

COGNITIONS AND BEHAVIORS OF SUCCESSFUL NASCENT ENTREPRENEURS:
A THREE-YEAR PANEL STUDY

ABSTRACT

A mediation model of the cognitions and behaviors that successful nascent entrepreneurs (vs. quitters) use to start “promising” companies was derived from psychological theories about the causality among situation (environment), person (cognition), and behavior. Entrepreneurship, leadership and social cognition research concepts that offer successful responses to uncertain resource-poor dynamic situations, such as those faced by the typical entrepreneur, were studied. Seven interviews over three years for each of 122 would-be founders of independent companies yielded data that fit the theoretical model. Successful entrepreneurs: (1) think frequently about clear stable challenging *entrepreneurial visions*, (2) apply venture-specific *tacit knowledge*, (3) *borrow* to overcome insufficient financial and human resources, (4) engage in product and process *experimentation*, and (5) *adapt strategies and goals* to manage problems and opportunities. A zigzag pattern of quick responses to surprises and shortages emerged among the successful.

The dream of starting a company is held by many; however, few make it to venture start-up, and even fewer start “promising” companies (Bhide, 2000). What is different about those who start promising companies? The answer proposed herein is an “entrepreneurial style” that consists of cognitions and behaviors that had been suggested separately in entrepreneurship, leadership, and social cognition research as isolated predictors of personal success in challenging environments (e.g., high uncertainty, risk, urgency, insufficient personal resources and surprise problems and opportunities). The relevant cognitions and behaviors are combined in a web of relationships that predict new venture start-up, and the model was tested over three years by a research team that tracked the personal characteristics and success or failure of those who had recently and formally declared their pursuit of a start-up dream.

There are multiple personal, organizational, and environmental factors that impact new venture creation and success (Baum, Locke, & Smith, 2001); however, according to venture financiers, entrepreneurs’ personal characteristics dominate other factors (Shepherd, 1999; Zopounidis, 1994). Thus, I focus here on cognitions and behaviors that are used by those who decide to start potentially valuable companies. I want to identify which cognitions and behaviors matter, and I want to better understand how the concepts work together. This study joins work by the growing cohort of researchers who focus on entrepreneurs’ personal characteristics for insight about new venture creation (Baron, 1998, Bhide, 2000; Busenitz & Barney, 1997; Krueger, Reilly, & Carsrud, 2000; Simon, Houghton & Acquino, 2000).

This is the first empirical study of entrepreneurial cognition *and* behavior to focus on the period of opportunity exploitation between “the decision to found a new venture” and “the emergence of an organization with employees and customers”. It builds upon empirical research about entrepreneurs’ decision-making cognitions (heuristics) (Baron, 1998; Busenitz & Barney,

1997) and “arrangements, willingness, and ability” scripts (Mitchell, Smith, Seawright, & Morse, 2000) to focus on entrepreneurial vision, a motivating cognition, and tacit knowledge (automatic compressed experience) which underpin entrepreneurial behavior. The study extends social cognition and leadership theory with attention to three behaviors that have been studied in isolation as responses to resource poor and uncertain "situations". The results may help academics who want to understand the relationships and effects of entrepreneurs' personal characteristics and would-be founders who want to acquire the thinking and action patterns of successful founders.

Insert Figure 1 About Here

THEORY AND HYPOTHESES

Psychologists point to the importance of "situation" in determining cognition and behavior (Endler, 1983; Fiske & Taylor, 1984; House, Shane, & Herold, 1996; Mischel, 1968). Bandura (1986) claims there is three-way causality among person (thinking), situation (environment), and behavior. I draw upon these views about relationships between situation, thinking, and acting to form the theoretical model of entrepreneurs' thinking and acting shown in Figure 1. Indeed, the entrepreneur's situation is strong in the sense that situation (environment) has much to do with entrepreneurship outcomes (Funder & Ozer, 1983; House et al., 1996), and it thereby deserves special attention in the search for personal characteristics that predict start-up success.

Entrepreneurs face uncertainty, risk, urgency, resource shortages (e.g., human and financial), and surprise problems and opportunities because they create new markets, disrupt established markets, and form new organizations (Schumpeter, 1934). Thus, information to guide entrepreneurs' expectations about new marketing and organizational outcomes is scant or even non-existent. Unless intellectual property is protected, competitive advantages may be temporary as competitors or substitutes emerge; high-speed decisions and action are typically required for success (Eisenhardt, 1989). Furthermore, few entrepreneurs have sufficient financial resources to acquire complete facilities, process systems, equipment, and professional talent; and, few can support start-up losses alone. I reviewed entrepreneurship, leadership, and social cognition research in search of cognitions and behaviors that offer successful responses to the extreme situation that entrepreneurs face.

The path model shown in Figure 1 represents recursive relationships; this is useful but incomplete because thinking and acting occur simultaneously and with interdependent effects (Bandura, 1986; Bargh & Chartrand, 1999). Nevertheless, to reflect the proposed dominant flow of forces toward the outcome of interest, the model shows that entrepreneurial vision (H1), tacit knowledge (H2), borrowing (H3), experimentation (H4), and strategy and goal adaptation (H5) affect start-up directly. I also propose that entrepreneurial vision works indirectly through borrowing (H6) and strategy and goal adaptation (H7) and that tacit knowledge works indirectly through experimentation (H8), and strategy and goal adaptation (H9). Examination of the mediation of the effects of cognitive factors (entrepreneurial vision and tacit knowledge) upon "start-up" by behavioral factors (borrowing, strategy and goal adaptation, and experimentation) provides a richer view of the role of behavior (H10) (Baron & Kenny, 1986).

“Start-up” is defined in this study in terms of the presence of paid employees and receipt of payments from customers in independent businesses. “Promising” indicates that the business envisioned could achieve significant economic impact in terms of sales, employment, and profit growth. The category does not include solitary self-employment, life-style firms, "mom and pop" firms, or buy outs (Bhide, 2000).

Entrepreneurial Cognitions

Theory about entrepreneurs’ start-up cognitions (perception, memory, experience, intuition, and judgment) has focused on (1) thinking about the future (e.g., intentions and vision) (Bird, 1992; Krueger et al., 2000; Shaver & Scott, 1991), and (2) decision making orientations (Baron, 1998; Busenitz & Barney, 1997; Eisenhart, 1989; Mitchell et al., 2000; Sarasvathy, 2001; Simon et al., 2000). In summary, researchers note that (1) entrepreneurs hold intense mental *visions* of desirable futures to maintain their long term goals through surprises, shortages and barriers, and (2) they draw upon *tacit knowledge* (e.g., heuristics, scripts, or schema) through automatic cognitive processes based on compressed experience to cope with the uncertainty and urgency they face. These processes produce fast, perhaps biased, decision making. I discuss entrepreneurial vision first and tacit knowledge second.

