm strategy. Similarly, market responsiveness was predicted to

also contribute to increased strategic knowledge and greater strategic change. However, the finding of full mediation suggests that market responsiveness may function as an evaluative mechanism in the EO-strategic learning capability relationship, such that market responsiveness, while also generating new strategic knowledge, may also be an accuracy check on the strategic knowledge generated through EO behaviors. To state differently, by being close to changing market conditions, firms are in a better position to continually evaluate the accuracy of their strategic knowledge and its applicability to the strategic context. This accuracy check on the strategic knowledge generated through EO behaviors may, in turn, improve the quality of strategic decisions (Sinkula, 1994) and, thereby, contribute to enhanced strategic learning capability.

Contrary to the hypothesized relationship, a planned (versus emergent) strategy formation mode is a mediator of the EO-strategic learning capability relationship. Indeed, in the current research, there is a statistically significant, positive, zero-order correlation between planned strategy and EO ($r = 0.41$) and between planned strategy and strategic learning capability ($r = 0.28$). As hypothesized, high-EO firms would likely favor the strategy formation flexibility inherent to emergent strategies. Further, it was expected that relative to planned strategies, emergent strategies would both generate higher quantities of strategic knowledge and be more conducive to strategic change—factors which contribute to greater strategic learning capability. However, these expectations were not upheld by the data. One possible explanation for the unexpected finding is that it may not be the continuous gathering of strategically relevant information as generated from an emergent strategy formation mode that best facilitates strategic learning capability. Rather, strategic learning capability may be most pronounced and effective when the quality of strategically relevant information gathered is greatest, and this may most likely occur among firms with strong planning orientations.

Strategic planning is, by definition, deliberate and evaluative, functioning as an appraisal mechanism that examines the potentially strategically relevant information available to a firm for the purpose of guiding strategic decisions. A benefit of strategic planning over a more emergent approach to strategy formation is that planned strategies imply that strategic choices have been consciously considered and deliberately chosen. Importantly, the exhibition of

EO behaviors may encourage the adoption of greater discipline within the strategy formation process, as would be characteristic of firms with strong planning orientations, because such discipline imbues a sense of purpose and focus to entrepreneurial initiatives. In other words, high-EO firms may choose planning orientations because those orientations channel and direct their initiatives in purposeful fashion. Directionality and focus are not inherent to the concept of EO. Yet without such qualities, entrepreneurial firms ‘tend to generate an incoherent mass of interesting but unrelated opportunities that may have profit potential, but that don’t move their firms toward a desirable future’ (Getz and Tuttle, 2001: 277). Moreover, knowing where the firm intends to go with its entrepreneurial initiatives and what is expected from those initiatives, as would be most typical of firms with planned strategy approaches, may better attune those firms’ managers to implementation information and performance feedback of potential strategic relevance. Being in a position to recognize and evaluate data of potential strategic relevance as entrepreneurial initiatives are carried out would facilitate strategic knowledge acquisition and inform the advisability of strategic change, thereby enhancing strategic learning capability.

IMPLICATIONS

Three principal implications can be derived from the current research. First, the inevitability of building strategic learning capability by behaving entrepreneurially—often suggested in current theory—is questionable based on this study’s findings. While the results of the analysis indicate a positive relationship between EO and improved strategic learning capability, this direct effect was relatively weak. In the direct effect model, EO explained only 9% of the variance in strategic learning capability in the presence of the control variables. Furthermore, structural organicity, market responsiveness, and strategy formation mode *fully* mediate the EO-strategic learning capability relationship. As Baron and Kenny (1986) note, evidence of full mediation implies that the mediator constructs are potent translators of the affect of the predictor variable on the criterion variable—perhaps more so than the predictor variable itself. Thus, an implication of the current research is that the exhibition of entrepreneurial behaviors is likely insufficient to building strategic learning capability. Rather, this research suggests that in

order to build greater strategic learning capability through EO, at least three indirect mechanisms are necessary: (1) an enabling mechanism through which the strategic knowledge generated by EO behaviors disseminates through the organization and reaches strategic decision makers empowered to act on that knowledge (structural organicity); (2) an evaluative mechanism to assess the efficacy of newly generated strategic knowledge and determine its applicability to the firm's strategic context (market responsiveness); and (3) an accountability mechanism to ensure that changes to firm strategy are based on well understood and deliberate considerations pertaining to what the firm expects from and intends to accomplish through its choice of entrepreneurial initiatives (planned strategy formation mode). In short, while entrepreneurial firms may tend to be better strategic learners, those firms that also organize and develop policies and practices to better communicate, evaluate, and account for the strategic knowledge generated through EO will likely exhibit heightened strategic learning capability.