The Relationship of Entrepreneurial Vision to Subsequent Venture Start-up

New ventures get started and develop through their initial stages largely based upon the thinking and actions of individuals who hold dreams, or visions, of their intended creation (Bird, 1992). Knowledge about the composition, causes and effects of vision has been primarily developed by leadership researchers, and since entrepreneurship is leadership in a new product /

market / organization setting (Vecchio, 2002), leadership knowledge about vision illuminates this theory.

Leadership researchers explain that vision is a projected mental image of what a leader wants to achieve (Bass, 1990); it is a bold audacious overarching goal (Collins & Lazier, 1992), and it is a key predictor of charismatic behavior (House & Shamir, 1993). Vision reflects the cognitions of the leader in terms of values and foresight (Locke, 2000), and it signals motivation, an element of social cognition theory's "willingness" script (Leddo & Abelson, 1986). Leader vision has shown direct and indirect performance effects in laboratory studies (Howell & Avolio, 1989; Kirkpatrick & Locke, 1996).

Successful entrepreneurs tend to have "entrepreneurial visions". That is, they hold visions of new products, new markets, and new venture growth (Baum, Locke, & Kirkpatrick, 1998; Bird, 1989). Entrepreneurial vision may include detailed images of growing workforces, factories, increasingly satisfied customers, fame, and personal wealth, all set in a future timeframe. Whatever the process that created an entrepreneur's vision, I suggest that entrepreneurial vision is important as entrepreneurs face uncertainty about product acceptance, inadequate financing, and feared competitive threats. Successful entrepreneurs' reputed persistence, despite seemingly insurmountable obstacles, may reside in their brilliant visions of desirable futures. Indeed, social cognition theorists recognize the importance of visions as motivating scripts in terms of coping with present problems (Beach, 1993; Fiske & Taylor, 1984). Bird (1992) suggested that entrepreneurs must manage the "temporal tension" between their vision and present day obstacles, and she, too, noted that "temporal tension" provides a motivating force when visions are clear, stable, and challenging. Thus, I hypothesize.

Hypothesis 1: The greater the entrepreneur's vision in terms of its start-up clarity,

stability, and challenge, the greater the incidence of promising venture start-up.

The Relationship of Tacit Knowledge to Subsequent Venture Start-up

Tacit knowledge is knowledge, skill, and ability (KSAs) learned from past experience, analysis, and decision-making - which is compressed subconsciously and held in a human mind *and* which can be accessed in a flash (Polanyi, 1969; Sternberg, Wagner, Williams, & Horvath, 1995). Social cognition researchers (Bargh & Chartrand, 1999) and entrepreneurship researchers (Busenitz & Barney, 1997) identify these cognitive structures as “schema” or “scripts” that enable conscious knowing without conscious analysis. Tacit knowledge is not just a “hunch” or luck; it is knowing without knowing how it is known (Miller & Ireland, 2000). Similarly, tacit knowledge is identified as the “ability script” by Leddo and Abelson (1986).

Personal tacit knowledge is similar to intuition but without metaphysical or mystical roots (Agor, 1989; Crossan, Lane, & White, 1999; Isenberg, 1986; Khatri & Ng, 2000), and it is similar to team level tacit knowledge except that it does not necessarily reflect individuals' experiences with a specific existing company group (Berman, Down, & Hill, 2002; Weick & Roberts, 1993).

As utilized in this study, tacit knowledge is situationally specific (Klein & Hoffman, 1993; Sonnentag, 1998) in terms of the venture that the entrepreneur wants to create. Mitchel et al., (2000) developed a similar concept, “venture ability script”, based upon Leddo and Abelson (1986). That is, venture-specific tacit knowledge has to do with the entrepreneur's KSAs which enable the entrepreneur's vision (Aldrich, 1999; Katz & Gartner, 1988). For example, in this study, tacit knowledge has to do with (1) knowledge about the targeted product and industry

envisioned, and (2) selling, resource acquisition and resource systemization skills. It is likely that serial or habitual entrepreneurs are high on vision-specific tacit knowledge (MacMillan & Katz, 1991); however, others may acquire vision-specific tacit knowledge in diverse settings, even general management (Simon, 1987). Pattern recognition and task-specific memory may be essential antecedents of venture-specific tacit knowledge, even dominating experiential intensity; thus, simple conclusions about who will hold venture-specific tacit knowledge should be challenged (Sternberg et al., 1995; Berman et al., 2002).

In part, tacit knowledge appears as patterns of thought called heuristics or rules of thumb. Heuristics are automatic processes involving schema that can be articulated and classified, as for example in the case of anchoring (Kahneman, Slovic, & Tversky, 1982). Unfortunately when decision makers use simplified abstractions of experience, biases and mistakes may appear in their decision-making (Busenitz & Barney, 1997; Hitt & Tyler, 1991; Kahneman et al., 1982, Miller & Ireland, 2000). Nevertheless, Agor (1989) found that most decision makers who use these processes maintain an awareness of the risks involved in projecting a generalized past to the present.

Tacit knowledge is important in the entrepreneur's exploratory and experimental setting where information is scarce and outcome probabilities unclear. In these urgent highly uncertain situations rational decision-making processes involving extensive information gathering, option generation, and evaluation for optimal choice provide little gain and strain limited resources (Miller & Ireland, 2000; Mitchell & Beach, 1990; Simon, 1987). The effects of tacit knowledge have been studied in four empirical studies of entrepreneurs (Dyke, Fischer, & Reuber, 1989; Reuber, Dyke, & Fisher, 1990; Marchisio & Ravasi, 2001; Samuelsson, 2001). However, none

of these studies offered a comparison of successful vs. less successful entrepreneurs and the tacit knowledge concepts were not measured in terms of the entrepreneurship setting.

Holders of venture-specific tacit knowledge will be better able to move quickly to exploit their vision and hold onto early mover competitive advantages by skipping time-consuming rational decision-making processes (Bargh & Chartrand, 1999; Kirschbaum, 1992). Indeed, theorists and researchers point to performance benefits for the family of concepts that are related to tacit knowledge (intuition / heuristics / scripts / schema) (Agor, 1989; Barnard, 1938; Berman et al., 2002; Crossan et al., 1999; Isenberg, 1986; Knight, 1921; Lord & Maher, 1989).

Hypothesis 2: The greater the use of venture-specific tacit knowledge, the greater the incidence of promising venture start-up.

Entrepreneurial Behaviors

There is little entrepreneurship research about successful entrepreneur behaviors (Gartner, 1988; Gartner, Bird, & Starr, 1992; Stevenson, 1983); however, Bhidé (2000) conducted a case study of 100 new ventures and drew upon Howard Stevenson's (1983) comprehensive behavioral framework of "promoters" (entrepreneurs) and "trustees." Bhidé confirmed that entrepreneurs (1) make quick incremental decisions because they face uncertainty and market pressure, (2) take action that involves minimal investment in temporary assets so they can "bootstrap", (3) gain from trial and error, and (4) adapt to opportunities that arise. Finance researchers who study entrepreneurs' behavior point to financial borrowing that is based upon changing goals and continuous experimentation to cope with uncertainty, shortages, and surprises (Gompers & Lerner, 1999; Smith & Smith, 2000). Taken together and as explained

below, I included borrowing, experimentation, and strategy and goal adaptation as concepts for study.

The Relationship of Borrowing to Subsequent Venture Start up

Borrowing is taking and using something that you don't own with a promise to return what was borrowed with a gain or bonus for the lender. "Entrepreneurial borrowing" includes financial borrowing (leasing, credit card debt, personal mortgages, preferred private equity, joint ventures, etc.), but it can be interpreted more broadly. For example, entrepreneurial borrowing involves paying employees at below market compensation rates in return for promises of future bonuses or equity, borrowing advisor's fees in return for free future goods or services, etc. Indeed, entrepreneurship has been described as the pursuit of opportunities to combine and redeploy resources, without regard to current ownership or control of those resources (Bygrave, 1993). Smith and Smith (2000: 4) point to entrepreneurs' efforts to borrow as a signal of likely new venture success.

Few would-be entrepreneurs have sufficient financial and human capital to start-up "promising" companies without help from employees, customers, and / or suppliers, and debt or equity investors (Smith & Smith, 2000). Founders of mom and pop stores or small service companies may be able to bootstrap their start-up; however, few founders of "promising" companies have sufficient wealth to proceed without regard for the inadequate resources they own (Stevenson, 1983).

Entrepreneurs attract resource lenders with promises of exceptional *future* payments and rewards. For example, successful founders promise high levels of interest on borrowed money with participation in expected earnings, high multiple returns of principal to financiers, and

participation in management; furthermore, founders accept incremental, performance-based releases of cash from financiers (Gompers & Lerner, 1999; Smith & Smith, 2000; Stevenson, 1983). Successful founders offer delayed financial rewards to employees in return for work at below market compensation; they promise valuable products / services at reduced prices in underserved market niches to customers, and they accept contracts with suppliers that include exclusive future relationships and excess prices (Bhide, 2000; Smith & Smith, 2000).

In summary, promising ventures require more financial and human resource investment than less promising ventures (Bhide, 2000). Few would-be entrepreneurs have sufficient resources, so they must borrow resources from others. Those would-be entrepreneurs who won't borrow or who can't borrow are less likely to make it to startup. Thus, I believe that human resource and financial resource borrowing predicts subsequent “promising” venture start-up.

Hypothesis 3: The greater the borrowing of human and financial resources, the greater the incidence of “promising” venture start-up.

The Relationship of Experimentation to Subsequent Venture Start-up

“Experimentation” is conducting trials or tests to discover something that is not known. When coupled with monitoring, the process provides information for adaptation thereby reducing uncertainty. Experimentation also conserves resources by reducing losses through minimal incremental investments (Hisrich, 1990). Experimentation is useful for information gathering, resource conservation, and opportunity taking. Successful experimentation depends upon tight monitoring of constituent (markets, employees, and stakeholders) responses and control of the unfolding action for success to ensue (Levinthal & March, 1993; Thomke, 2003).

Experimentation is useful for entrepreneurs because it reveals information about potential

markets where no established markets exist, and it reveals customer reactions to disruptive product, service, and business model introductions in existing markets (Bhide, 2000: 60). These activities are the entrepreneurial work of business, and they involve decisions about the basic “entrepreneurial problem” in a setting with high uncertainty, urgency, resource scarcity, and surprise (Miles & Snow, 1978). Indeed, Eisenhart (1989) observed “unintended” experimentation among successful entrepreneurs who she studied.

Stevenson (1983: 41) identified the value of experiments for conservation of entrepreneurs’ limited resources: “The entrepreneur’s revolutionary manner of commitment allows for the management of risk, since the ability to decommit quickly must accompany the ability to commit quickly... with the capacity to decommit, an entrepreneur is able to engage in experiments”. Other entrepreneurship scholars have pointed to entrepreneurs’ experimental behavior (conduct incremental product and process introductions, use option-oriented contracts, rent, and subcontract) with close monitoring and control as a form of opportunism that enables fast tentative decisions (Baum, 2003; Bhide, 2000).

Experimentation speeds decision-making and action because it reduces the need for time-consuming, and perhaps, useless information gathering, option development, and option valuation activities. Utilizing an array of diversified experiments may increase decision and action speed because decision makers have confidence that immediate incremental action presents low risk. Laboratory tests of individual level decision making support the view that when experimentation is possible in uncertain environments, decision makers act more quickly than when they must make a full commitment (Levinthal & March, 1993). Taken together, I believe that would-be entrepreneurs who use experimentation move more quickly and toward start-up.

Hypothesis 4: The greater the entrepreneur's use of experimentation in terms of Incremental product and process introductions and use of option-based contracts, the greater the incidence of promising venture start-up.

The Relationship of Strategy and Goal Adaptation to Subsequent Venture Start-up

Goal theory explains that business strategies are implemented most effectively when specific, challenging goals are set (Locke & Latham, 1990). No other theory has deeper or broader empirical support (Landy & Becker, 1987; Locke & Latham, 1990). Goals are important for new venture success in terms of growth (Covin & Slevin, 1988) and new venture survival (Krueger et al., 2000). However, problems or opportunities may arise that make specific established strategies and goals counterproductive (Bhide, 2000; Mischel, 1968). For example, a challenging strategic goal to have a public offering within 1 year may focus attention and inspire achievement of record sales and profits; but if public equity markets suddenly collapse, an unchanged IPO goal may lead to expensive, even disastrous, financing.

The need to adapt strategies and goals is high in start-up situations because decision-making that utilizes tacit knowledge may miss important problems or opportunities. Poor market conditions, high resource requirements, and operating challenges may have been missed or misunderstood. Indeed, rapid changes in new markets frequently present surprise setbacks in start-ups (Smith & Smith, 2000), and opportunities to build better products / services or bigger or better companies emerge out of marketing problems or surprise technological breakthroughs. Thus, the fast moving unresolved markets that entrepreneurs face and their inability to get “hard” information to guide foresight require strategy and goal adaptation for survival and success.

Similarly, entrepreneurial visions, which are in part abstract long-term strategic goals, may require revision, although they are more stable than strategies and goals (Locke, 2000). Strategies and goals, however, must be more flexible than visions because they are more immediate and more specific. They focus immediate attention, and they motivate immediate specific action (Locke & Latham, 1990). Nevertheless, Locke and Latham explain that even strategies and goals that are changeable are important motivators because they focus attention. Finally, Bhide's (2000) case-based research supports the view that new venture strategy and goal adaptation contribute to new venture success. Thus, I hypothesize,

Hypothesis 5: The greater the strategy and goal adaptation to market or operating shifts, the greater the incidence of promising venture start-up.