A second implication of this research derives from additional *post hoc* analyses performed on the data. The current research model adopted EO as the predictor variable and strategic learning capability as the criterion variable, consistent with the predominate characterization in the literature of learning as an outcome of EO (e.g., Slater and Narver, 1995; Wang, 2008). However, it is conceptually possible that EO could also be a *consequence* of a firm's strategic learning capability. In recognition of this possibility, the model was tested again in the reverse causal direction (i.e., strategic learning capability as the predictor variable and EO as the criterion). Importantly, because of the use of cross-sectional data, directions of causality cannot be empirically determined in this study. However, in testing the model in reverse there is evidence of a strategic learning capability-EO relationship ($R^2 = 0.31$; Adjusted $R^2 = 0.24$; $F = 4.47$, $p < 0.001$). Furthermore, there is again evidence of a fully mediated relationship, with structural organicity and a planned strategy formation mode (though not market responsiveness) functioning as mediators. This finding raises the theoretical possibility of a reciprocally causal relationship between EO and strategic learning capability.

Strategic learning capability reflects both the firm's ability to generate strategic knowledge and the firm's ability to make changes to organizational strategy based on that knowledge. As posited, EO contributes both to strategic knowledge and strategic

change, thereby increasing strategic learning capability. It is possible, however, to conceptualize that over time being good at deriving strategic knowledge and acting on that knowledge might engender further entrepreneurial behavior. Firms can fluctuate between entrepreneurial and conservative strategic postures over their lifetime (Lumpkin and Dess, 2001; Wiklund, 2006). Yet, as mentioned previously, firms that are more entrepreneurial in nature—particularly in dynamic environments—tend to outperform their more conservative peers. At issue then is what organizational mechanism(s) may be at play that encourages consistent entrepreneurial behavior; that is, what factor or factors may enable a firm to stay entrepreneurial in the face of organizational tendencies to become more conservative. Strategic learning capability may be one such factor. Over time, as firms gain confidence in generating strategic knowledge and making strategic changes based on that knowledge, firms may be empowered to engage in more innovative, proactive, and risk-taking behaviors. In a similar vein, greater strategic learning capability may also heighten the awareness of the value of using EO to accomplish selected strategic objectives. Specifically, greater strategic learning capability may improve a firm's ability to recognize new product-market opportunities, thereby encouraging higher levels of EO. The second implication of this research is, therefore, the theoretical possibility that a *virtuous cycle* exists between EO and strategic learning capability—EO contributes to increased strategic learning capability, which in turn boosts firm confidence in their strategic abilities, which in turn engenders more EO behavior.

A third implication of the current research is that a firm's strategic learning capability can be actively fostered through managerial policies and actions that promote the indirect effect constructs—namely structural organicity, market responsiveness, and a planned (versus emergent) strategic formation mode. Past theorizing has often described the capability development process (and, in particular, the learning capability development process) somewhat abstractly, such as the accumulation of tacit knowledge and the systematic application of resources (e.g., Slater and Narver, 1995; Yeung *et al.*, 1999). While such observations are valid, they offer little insight into what managers might do to actively build this increasingly important organizational capability (e.g., Huber, 1991; March, 1991; Slater and Narver, 1995). The current research suggests that particular organizational phenomena are critical

building blocks to the emergence of strategic learning capability. In short, the emergence of a strategic learning capability is not simply a fortuitous occurrence, or one that managers can only partially understand because of the vagueness associated with descriptions of learning capability development in the relevant literature. Rather, strategic learning capability is a competency that managers can consciously decide to enact, and then to develop, if they have an accurate understanding of strategic learning capability's antecedents.

Research limitations and directions for future research

As discussed previously, with all research that relies on cross-sectional data, directions of causality cannot be empirically determined. Future research—perhaps using longitudinal data—may aid in better understanding the directions of causality and in testing the possible reciprocally causal relationship between EO and strategic learning capability. Furthermore, as with all research conducted using primary data, scholars must choose from multiple measures and multiple scales with which to capture psychometric data. While substantial effort was taken to establish the validity, and reliability of the scales used in this study, different operationalizations of the constructs may yield different results. Related to this notion is the introduction of the scale measuring strategic learning capability. While there is evidence of this scale's internal reliability, convergent validity and internal response consistency, this is a new scale to the strategic entrepreneurship literature. Future research is encouraged to productively explore this scale's utility in other contexts and further assess its psychometric properties.