The Relationship of Entrepreneurial Vision to Borrowing

We propose that possession of a challenging entrepreneurial vision relates with borrowing behavior because challenging visions represent dreams of more substantial ventures. More substantial ventures require greater resources, which, in turn, require greater borrowing of financial and human capital.

Hypothesis 6: The greater the entrepreneurial vision in terms of clarity, stability, and challenge, the greater the borrowing.

The Relationship of Entrepreneurial Vision to Strategy and Goal Adaptation

Collins and Porras (1991) defined vision, in part, as an image of the future based on general, long-term plans and goals. Since we define "strategy and goals" in our research as near-term plans and objectives, we suggest that entrepreneurs' near-term "strategy and goals" are

derived from or based upon entrepreneurial visions. That is, strategy and goals reflect the entrepreneur's grand design in incremental plans and steps along the way to achievement of the vision. Thus, I suggest that would-be entrepreneurs who have a clear challenging vision will also have near-term strategies and goals. Since strategy and goal adaptation can only exist in the presence of existing strategy and goals, I hypothesize that higher entrepreneurial vision clarity and challenge will relate with strategy and goal adaptation. Visionary entrepreneurs may be tempted to persist with their strategies and goals, even as they watch market or operational conditions change; however, would-be founders who hold well-developed visions are more inclined to pay attention to, and act on, emerging problems and opportunities (Bird, 1992).

Hypothesis 7: The greater the entrepreneurial vision in terms of clarity, stability, and challenge, the greater the strategy and goal adaptation to emerging problems and opportunities.

The Relationship of Venture-Specific Tacit Knowledge to Experimentation

Experimentation entails use of “small-step” or partial initiatives with monitoring of outcomes. If outcomes are acceptable, increased or full commitment of resources follows. If outcomes are not acceptable, adaptation and new trials ensue. The process involves multiple decisions about the success or failure of product, market, or operational trials and involves decisions about the appropriate degree of increased commitment or adaptation (Thomke, 2003). Thus, cognitions such as the use of tacit knowledge facilitate and speed the experimental process:

Hypothesis 9: The greater the use of venture-specific tacit knowledge, the greater the use of experimentation.

The Relationship of Venture-Specific Tacit Knowledge to Strategy and Goal Adaptation

Strategy and goal adaptation involve monitoring and responding to emerging problems and opportunities. Would-be founders who possess venture specific tacit knowledge are better endowed with plans and benchmarks and “action triggers” that should help them interpret change and facilitate responses. Furthermore, tacit knowledge affords confidence to speed decision-making about strategy and goals (Baum, 2003).

Hypothesis 8: The greater the use of venture specific tacit knowledge, the greater the strategy and goal adaptation to emerging problems and opportunities.

Borrowing, Experimentation, and Strategy and Goal Adaptation as Mediators

I expect the direct effects of entrepreneurial vision upon venture start up (H1) and the direct effects of venture-specific tacit knowledge upon venture start up (H2) to be diminished when the indirect effects of entrepreneurial vision upon borrowing (H6) and strategy and goal adaptation (H7) and the indirect effects of venture-specific tacit knowledge upon experimentation (H8) and strategy and goal adaptation (H9) are included. Together with significant direct effects from borrowing, experimentation, and strategy and goal adaptation to venture start-up, this condition will confirm that the effects of entrepreneurial vision and tacit knowledge upon venture start-up are mediated by the three behaviors studied (Baron & Kenny, 1986).

Hypothesis 10: The significance of the direct effects of entrepreneurial vision and venture-specific tacit knowledge upon venture start-up is reduced when the indirect effects of entrepreneurial vision and venture specific tacit knowledge through borrowing, experimentation, and strategy and goal adaptation are

included in a total effects model that also exhibits significant direct effects for borrowing, experimentation, and strategy and goal adaptation.

METHODOLOGY

Field Study Participants and Pilot Study

Introductory requests for participation in the study were sent to the four hundred thirty-three (433) would-be founders who applied for start-up information from regional economic development authorities or who received approvals for C-corp, S-corp, LLC, LLP, or LP status in York, Lancaster, and Cumberland Counties, Pa. (YLCC) between October, 1998, and April, 1999. YLCC is an established industrial center with a growing complex of technology-oriented software and hardware companies. Two hundred forty-eight (248) would-be founders applied. Ten would-be entrepreneurs were invited and agreed to pretest a “draft” questionnaire involving ninety-two measures for use in (1) screening to yield the qualified sample, (2) a base-line questionnaire and (3) six structured interviews over three years. The questionnaire was adapted for suggestions from the pilot study group and mailed with a complete explanation of the study and the incentives offered. Responses were received from 202 would-be founders (The representativeness of the 202 respondents in terms of residency by 12 regions and legal entity vs. the population (433) was verified with chi-squared similarity tests.). Qualification of the respondents in terms of (1) intentions to found a promising venture, (2) complete data, and (3) independence from existing organizations yielded 142 qualified participants.

Questionnaire and Interviews

The questionnaire collected personal demographic information, a description of the proposed company, vision statement, business and financial strategy statements, business and financial goals, and three scenarios to identify decision patterns for measurement of tacit knowledge and the "experimentation" benchmark. Measures of financial and human resource sufficiency, KSAs, and measures of the business environment and the start-up situation were also included.

One hundred forty-two (142) "base-line" one-hour structured interviews were conducted by two experienced MBA student-interviewers who worked for a market research firm. Participant's baseline vision, strategy, and goal statements were clarified, additional decision style measures obtained, and a system of monthly diary recording was explained and established to track changes in the entrepreneurs' vision, strategy, goals, financial borrowing, human resource borrowing, product experimentation, process experimentation, and contracting practices. Participants were informed of the format of subsequent follow-up conference calls and about the benefits of continued participation. An important goal of the base-line face-to-face interviews was to establish a relationship between the MBA student interviewers and the participants so that follow-up conference calls would be productive.

Approximately every six months for three years, the MBA student - interviewers conducted follow-up conference call interviews with the would-be founders. The conference calls tracked (1) start-up status, (2) incidence of problems, (3) emergence of opportunities, (4) changes in vision, (5) changes in strategy, (6) changes in goals, (7) incidence of borrowing involving financiers, employees, suppliers, and customers, (8) incidence of product, market, process and contract experimentation, and (9) changes in perceived uncertainty, urgency, and

resource sufficiency. The periodic calls ended when start-up or give-up was reported. The total incidence of strategy and goal adaptation, borrowing, and experimentation was recorded from the inception of the study and also recorded as a calculated rate per month. We lost contact with 20 of the 142 “promising” companies over the 3-year duration of the study, so data from 122 respondents is used in this study. Seventy-four (74) would-be founders started operations, 46 gave-up, and 2 continued their start-up attempt beyond the three year duration of the study.