The three mediators chosen for this research were based on their theoretically apparent relationship to both EO and strategic learning capability. Future research may also consider additional mediator constructs, or may choose to delve deeper into the constructs in the current article. For example, considering that a planned strategy mediates the EO-strategic learning capability relationship, looking within the planned strategy formation mode construct (i.e., into planning processes, decision-making styles, and planning technologies) may yield additional insights into the planned strategy-EO and planned strategy-strategic learning capability relationships.

Lastly, while the current research focused on mediators of the EO-strategic learning capability

relationship, future research may explore moderators of this relationship. For example, research suggests that hostility—defined by competitive intensity and a paucity of readily exploitable product-market opportunities—negatively moderates the EO-firm performance relationship (Covin and Slevin, 1989), and March (1991) suggested that competitiveness and the competitive relationships among the firms in an industry might affect a firm's organizational learning capability. As such, it is plausible that the nature of the EO-strategic learning capability relationship is affected by the relative hostility of a firm's environment and how firms behave vis-à-vis their competitors. These possibilities represent fertile ground for future research.

CONCLUSION

The purpose of this research was to explore whether a firm's proclivity to behave entrepreneurially improves its strategic learning capability. To put it another way, do taking risks, exploring new domains, and experimenting with new products and processes make the firm a better strategic learner? This study suggests the answer to this question is a qualified *yes*—an entrepreneurial orientation does improve strategic learning capability. However, and more importantly, EO may be insufficient to dramatically improve strategic learning capability. Possessing an organic structure, responding quickly to changing market conditions, and pursuing planned, well-crafted strategies function as critical intervening mechanisms in the EO-strategic learning capability relationship. Current theory proposing a robust, causally-adjacent relationship between EO and strategic learning capability may, therefore, be inadequate, as this relationship is demonstrably more elaborate than previously understood.

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REFERENCES

- Ambrosini V, Bowman C. 2005. Reducing causal ambiguity to facilitate strategic learning. *Management Learning* 36(4): 493–512.

- Atuahene-Gima K, Ko A. 2001. An empirical investigation of the effect of market orientation and entrepreneurship orientation alignment on product innovation. *Organization Science* **12**(1): 54–74.
- Baron RM, Kenny DA. 1986. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* **51**(6): 1173–1182
- Barr PS. 1998. Adapting to unfamiliar environmental events: a look at the evolution of interpretation and its role in strategic change. *Organization Science* **9**(6): 644–669.
- Barrett H, Weinstein A. 1998. The effect of market orientation and organizational flexibility on corporate entrepreneurship. *Entrepreneurship Theory and Practice* **23**(1): 57–70.
- Bhide A. 1994. How entrepreneurs craft strategies that work. *Harvard Business Review* **72**(2): 150–161.
- Burns T, Stalker G. 1961. *The Management of Innovation*. Tavistock: London, U.K.
- Cahill D. 1996. Entrepreneurial orientation or pioneer advantage. *Academy of Management Review* **21**(3): 603–605.
- Carpenter GS, Nakamoto K. 1989. Consumer preference formation and pioneering advantage. *Journal of Marketing Research* **26**(3): 285–298.
- Certo ST, Covin JG, Daily CM, Dalton DR. 2001. Wealth and the effects of founder management among IPO-stage new ventures. *Strategic Management Journal* **22**(6–7): 641–658.
- Chandler AD Jr. 1962. *Strategy and Structure*. Doubleday: Garden City, NY.
- Covin JG, Green KM, Slevin DP. 2006. Strategic process effects on the entrepreneurial orientation-sales growth rate relationship. *Entrepreneurship Theory and Practice* **30**(1): 57–82.
- Covin JG, Slevin DP. 1989. Strategic management of small firms in hostile and benign environments. *Strategic Management Journal* **10**(1): 75–87.
- Covin JG, Slevin DP. 1991. A conceptual model of entrepreneurship as firm behavior. *Entrepreneurship Theory and Practice* **16**(1): 7–24.
- Day GS. 1994. The capabilities of market-driven organizations. *Journal of Marketing* **58**(4): 37–52.
- Dean CC, Thibodeaux MS. 1994. Corporate entrepreneurship: U.S. firms operating in the Middle East and the Arab world. In *Advances in International Comparative Management*, Vol. 9, Prasad SB (ed). JAI Press: Greenwich, CT; 193–222.
- Dess GG, Ireland RD, Zahra SA, Floyd SW, Janney JJ, Lane PJ. 2003. Emerging issues in corporate entrepreneurship. *Journal of Management* **29**(3): 351–378.
- Dess GG, Lumpkin GT. 2005. The role of entrepreneurial orientation in stimulating effective corporate entrepreneurship. *Academy of Management Executive* **19**(1): 147–156.
- Dess GG, Lumpkin GT, Covin JG. 1997. Entrepreneurial strategy making and firm performance: tests of contingency and configurational models. *Strategic Management Journal* **18**(9): 677–695.
- DiBella AJ, Nevis EC, Gould JM. 1996. Understanding organizational learning capability. *Journal of Management Studies* **33**(3): 361–379.
- Dickson PR. 1992. Toward a general theory of competitive rationality. *Journal of Marketing* **56**(1): 69–83.
- Fredrickson JW. 1986. The strategic decision process and organizational structure. *Academy of Management Review* **11**(2): 280–297.
- Ganster DC, Hennessey HW, Luthans F. 1983. Social desirability response effects: three alternative models. *Academy of Management Journal* **26**(2): 321–331.
- Getz G, Tuttle EG. 2001. A comprehensive approach to corporate venturing. In *2001 Handbook of Business Strategy*. Thompson Financial Media: New York; 277–283.
- Greer CR, Ireland TC. 1992. Organizational and financial correlates of a *contrarian* human resource investment strategy. *Academy of Management Journal* **35**(5): 956–984.
- Grewal R, Tansuhaj P. 2001. Building organizational capabilities for managing economic crisis: the role of market orientation and strategic flexibility. *Journal of Marketing* **65**(2): 67–80.
- Grinstein A. 2008. The relationships between market orientation and alternative strategic orientations. *European Journal of Marketing* **42**(1/2): 115–134.
- Hair JF, Anderson RE, Tatham RL, Black WC. 1998. *Multivariate Data Analysis* (5th edn) Prentice-Hall: Upper Saddle River, NJ.
- Hambrick DC, Geletkancycz MA, Fredrickson JW. 1993. Top management commitment to the status quo: some tests of its determinants. *Strategic Management Journal* **14**(6): 401–418.
- Helfat CE. 1997. Know-how and asset complementarity and dynamic capability accumulation: the case of R&D. *Strategic Management Journal* **18**(5): 339–360.
- Huber GP. 1991. Organizational learning: the contributing processes and the literatures. *Organization Science* **2**(1): 88–115.
- Jennings DF, Seaman SL. 2006. High and low levels of organizational adaptation: an empirical analysis of strategy, structure, and performance. *Strategic Management Journal* **15**(6): 459–475.
- Jerez-Gómez P, Céspedes-Lorente J, Valle-Cabrera R. 2005. Organizational learning capability: a proposal of measurement. *Journal of Business Research* **58**(6): 715–725.
- Karagozoglu N, Brown WB. 1988. Adaptive responses by conservative and entrepreneurial firms. *Journal of Product Innovation Management* **5**(4): 269–281.
- Kaya N, Seyrek IH. 2005. Performance impacts of strategic orientations: evidence from Turkish manufacturing firms.