Insert Table 1 About Here

Measures and Controls

Table 1 is a summary of the measurement model concepts, the number of items, format, research source and LISREL 8.3 composite reliability (CR). CR is conceptually similar to ALPHA (Werts et al., 1974); it should exceed .60 for exploratory model testing (DeVellis, 1991) (The lowest CR for the focal measures used herein was $CR > .71$. The munificence control variable had $CR > .70$).

(1) *Promising Venture Start-up* (CR = 1.00). “Start-up” was defined as the date when cash from billings was received and employees were paid. It was self-reported by the study participants during follow-up conference calls and scored as 0 for “give-up”, .5 for “still trying”, and 1 for start-up.

(2) *Entrepreneurial Vision* (CR = .83). In the questionnaire, respondents were asked to write out the vision they held of their future company, if they had a vision. A research assistant and PhD student who had been trained in content analysis rated vision in terms of challenge and

clarity (Baum et al., 1998). The two ratings produced the CR shown. Vision stability was evaluated and scored in subsequent interviews by the MBA student - interviewers.

(3) *Venture-specific Tacit Knowledge* (CR = .71). Tacit knowledge was measured consistent with the practice of Sternberg et al.(1995). The participants were asked to read each of three scenarios that drew upon the participants own venture idea to rank a list of 10 follow-up actions in the order that they would follow. The actions include protection of intellectual property, collection of human and financial resources, market evaluation, and product introduction. An expert ranking (benchmark) was developed using the average ranking offered by 10 successful established serial entrepreneurs who participated in a separate study. Reversed ranking variances ($\Sigma\delta^2$) from the expert panel's average ranking were calculated for each of the participants for each of the three decision scenarios to reflect venture-specific tacit knowledge. Sternberg et al. report satisfactory construct validities for this tacit knowledge measurement process utilizing other scenarios in laboratory settings; however, the decision scenarios employed in this field test have not been tested elsewhere.

(4) *Borrowing* (CR = .81). Borrowing was measured by the three MBA interviewers during the follow-up conference calls as the number of incidents per month of acquisition of resources not owned by the would-be founder during the “spell”. Interviewers had a guide list of borrowing events (e.g., employment with stock options, promises to pay later for supplies, etc.). The 2 raters performed their evaluations independently to produce blind / independent measures of borrowing over the three year period.

(5) *Experimentation* was measured by the three MBA interviewers during the follow-up conference calls (CR = .86). "Experimentation" was the number of experimentation incidents per month during the spell. A guide based upon questions derived from questionnaire responses,

Stevenson (1983), and Levinthal and March (1993) was used. The 2 raters performed their evaluations independently to produce blind / independent measures of borrowing over the three year period.

(6) *Strategy and Goal Adaptation* was also blind coded by the MBA interviewers during the follow-up conference calls (CR = .78). Similar to the calculation of “borrowing”, “strategy and goal adaptation” was the number of incidents per month of changed strategies and goals during the “spell”. Interviewers had a list of “strategy adaptation” and “goal adaptation” events that were used to guide for the discussion of “strategy and goal adaptation” based upon Locke and Latham (1990) and answers provided in the questionnaire.

Three controls were included to clarify the relations among the independent and dependent variables: (7) *Basis for Competition* (technology or efficiency), which was assessed by an experienced private equity financier and myself based upon the questionnaire descriptions of the proposed company, (8) *Industry Munificence* was assessed with 5 LRF statements in the questionnaire at the beginning of the study period, and (9) *Industry Dynamism* was also measured with 5 LRF statements. Control measurement items are available from the author.

RESULTS

LISREL 8.3 and PRELIS 2 were used to: (1) evaluate concept validity [i.e., “composite reliability”, convergent, and discriminant validity], (2) perform confirmatory factor analysis to verify the validity of the proposed configuration of causal concepts, and (3) test the hypotheses (Joreskog & Sorbom, 1993). The measurement model had 6 concepts with CR > .80 and 3 concepts with CR between .70 and .79. All measure coefficients were significant ($t > 2.0$; $p < .05$); thus, claims of convergent validity were supported. Discriminant validity was verified by

determining for each latent variable that the average variance extracted by the latent variable's measures was larger than the latent variable's shared variance with any other latent variable (Fornell & Larcker, 1981). Discriminant validity is also supported because no bivariate correlations in excess of .40 exist between predictor concepts except between goal adaptation and experimentation ($p = .42$) (Jones, Lanctot, & Teegen, 2000). Common source bias was checked with LISREL confirmatory factor analysis by linking a common latent variable with all of the scale-based self-reported measures (2 independent concepts and 2 controls). The resultant coefficient $LAMBDA = .06$ ($t = .29$, $p < .05$) indicated that common variance was less than 2%. In summary, the measurement model exhibited reliable measurement of the latent concepts, convergence of the measures of each concept, and divergence of the concepts.

Insert Table 2 About Here

Table 2 shows the "fit" results of the structural equation modeling. The direct, indirect, and total effects models have acceptable fits, but the direct effects model is significantly better than the indirect effects model (e.g., the χ^2 reduction is significant for the degrees of freedom added). The total effects model is best [χ^2 (339, $n = 112$) = 718.68; GFI = .94; AGFI = .91; RMR = .066; and RMSEA = .042].

Table 2 also shows the standardized structural equation coefficient results. As hypothesized, entrepreneurial vision, venture-specific tacit knowledge, borrowing, experimentation, and strategy and goal adaptation predict promising venture start-up. The behaviors partially mediate the cognitions. Indeed, hypothesis 10 is supported in part because the direct effects of entrepreneurial vision upon start-up are reduced when the indirect effects

through borrowing and strategy and goal adaptation are included, and the direct effects of venture-specific tacit knowledge are reduced when the indirect effects through strategy and goal adaptation and experimentation are included. The direct effects of the behaviors studied remained significant. Hypothesis 7 (entrepreneurial vision is positively related with strategy and goal adaptation) was not supported. Although the relationship was negative in the indirect effects model, the coefficient is not significant in any of the models. The industry munificence and dynamism controls were significant, but the "basis for competition" control did not significantly affect start-up.

I reran the SEM solution with the non-significant paths between entrepreneurial vision and goal adaptation and between basis for competition and promising venture start-up removed. The model fit improved significantly; however, I chose to display the results with the non-significant paths shown as a backdrop for the discussion. In short, the SEM fit is good, so conclusions about the relationships among the study's concepts can be based upon the latent variable coefficients.

DISCUSSION

The most important finding of this study is that over three years, those entrepreneurs who used a web of cognitions and behaviors to cope with their uncertain, urgent, resource poor situations were more likely to achieve promising new venture start up than entrepreneurs who did not adopt the entrepreneurial style identified herein. The success of searching for predictors that are oriented to the entrepreneur's situation may attract further analysis of the entrepreneur's unique *situation*. Findings that the concepts studied here impact individual performance are fully consistent with prior studies in entrepreneurship, leadership, and cognitive psychology, but this

study points to the interrelationships among the concepts and confirmed their prediction of start-up success in the entrepreneurship research domain. A further contribution of the study is that it provides support for the growing cohort of researchers who believe that a personal "internal" explanation for entrepreneurship performance is valid and useful.

The picture that emerges from our findings is of an entrepreneur who (1) thinks repeatedly about his/her clear challenging vision, (2) has and applies relevant tacit knowledge, (3) borrows to overcome insufficient personal resources, (4) experiments with products, processes, and business arrangements, and (5) who adapts strategies and goals to manage problems and opportunities. In other words, successful entrepreneurs' thinking and acting during the days from conception of a new business until start-up are characterized by zigzags that are responses to the dynamic tension between dreams, surprises, shortages, and unintended trials and errors. The five predictor concepts studied herein deserve further attention in entrepreneurship research; but the strong quantitative results do not adequately describe the dynamics of the process that the interviewees and I watched and listened to as would-be entrepreneurs struggled with real challenges to their dreams. Nevertheless, the quantitative significance of vision, tacit knowledge, borrowing, experimentation, and adaptation in this study captures the essence of the process that we observed. There is evidence that these concepts work together.

Entrepreneurial Vision

Although vision is widely discussed in the leadership literature, it has received only occasional attention among entrepreneurship researchers. My focus on the clarity, stability, and degree of challenge of the vision and my findings of significant direct effects, even in the presence of mediators, points to the likely gains from more empirical studies of vision. However, my measurement of vision in terms of situationally specific clarity and challenge may

have yielded higher relationships with specific outcomes than general vision concepts yield with general outcomes. It is noteworthy that entrepreneurial vision related highly with borrowing, and this may be because those who hold clear challenging visions may borrow more readily because they are more confident about their future. Or they may need more resources because they have bigger dreams.

Venture-specific Tacit Knowledge

This study found that entrepreneur's who are able to utilize flash responses to opportunities and problems achieve higher rates of new venture creation than those who hold to more synoptic formal processes. Whether tacit knowledge is labeled intuition, schema, or heuristics; and, whether it is viewed as metaphysical, subconscious, conscious, or part of a “collective mind”, tacit knowledge is measurable and useful as a tool to explain individual and organizational behavior. Left unanswered by our study is why and how some people gain useful tacit knowledge from past experiences and others do not. The extent to which tacit knowledge use is a learnable, volitional, malleable, aspect of decision style also remains a topic for future study.

Borrowing

Borrowing is the only predictor concept that did not relate significantly with promising venture start-up in the direct effects model; however, it was a significant predictor in the indirect effects model where the effects of vision through borrowing were included. While it does not appear to be as significant a predictor of start-up in this study as experimentation and strategy and goal adaptation, its importance as a mediator of vision points to its importance for most promising new venture start-ups. My definition and measurement of borrowing to include

financial and human resource borrowing may have been too broad, so future studies may wish to segment the concept.

Strategy and Goal Adaptation

As expected, strategy and goal adaptation was a significant predictor of start-up. It is one of three concepts in this study (venture-specific tacit knowledge, goal adaptation, and experimentation) that reflect the zigzag behavior that we observed among the most successful participants. Interestingly, entrepreneurial vision did not predict strategy and goal adaptation as expected. However, the strong logical links between vision, strategy, and goals has to do with content, not stability. That is, high vision challenge has been linked with high goal challenge, but vision stability has not linked empirically with either strategic or goal stability as we hypothesized. Interviewers reported that successful founders tended to hold fast to their vision, even as they were active adapters of strategies and goals.

Experimentation

Experimentation appears in multiple research domains as trial and error and improvisation; however, this is the first empirical study of experimentation among start-up entrepreneurs. My finding that experimentation has significant direct and mediating effects for start-up suggests that it may be useful to explore its antecedents and appropriateness across settings. Apparently, experimentation is relevant in situations where information is poor; however, it may only be useful when monitoring is possible and when it is possible to make rapid changes in decisions and actions. Furthermore, experimental processes may not be possible with strategic decisions about start-ups that require massive long-term investments, and experimentation may not be useful for entrepreneurs who have few resource constraints or who need to move forward with full commitments to threaten competitors. Experimental behavior is

trainable. Indeed, our pilot study panel was able to describe ways to construct experiments and it was able to develop options or stage investments to avoid full commitment in three start-up scenarios.

Limitations

First, I control for industry munificence and dynamism; however, there is no control for the commercial feasibility of the business idea. Bad ideas may not attract necessary resources, no matter how strong the vision or how able the entrepreneur is to zigzag around barriers to market entry. Second, measurement of the study concepts involves content analysis of vision statements and structured interviews. Although multiple raters were utilized, biases and mistakes may contribute to misinterpretation. Third, the region studied may have unique regional market structures that prevent generalization to other regions. Fourth, the study period was triggered by the application for, and approval of, a legal entity. This event may not reflect the origination of the entity (e.g., some would-be founders may have been well-organized before they sought legal status.). Fifth, future studies could benefit from a larger sample; however, the gains from a three-year interview study may justify our compromised sample size. Sixth, I modeled with linear equations rather than multiple-order equations because structural equation modeling is not well suited to testing non-linear models. Finally, I utilized self-reports for some measures; however, the tests for common source bias appear to indicate that the threat is small.

Nevertheless, these possible failures to specify the optimal concepts and the exact form of the relationships do not diminish the value of the primary finding – that entrepreneurs who adopt potent visions, borrow, and zigzag quickly around surprises and barriers are more likely to achieve start up.

REFERENCES

- Agor, W.H. 1989. Intuition in organizations. Newbury Park, CA: Sage.
- Aldrich, H.E. 1999. Organizations evolving. London, Sage.
- Bandura, A. 1997. Self-efficacy: The exercise of control. New York: W.H. Freeman.
- Bargh, J.A., & Chartrand, T.L. 1999. The unbearable automaticity of being. American Psychologist, 54:462-479.
- Barnard, C.I. 1938. The functions of the executive. Cambridge, MA: Harvard University Press.
- Baron, R.A. 1998. Cognitive mechanisms in entrepreneurship: Why and when entrepreneurs think differently than other people. Journal of Business Venturing, 13: 275-294.
- Baron, R.E., & Kenny, D.A. 1986. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology, 51: 1173-1182.
- Bass, B.M. 1990. Handbook of leadership. New York, Free Press.
- Baum, J.R. 2003. Entrepreneurial orientation and strategic decision speed. Proceedings: Academy of Management Conference – Seattle, WA.
- Baum, J.R., Locke, E.A., & Kirkpatrick, S.A. 1998. A Longitudinal Study of the relations of vision and vision communication to venture growth in entrepreneurial firms. Journal of Applied Psychology, 83(1): 43-54.
- Baum, J.R., Locke, E.A., & Smith, K.G. 2001. A multidimensional model of venture growth. Academy of Management Journal, 44(2): 292-303.
- Beach, L.R. 1993. Making the right decision: Organizational culture, vision, and planning. Englewood Cliffs, NJ: Prentice-Hall.
- Berman, S. L., Down, J., & Hill, C. W. L. 2002. Tacit knowledge as a source of competitive