- Journal of American Academy of Business, Cambridge* 6(1): 68–73.
- Khandwalla PN. 1976. Some top management styles, their context and performance. *Organization and Administrative Sciences* 7(4): 21–51.
- Kohli AK, Jaworski BJ. 1990. Market orientation: the construct, research propositions, and managerial implications. *Journal of Marketing* 54(2): 1–18.
- Kuwada K. 1998. Strategic learning: the continuous side of discontinuous strategic change. *Organization Science* 9(6): 719–736.
- Lant TK, Milliken FJ, Batra B. 1992. The role of managerial learning and interpretation in strategic persistence and reorientation. *Strategic Management Journal* 13(8): 585–608.
- Lee C, Lee K, Pennings J. 2001. Internal capabilities, external networks, and performance: a study on technology-based ventures. *Strategic Management Journal* 22(6–7): 615–640.
- Levitt B, March JG. 1988. Organizational learning. *Annual Review of Sociology* 14: 319–340.
- Liu SS, Luo X, Shi Y. 2002. Integrating customer orientation, corporate entrepreneurship, and learning orientation in organizations-in-transition: an empirical study. *International Journal of Research in Marketing* 19(4): 367–382.
- Lumpkin GT, Dess GG. 1996. Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review* 21(1): 135–172.
- Lumpkin GT, Dess GG. 2001. Linking two dimensions of entrepreneurial orientation to firm performance: the moderating role of environment and industry life cycle. *Journal of Business Venturing* 16(5): 429–451.
- Maidique MA, Zirger BJ. 1985. The new product learning cycle. *Research Policy* 14(6): 299–313.
- March JG. 1991. Exploration and exploitation in organizational learning. *Organization Science* 2(1): 71–87.
- McGrath RG. 1999. Falling forward: real options reasoning and entrepreneurial failure. *Academy of Management Review* 24(1): 13–30.
- Miles MP, Arnold DR. 1991. The relationship between marketing orientation and entrepreneurial orientation. *Entrepreneurship Theory and Practice* 15(4): 49–65.
- Miller D. 1983. The correlates of entrepreneurship in three types of firms. *Management Science* 29(7): 770–791.
- Miller D, Friesen PH. 1982. Innovation in conservative and entrepreneurial firms: two models of strategic momentum. *Strategic Management Journal* 3(1): 1–25.
- Miller D, Shamsie J. 1996. The resource-based view of the firm in two environments: the Hollywood film studios from 1936 to 1965. *Academy of Management Journal* 39(3): 519–543.
- Mintzberg H. 1990. The design school: reconsidering the basic premises of strategic management. *Strategic Management Journal* 11(3): 171–195.
- Mintzberg H, Waters JA. 1985. Of strategies, deliberate and emergent. *Strategic Management Journal* 6(3): 257–272.
- Morris MH, Paul GW. 1987. The relationship between entrepreneurship and marketing on established firms. *Journal of Business Venturing* 2(3): 247–259.
- Nunnally JC, Bernstein IH. 1994. *Psychometric Theory*. McGraw-Hill: New York.
- Pietersen W. 2002. *Reinventing Strategy: Using Strategic Learning to Create and Sustain Breakthrough Performance*. John Wiley & Sons: Hoboken, NJ.
- Podsakoff PM, MacKenzie SB, Lee J, Podsakoff N. 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology* 88(5): 879–903.
- Podsakoff PM, Organ DW. 1986. Self-reports in organizational research: problems and prospects. *Journal of Management* 12(4): 531–544.
- Pouder R, St. John CH. 1996. Hot spots and blind spots: geographical clusters of firms and innovation. *Academy of Management Review* 21(4): 1192–1225.
- Preacher KJ, Hayes AF. 2007. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Working paper, University of Kansas, Lawrence, KS.
- Rauch A, Wiklund J, Lumpkin GT, Frese M. 2004. Entrepreneurial orientation and business performance: cumulative empirical evidence. In *Frontiers of Entrepreneurship Research 2004: Proceedings of the Twenty-Fourth Annual Entrepreneurship Research Conference*, Bygrave WD (ed). Babson College: Babson Park, MA.
- Sapienza HJ, DeClerq D, Sandberg WR. 2005. Antecedents of international and domestic learning efforts. *Journal of Business Venturing* 20(4): 437–457.
- Schindehutte M, Morris MH, Kocak A. 2008. Understanding market-driving behavior: the role of entrepreneurship. *Journal of Small Business Management* 46(1): 4–46.
- Schnaars SP. 1994. *Managing Imitation Strategies: How Later Entrants Seize Markets From Pioneers*. The Free Press: New York.
- Schumpeter JA. 1934. *The Theory of Economic Development*. Transaction Publishers: Brunswick, NJ.
- Schumpeter JA. 1939. *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalistic Process*. McGraw-Hill: New York.
- Sinkula J. 1994. Market information processing and organizational learning. *Journal of Marketing* 58(1): 35–45.
- Slater SF, Narver JC. 1995. Market orientation and the learning orientation. *Journal of Marketing* 59(3): 63–74.
- Slevin DP, Covin JG. 1997. Strategy formation patterns, performance, and the significance of context. *Journal of Management* 23(2): 189–209.
- Spector P. 1992. *Summated Rating Scale Construction: An Introduction*. Sage: Newbury Park, CA.