- advantage in the national basketball association. Academy of Management Journal, 45(1), 13-31.
- Bhide, A.V. 2000. The origin and evolution of new businesses. New York: Oxford University Press.
- Bird, B. 1989. Entrepreneurial behavior. Glenview, IL: Scott Foresman.
- Bird, B. 1992. The operation of intentions in time: The emergence of the new venture. Entrepreneurship Theory and Practice, 17(1): 11-20.
- Busenitz, L.W., & Barney, J.B. 1997. Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. Journal of Business Venturing, 12: 9-30.
- Bygrave, W.D. 1993. Theory building in the entrepreneurship paradigm. Journal of Business Venturing, 8: 255-280.
- Collins, J.C., & Lazier, W.C. 1992. Beyond entrepreneurship. Englewood Cliffs, NJ: Prentice Hall.
- Collins, J.C., & Porras, J. 1991. Organizational vision and visionary organizations. California Management Review, 34: 30-52.
- Covin J.G., & Slevin, D.P. 1988. The influence of organization structure on the utility of an entrepreneurial top management style. Journal of Management Studies, 25: 217-234.
- Crossan, M.M., Lane, H.W., & White, R.E. 1999. An organizational learning framework: from intuition to institution. Academy of Management Review, 24(3): 522-537.
- DeVellis, R.F. 1991. Scale development: Theory and applications. Newbury Park, CA: Sage.
- Dyke, L., Fischer, E., & Reuber, A. 1989. Measuring the cognitive strategic sophistication of entrepreneurs through tacit knowledge. Proceedings: Babson Entrepreneurship

- Research Conference, St. Louis, MO. Babson Park, MA: Babson College.
- Eisenhardt, K.M. 1989. Making fast strategic decisions in high-velocity environments. Academy of Management Journal, 27: 299-343.
- Endler, N.S. 1983. Interactionism: A personality model but not yet a theory. In M.M Page, & L. Diensthier (eds.). Personality: Current theory and research: 155-200. Nebraska Symposium on Motivation. Lincoln, NB: University of Nebraska Press.
- Fiske, S.T., & Taylor, S.E. 1984. Social Cognition. Reading, MA: Addison-Wesley.
- Fornell C., & Larcker D. 1981. Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18:39-50.
- Gartner, W.B. 1988. "Who is an entrepreneur?" is the wrong question. American Journal of Small Business, 13: 11-32.
- Gartner, W.B., Bird, B., & Starr, J. 1992. Acting as if: Differentiating entrepreneurial from organizational behavior. Entrepreneurship Theory and Practice, 16(3): 13-31.
- Gompers, P.A., & Lerner, J. 1999. The venture capital cycle. Cambridge, MA: MIT Press.
- Hambrick, D.C., & Finkelstein, S. 1987. Managerial discretion: A bridge between polar views of organizational outcomes. In L.L. Cummings, & B.M. Staw, Research in Organizational Behavior: 369-406. Greenwich, CT: JAI Press.
- Hisrich, R.D. 1990. Entrepreneurship/Intrapreneurship. American Psychologist 45: 209-222.
- Hitt, M.A., & Tyler, B.B. 1991. Strategic decision models: Integrating different perspectives. Strategic Management Journal, 12: 327-351.
- House, R.J., & Shamir, B. 1993. Toward the integration of transformational, charismatic and visionary theories of leadership. In M. Chemers & R. Ayman (Eds.), Leadership theory and research: Perspectives and directions: 81-107. San Diego, CA: Academic Press.

- House, R.J., Shane, S.A., & Herold, D.M. 1996. Rumors of the death of dispositional research have been greatly exaggerated. Academy of Management Review, 21(1): 203-224.
- Howell, J.M., & Avolio, P.J. 1989. A laboratory study of charismatic leadership. Organization Behavior and Human Decision Processes, 43: 243-269.
- Isenberg, D.J. 1986. Thinking and managing: A verbal protocol analysis of managerial problem solving. Academy of Management Journal, 9: 775-788.
- Jones, G.K., Lanctot, A., & Teegen, H.J. 2000. Determinants and performance impacts of external technology acquisition. Journal of Business Venturing, 16: 255-283.
- Joreskog K.G., & Sorbom D. 1993. LISREL 8: User's reference guide. Chicago, IL: Scientific Software International.
- Kahneman, D.D., Slovic, P., & Tversky, A. 1982. Judgment under uncertainty: Heuristics and biases. New York: Cambridge University Press.
- Katz, J.A., & Gartner, W. 1988. Properties of emerging organizations. Academy of Management Review 13: 429-441.
- Khatri, N., & Ng, H.A. 2000. The role of intuition in strategic decision-making. Human Relations, 53: 57-86.
- Kirkpatrick, S.A., & Locke, E.A. 1996. Direct and indirect effects of three core charismatic leadership components on performance. Journal of Applied Psychology, 81: 36-51.
- Kirschbaum, S.S. 1992. Influence of experience on information-gathering strategies. Journal of Applied Psychology, 77: 343-352.
- Klein, G., & Hoffman, R. 1993. Seeing the invisible: Perceptual-cognitive aspects of expertise. In M. Rabinowitz (Ed.), Cognitive Science Foundations of Instruction: 203-226.

- Hillsdale, NJ: Lawrence Erlbaum.
- Knight, F.H. 1921. Risk, uncertainty and profit. Boston: Houghton Mifflin.
- Krueger, N.F., Reilly, M.D., & Carsrud, A.L. 2000. Competing models of entrepreneurial intentions. Journal of Business Venturing, 15: 411-432.
- Leddo, J., & Abelson, R.P. 1986. The nature of explanations." In J.A. Galambos, R.P. Abelson, & J.B. Black (eds.). Knowledge Structures: 103-122. Hillsdale, NJ: Erlbaum.
- Levinthal, D.A., & March, J.G. 1993. The myopia of learning. Strategic Management Journal, 14: 95-112.
- Landy, F.J., & Becker, W.S. 1987. Motivation theory reconsidered. In L.L. Cummings & B.M. Staw (Eds.), Research in organization behavior: 1-38.
- Locke, E.A. 2000. The prime movers. New York: Amacom.
- Locke, E.A., & Latham, G.P. 1990. A theory of goal setting and task performance. Englewood Cliffs, NJ: Prentice Hall.
- Lord, R.G., & Maher, K.J. 1989. Cognitive processes in industrial and organizational psychology. In C.A. Cooper & I.I. Robertson (Eds.), International Review of Industrial and Organizational Psychology: 49-92. Chichester, UK: Wiley.
- MacMillan, I.C., & Katz, J.A. 1991. Idiosyncratic milieus of entrepreneurial research: The need for comprehensive theories. Journal of Business Venturing, 7: 1-8.
- Marchisio, G. & Ravasi, D. 2001. Managing external contributions to the innovation process in entrepreneurial ventures: A knowledge-based perspective. Frontiers of Entrepreneurship Research. Boston, MA: Babson College.
- Miles, R.E., & Snow, C.C. 1978. Organization strategy, structure, and process. New York: McGraw-Hill.

- Miller, C.C., & Ireland, R.D. 2000. Intuition in strategic decision making: Friend or foe in the entrepreneurial millennium. Vancouver: Strategic Management Society.
- Mischel, W. 1968. Personality and assessment. New York: Wiley.
- Mitchell, T.R., & Beach, F.L.R. 1990. "...Do I love thee? Let me count ...". Toward an understanding of intuitive and automatic decision making. Organizational Behavior and Human Decision Processes, 47: 1-20.
- Mitchell, R. K., Smith, B., Seawright, L. W., & Morse, E., A. 2000. Cross-cultural cognitions and the venture creation decision. Academy of Management Journal, 43(5): 974-993.
- Polanyi, M. 1969. Knowing and being. Chicago: University of Chicago Press.
- Reuber, R., Dyke, L., & Fischer, E. 1990. Experientially acquired knowledge and Entrepreneurial venture success. Proceedings: Academy of Management Conference
- Samuelsson, M. 2001. Modeling the nascent venture opportunity exploitation process across time. Frontiers of Entrepreneurship Research. Boston, MA: Babson College.
- Sarasvathy, S.D. 2001. Causation and effectuation: Toward a shift from economic inevitability to entrepreneurial contingency. Academy of Management Review, 26 (2): 243-263.
- Schumpeter, J.A. 1934. The theory of economic development. Cambridge, MA: Harvard University Press.
- Shane, S., & Venkataraman, S. 2000. The promise of entrepreneurship as a field of research. Academy of Management Review, 25 (1): 217-226.
- Shaver, K.G., & Scott, L.R. 1991. Person, process, choice: The psychology of new venture creation. Entrepreneurship Theory and Practice, Winter: 23-45.
- Shepherd, D.A. 1999. Venture capitalists' assessment of new venture survival. Management Science, 45(5): 621-632.

- Simon, 1987. Making management decisions: The role of intuition and emotion. Academy of Management Executive, 1: 57-64
- Simon, M., Houghton, S.M., & Aquino, K. 2000. Cognitive biases, risk perception, and venture formation: How individuals decide to start companies. Journal of Business Venturing, 15: 113-134.
- Smith, K.S., & Smith, R.L. 2000. Entrepreneurial Finance. New York: Wiley.
- Sonnentag, S. 1998. Expertise in professional software design: A process study. Journal of Applied Psychology, 83(5): 703-715.
- Sternberg, R.J., Wagner, R.K., Williams, W.M., & Horvath, J.A. 1995. Testing common sense. American Psychologist, 50:11: 912-927.
- Stevenson, H.H. 1983. A new paradigm for entrepreneurial management. In J.J. Kao and H.H. Stevenson (Eds.). Entrepreneurship: What it is and how to teach it. Boston: Harvard Business School Publishing.
- Thomke, S.H. 2003. Experimentation matters: Unlocking the potential of new technologies for innovation. Boston: Harvard Business School Publishing
- Vecchio, R.P. (in press). Entrepreneurship and leadership: Common threads and common trends. Human Resources Management Review.
- Weick, K.E., & Roberts, K.H. 1993. Collective mind in organizations: Heedful interrelating on flight decks. Administrative Science Quarterly, 38: 357-381.
- Werts, C.E., Linn, R.L., & Joreskog, K.G. 1974. Interclass reliability estimates: Testing structural assumptions. Educational and Psychological Measurement, 34: 25-33.
- Zoupounidis, C. 1994. Venture capital modeling: Evaluation criteria for the appraisal of investments. The Financier, 1(2): 54-64.

TABLE 1
MEASUREMENT MODEL

Latent Variables	# Items & Format ^a	CR ^b	Research Reference
Promising Venture Start Up	Rev's and wages = 1	1.00	Bhide (2000)
Entrepreneurial Vision	2 raters scores	.83	Baum et al. (1998)
Tacit Knowledge	3 rankings vs. experts	.71	Sternberg et al. (1995)
Borrowing	3 raters scores	.81	Smith & Smith (2000)
Experimentation	3 raters scores	.86	Stevenson (1983)
Strategy & Goal Adaptation	3 raters scores	.78	Locke & Latham (1990)
Basis for Competition	2 raters classifications	.97	Shane & Venkataraman (2000)
Industry Munificence	5 LRF statements	.70	Hambrick & Finkelstein (1987)
Industry Dynamism	5 LRF statements	.87	Covin & Slevin (1988)

Notes: ^a See Methodology for details.

^b CR = Composite reliability, an indication of internal consistency. CR is the sum of the square roots of the item squared multiple correlations, squared, and divided by the same quantity plus the sum of the error variances (Werts, Linn, & Joreskog, 1974)

TABLE 2
STRUCTURAL EQUATION RESULTS:
DIRECT, INDIRECT, AND TOTAL EFFECTS MODELS

Predictor	Outcome	Direct Effects	Indirect Effects	Total Effects
Entrepreneurial Vision	Start-up	.34*	.	.20*
Tacit Knowledge	Start-up	.16*		.12*
Borrowing	Start-up	.10	.16*	.12*
Experimentation	Start-up	.32*	.32*	.32*
Strategy & Goal Adaptation	Start-up	.28*	.32*	.30*
Basis for Competition	Start-up	.06	.08	.07
Industry Munificence	Start-up	.22*	.23*	.22*
Industry Dynamism	Start-up	.17*	.19*	.19*
Entrepreneurial Vision	Borrowing		.44*	.28*
Entrepreneurial Vision	Strategy and Goal Adaptation		-.09	.00
Tacit Knowledge	Strategy and Goal Adaptation		.42*	.24*
Tacit Knowledge	Experimentation		.31*	.26*
Fit Statistics: X^2		751.17	787.71	718.68
Degrees of freedom		343	341	339
GFI		.92	.90	.94
AGFI		.89	.86	.91
RMR		.073	.081	.066
RMSEA		.059	.068	.042

Parameter estimates are from the completely standardized solution.

* = "t" > 2.0 (p<.05); N = 122

FIGURE 1
THEORETICAL MODEL