Teece DJ. 1998. Capturing value from knowledge assets: the new economy, markets for know-how, and intangible assets. *California Management Review* **40**(3): 55–79.

Thomas JB, Sussman SW, Henderson JC. 2001. Understanding *strategic learning*: linking organizational learning, knowledge management and sensemaking. *Organization Science* **12**(3): 331–345.

Voronov M, Yorks L. 2005. Taking power seriously in strategic organizational learning. *The Learning Organization* **12**(1): 9–25.

Wang CL. 2008. Entrepreneurial orientation, learning orientation, and firm performance. *Entrepreneurship Theory and Practice* **32**(4): 635–657.

Wiklund J. 2006. The sustainability of the entrepreneurial orientation-performance relationship. In *Entrepreneurship and the Growth of Firms*, Davidsson P, Delmar F, Wiklund J (eds) Edward Elgar: Cheltenham, U.K.

Wiklund J, Shepherd D. 2003. Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strategic Management Journal* **24**(13): 1307–1314.

Williams LJ, Cole JA, Buckley MR. 1989. Lack of method variance in self-reported affect and perceptions at work: reality or artifact? *Journal of Applied Psychology* **74**(33): 462–468.

Woodman RW, Sawyer JE, Griffin RW. 1993. Toward a theory of organizational creativity. *Academy of Management Review* **18**(2): 293–321.

Yeung AK, Ulrich DO, Nason SW, Von Glinow MA. 1999. *Organizational Learning Capability*. Oxford University Press: New York.

Zack MH. 2002. Developing a knowledge strategy. In *The Strategic Management of Intellectual Capital and Organizational Knowledge*, Choo CW, Bontis N (eds) Oxford University Press: New York; 255–292.

Zahra SA. 2008. Being entrepreneurial and market driven: implications for company performance. *Journal of Strategy and Management* **1**(2): 125–142.

Zahra SA, Jennings D, Kuratko D. 1999a. The antecedents and consequences of firm-level entrepreneurship: the state of the field. *Entrepreneurship Theory and Practice* **24**(2): 47–67.

Zahra SA, Nielsen AP, Bogner WC. 1999b. Corporate entrepreneurship, knowledge, and competence development. *Entrepreneurship Theory and Practice* **23**(3): 169–189.

APPENDIX A

The strategic learning capability scale

On a seven-point scale ranging from *strongly disagree* (=1) to *strongly agree* (=7), respondents were asked to respond to the following statements:

- My business is good at identifying strategies that haven’t worked.
- My business unit is good at pinpointing why failed strategies haven’t worked.
- My business unit is good at learning from its strategic/competitive mistakes.
- My business unit regularly modifies its choice of business practices and competitive tactics as we see what works and what doesn’t.

- My business unit is good at changing its business strategy midstream as we get a sense of the likely effectiveness of our actions.
- We are good at recognizing alternative approaches to achieving our business unit’s objectives when it becomes clear that the initial approach won’t work.

The entrepreneurial orientation scale

On a seven-point scale, respondents were asked to respond to the following statements where a 1–3 indicates complete to intermediate agreement with the left-hand side statement; a 4 is neutral; and a 5–7 indicates intermediate to complete agreement with the right-hand side statement.

<i>In general, the top managers of my business unit favor . . .</i>	
A strong emphasis on the marketing of tried and true products or services	1 2 3 4 5 6 7
A strong emphasis on R&D, technological leadership, and innovations	
<i>How many new lines of products or services has your business unit marketed during the past three years?</i>	
No new lines of products or services	1 2 3 4 5 6 7
Very many new lines of products or services	
Changes in product or service lines have been mostly of a minor nature	1 2 3 4 5 6 7
Changes in product or service lines have usually been quite dramatic	
<i>In dealing with its competitors, my business unit . . .</i>	
Typically responds to actions which competitors initiate	1 2 3 4 5 6 7
Typically initiates actions to which competitors respond	

Typically seeks to avoid competitive clashes, preferring a <i>live-and-let-live</i> posture	1 2 3 4 5 6 7	Typically adopts a very competitive <i>undo-the-competitors</i> posture
<i>In general, top managers of my business unit have . . .</i>		
A strong proclivity for low-risk projects (with normal and certain rates of return)	1 2 3 4 5 6 7	A strong proclivity for high-risk projects (with chances for very high returns)
<i>In general, the top managers of my business unit believe that . . .</i>		
Owing to the nature of the environment, it is best to explore it gradually via cautious, incremental behavior	1 2 3 4 5 6 7	Owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives
<i>When confronted with decision-making situations involving uncertainty, my business unit . . .</i>		
Typically adopts a cautious <i>wait and see</i> posture in order to minimize the probability of making costly decision	1 2 3 4 5 6 7	Typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities

The structural organicity scale

On a seven-point scale, respondents were asked to respond to the following statements where a 1–3 indi-

cates complete to intermediate agreement with the left-hand side statement; a 4 is neutral; and a 5–7 indicates intermediate to complete agreement with the right-hand side statement.

In general, the operating management philosophy in my business unit favors . . .

A strong insistence on a uniform managerial style throughout the business unit	1 2 3 4 5 6 7	Managers' operating styles allowed to range freely from the very formal to the very informal
A strong emphasis on always getting personnel to follow the formally laid-down procedures	1 2 3 4 5 6 7	A strong emphasis on getting things done even if it means disregarding formal procedure
Tight formal control of most operations by means of sophisticated control and information systems	1 2 3 4 5 6 7	Loose, informal control; heavy dependence on informal relationships and the norm of cooperation for getting work done
A strong emphasis on getting line and staff personnel to adhere closely to formal job descriptions	1 2 3 4 5 6 7	A strong tendency to let the requirements of the situation and the individual's personality define proper on-the-job behavior

The market responsiveness scale

On a seven-point scale ranging from *strongly disagree* (=1) to *strongly agree* (=7), respondents were asked to respond to the following statements:

- We compete heavily on the basis of being quickly responsive to changing market demands.
- We react more quickly to changing market demands than do our major competitors.

- We typically don't know what the content of our business strategy should be until we engage in some trial and error actions.^a
- My business unit's strategy is carefully planned and well understood before any significant competitive actions are taken.
- Formal strategic plans serve as the basis for our competitive actions
- My business unit's strategy is typically not planned in advance but, rather, emerges over time as the best means for achieving our objectives become clearer.^a

The strategy formation mode scale

On a seven-point scale ranging from *strongly disagree* (=1) to *strongly agree* (=7), respondents were asked to respond to the following statements:

^aIndicates reverse-coded items

- Competitive strategy for my business unit typically results from a formal business planning process (i.e., the formal plan precedes the action).

The environmental dynamism scale

On a seven-point scale ranging from *strongly disagree* (=1) to *strongly agree* (=7), respondents were asked to respond to the following statements:

- Actions of competitors are generally quite easy to predict.^a
- The set of competitors in my industry has remained relatively constant over the last three years.^a
- Product demand is easy to forecast.^a
- Customer requirements/preferences are easy to forecast.^a

APPENDIX B

Tests of internal response consistency for the key research variables

The internal response consistency of this study’s measures was assessed by concurrently collecting data using scales expected to correlate with these measures. The presence of moderate to high internal response consistency suggests the presence of convergent validity for the measures (Spector, 1992).

Strategic learning capability scale

Lant, Milliken, and Batra (1992) suggest that strategic learning capability occurs as firms recognize the need to change their strategies, and that such strategic change is typically prompted by the exercise of strategic control. As such, a positive and significant correlation is expected between strategic learning capability and a strategic control scale collected simultaneously with the variables used in the current research ($\alpha = 0.88$). Specifically, strategic control was assessed using a seven-point scale where the respondent was asked to indicate his/her level of agreement (from *strongly disagree* (=1) to *strongly agree* (=7)) with the following two items:

(1) My business unit keeps close track of how well our business strategy is being carried out; and (2) My business unit regularly conducts performance reviews to determine whether we are likely to achieve our principal objectives through our business strategy. The strategic learning capability and strategic control scales are positively and significantly correlated ($r = 0.37, p < 0.01$).

As discussed previously, strategic learning capability is manifest through the accumulation of knowledge that leads to changes in a firm’s strategy (Kuwada, 1998; Thomas *et al.*, 2001). Therefore, evidence of greater levels of strategic learning capability can be found in the existence of changes in a firm’s business practices and competitive tactics. To assess such changes, respondents were asked to furnish data on several scale items. Deviations (i.e., absolute differences) from a score of 4 on the following scale items—where a score of 4 was defined as *No change over the past three years*—were correlated with the strategic learning capability scale at the indicated levels. These results reveal that firms with higher scores on the strategic learning capability scale are acting in manners—as implied by the presence of strategic change across multiple tactical dimensions—that suggest the presence of recently acquired strategic knowledge and are, thereby, indicative of strategic learning capability.

Relative to three years ago, my business unit competes . . .

Much less on the basis of special purchase incentives (e.g., discounts, credit) ($r = 0.37, p < 0.01$)	1 2 3 4 5 6 7	Much more on the basis of special purchase incentives (e.g., discounts, credit)
Much less on the basis of product quality ($r = 0.20, p < 0.05$)	1 2 3 4 5 6 7	Much more on the basis of product quality
Much less on the basis of the quality of customer service ($r = 0.23, p < 0.05$)	1 2 3 4 5 6 7	Much more on the basis of the quality of customer service
Much less on the basis of being responsive to unique customer needs (e.g., product customization) ($r = 0.26, p < 0.01$)	1 2 3 4 5 6 7	Much more on the basis of being responsive to unique customer needs (e.g., product customization)

Much less on the basis of new product introductions ($r = 0.31, p < 0.01$)	1 2 3 4 5 6 7	Much more on the basis of new product introductions
Much less on the basis of sales force strength ($r = 0.27, p < 0.05$)	1 2 3 4 5 6 7	Much more on the basis of sales force strength
Much less on the basis of product line breadth ($r = 0.28, p < 0.05$)	1 2 3 4 5 6 7	Much more on the basis of product line breadth
Much less on the basis of product performance characteristics ($r = 0.31, p < 0.01$)	1 2 3 4 5 6 7	Much more on the basis of product performance characteristics

Entrepreneurial orientation scale

Research has suggested that EO and market pioneering behavior are inherently similar constructs (Cahill, 1996); even accounting for the possibility that pioneering is contained within EO (Lumpkin and Dess, 1996). As such, the EO scale and a market pioneering scale collected simultaneously with the variables used in the current research ($\alpha = 0.77$) was expected to be significantly and positively correlated. Consistent with Carpenter and Nakamoto’s (1989) definition of a market pioneer as a firm that is first to introduce a competitively distinct product to the market, the themes of moving first and product distinction were incorporated into this study’s measure of market pioneering. On a seven-point scale ranging from *strongly disagree* (=1) to *strongly agree* (=7), respondents were asked to indicate the extent to which they agreed with the following items: (1) We compete heavily on the basis of being first-to-market with new products; (2) We typically precede our major customers in bringing new products to the market; (3) We offer products that are very similar to those of our major competitors (reverse scored); and (4) We offer products that are unique and distinctly different from those of our major competitors. As expected, there is a statistically significant and positive relationship between the EO and market pioneering scales ($r = 0.45, p < 0.001$).

Structural organicity scale

Burns and Stalker (1961) observed that participative management is sometimes found in organizations with organic structures. It follows, then, that a significant and positive correlation should exist between the structural organicity scale and a strategic decision-making participativeness scale collected simultaneously with the variables used in the current research ($\alpha = 0.89$). On a

seven-point scale ranging from *strongly disagree* (=1) to *strongly agree* (=7), respondents were asked to indicate the extent to which they agree with the following items, where a higher score indicates a more participative decision-making style: (1) Our major operating and strategic decisions result from consensus-oriented decision making; (2) Our major operating and strategic decisions are made by single individuals with responsibility in the decision area (reverse coded); (3) Our business unit’s philosophy is to involve all levels of management in major operating and strategic decisions; (4) Consensus seeking is a common and pervasive decision-making practice in my business unit; and (5) Information and power are shared extensively in making decisions in my business unit. A higher score on this scale indicates a more participative decision-making style. The structural organicity scales and the strategic decision-making participativeness scale are correlated at the $r = 0.21$ level ($p < 0.05$).

Market responsiveness scale

A theoretically consistent manifestation of market responsiveness is the ability of a firm to quickly deliver new products in response to changing conditions. As such, it was expected that the market responsiveness scale and a quick response scale collected simultaneously with the variables used in the current research would be significantly and positively correlated ($\alpha = 0.85$). On a seven-point scale ranging from *strongly disagree* (=1) to *strongly agree* (=7), respondents were asked to indicate the extent to which they agree with the following items, where a higher score indicates a more rapid product delivery time: (1) We compete heavily on the basis of (short) delivery time; and (2) We have a short delivery time relative to our major competitors. The relationship between the market responsiveness and

the quick response scale was found as expected ($r = 0.66$, $p < 0.01$).

Strategy formation mode scale

Khandwalla (1976) has argued that top management style can be operationalized along several dimensions, one of which is technocracy. A technocratic management style implies a heavy reliance on quantitative decision-making tools and an overall propensity to be systematic, analytical, and scientific when making top-level business decisions. Moreover, a technocratic style implies an analyze-then-act orientation that one would also expect to see among firms with high scores on the strategy formation mode scale. As such, a significant, positive correlation was expected between this scale and a technocratic management scale collected simultaneously with the variables used in the current research to capture Khandwalla's (1976) proposed construct ($\alpha = 0.77$). Technocratic management was assessed using a seven-point scale where the respondent was asked to indicate his/her level of agreement (from *strongly disagree* (=1) to *strongly agree* (=7)) with the following four items: (1) Our major operating and strategic decisions nearly always result from extensive quantitative analysis of data; (2) Our major operating and strategic decisions are nearly always detailed in formal written

reports; (3) We rely principally on experience-based intuition (rather than quantitative analysis) when making major operating and strategic decisions (reverse scored); (4) In general, our major operating and strategic decisions are much more affected by industry experience and lessons learned than by the results of formal search and systematic evaluation of alternatives (reverse scored). The strategy formation mode and technocratic management scales are positively and significantly correlated ($r = 0.67$, $p < 0.01$).

Environmental dynamism scale

It follows that firms that reported operating in a dynamic environment should also report that their respective industries experienced change over recent years. Respondents were asked to indicate how their principal industry downswings and upswings had changed over the past three years, ranging from *have become far more predictable* (=1) to *have become far less predictable* (=7). It was expected that respondents who indicated a high level of dynamism for their firm's principal industry would answer that their industries had become less predictable in recent times. Consistent with this expectation, a positive and significant correlation was observed between the environmental dynamism scale and the corroborating measure ($r = 0.32$, $p < 0.01$).