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RESEARCH NOTE

PREDICTING NEW VENTURE SURVIVAL: AN ANALYSIS OF "ANATOMY OF A START-UP." CASES FROM *INC.* MAGAZINE

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EXECUTIVE SUMMARY

This article tests the insights and predictions of venture success as offered by reporters and experts in Inc. *magazine, to the predictions generated from an analysis of data from a venture screening questionnaire. The venture screening questionnaire, consisting of 85 items covering four broad categories: (1) Individual Characteristics; (2) Entrepreneurial Behaviors; (3) Strategy; and (4) Environment, was used to evaluate 27 "Anatomy of a Start-up" articles from* Inc. *magazine. The creation of the questionnaire was guided by the following premises:*

Individual Characteristics. *We hypothesized that the chances of venture survival would be improved if: (1) entrepreneurs had substantial knowledge and ability at the beginning of the start-up story; (2) entrepreneurs gained knowledge and ability during the start-up process; and (3) entrepreneurs continued to demonstrate substantial knowledge and ability at the end of the start-up story.*

Entrepreneurial Behaviors. *We hypothesized that entrepreneurs who expended more effort in any*

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of the following activities would be in new ventures that survived compared to entrepreneurs who expended less effort: Finding and Refining the Opportunity—*comprised of 9 different activities, such as, defining the purpose of the business, planning, analyzing competitors;* Acquiring Resources and Help—*comprised of 15 different activities, such as, finding investors, getting advice from lawyers, getting a loan, acquiring technical expertise;* Operating the Business—*comprised of 5 different activities, such as, dealing with distributors, managing the day to day operations of the business;* Identifying and Selling to Customers—*comprised of 5 different activities, such as, identifying specific customers to sell to, selling to customers, managing sales channels;* Outside of the Business Issues—*comprised of 4 different activities, such as, dealing with family problems, spouse, and friends.*

Strategy and Environment. *The strategy and environment variables were characteristics requiring comparisons of the relative performance of new firms vis-à-vis other competitors and their industry characteristics, much like the questions used in PIMS research: first to entry, degree of innovation, rate of industry growth, size of market, relative price, and relative quality. There were 28 questions in this section of the instrument. We hypothesized that niche oriented strategies and high growth environments might be strategy and environmental characteristics common to startups that survived.*

In total, there were 85 questions that comprised the venture screening questionnaire.

New Venture Survival. *The measure of new venture survival for this study was a determination of whether the new venture described in each* Inc. *magazine article (Longsworth 1991) was still in operation as of January 1995. This date is nearly 4 years after the last case study that we analyzed was published (September 1990), and nearly 7 years after the first case study was published (February 1988). We were able to determine that of the 27 new ventures profiled in the "Anatomy of a Startup" series published in Longsworth (1991), 17 of these ventures were still in operation.*

A discriminant analysis was performed that resulted in seven variables that correctly classified 85% of the cases into new venture survivors or non-survivors. New ventures that survived were more likely to have: (1) entrepreneurs who gained knowledge and ability during the founding process; who devoted greater efforts to (2) dealing with suppliers; (3) analyzing potential new entrants and who (4) devoted less time to determining the identity of the business; businesses that had (5) "fundable" resource requirements (6) focused on products or services that were designed or produced to order; and (7) were in high growth industries. The classification accuracy of the model was much better than industry experts (55% correct), competitors (55% correct), venture capitalists and financiers (40% correct), and customers (38% correct).

Even though the discriminant analysis was better able to predict venture survival or non-survival compared to the experts, there are significant limitations to the reliability and validity of this one particular model, and the data set used. The primary value of this exercise involves making obvious the variables that observers use to make judgments about predicting venture success. One of the frustrations we experienced in analyzing the expert's predictions was our inability to glean consistent and general "rules of thumb" about new venture success from their observations. We conclude by discussing the value of academic research on new venture success predictors vis-à-vis other avenues of inquiry and expertise: popular journalism and practice.

INTRODUCTION

Can the survival of a new venture be predicted?

One of the engaging aspects of the "Anatomy of a Start-up" articles that began to appear in *Inc.* magazine beginning in February, 1988, was the commentary by venture experts on whether the new venture described in the article would likely survive. The "Anatomy of a Start-up" articles were written by journalists as profiles of ongoing new venture start-ups. When these articles were written the journalists did not know whether the new venture start-ups would succeed or fail. As George Gendron, Editor-in-Chief of *Inc.* magazine, explained:

TABLE I Advice From *Inc.* Magazine

1. *If Cash Is King, Flexibility Is God.* "What has made or broken many of the companies we've watched, though, is this: the ability (or inability) to recognize and react to the completely unpredictable."
2. *Nobody Likes Your Product As Much As You Do.* "The most successful entrepreneurs worked hard to assess the need for their offerings; others acted on blind faith, and for them the start-up process has been particularly rocky."
3. *If You Don't Have Experience, Buy It.* "The strongest companies were led by people with experience in their industries."
4. *Your Competitors Aren't Dumb.* "Competitors are to be respected. . . . When start-ups ignore that, they turn arrogance into red ink."
5. *It Isn't the Sales. It's the Sales Cycle.* ". . . what a lot of companies repeatedly miscalculated was the sales cycle—the length of time between the first sales pitch to the customer and that customer's actual purchase."
6. *Don't Underestimate How Much Time Simply Being the Boss Will Eat Up.* "Those who delegated well didn't get overwhelmed by minutiae. Others got buried."

> Each month we scout the start-up landscape for the most compelling business plans we can find: those that tell us something new about the world in which we do business or about the start-up process itself. One of *Inc.*'s writers takes the material and works it into publishable form—including a summary of the business plan narrative, a biography of the founder, detailed financial projections and all. Then (and here's the fun part), we locate the toughest, most seasoned, most skeptical experts—investors, industry analysts, even potential competitors—send them our write-up, and let them play venture capitalist. Will the new venture succeed? What are the hidden pitfalls that have been overlooked? How could the plan be changed to increase its chances of survival? (Longsworth 1991, p. iv)

What we found intriguing about these articles was the wide variation in the experts' opinions about the criteria for predicting new venture survival as well as *Inc.* magazine's insights (Brokaw 1991), about new venture survival/success predictors [e.g., "the most successful entrepreneurs worked hard to assess the need for their offerings," (p. 55); "the strongest companies were led by people with experience in their industries," (p. 57). See Table 1]. The insights offered by the venture experts and Brokaw (1991) prompted us to explore whether a systematic framework for assessing new ventures generated from the academic literature in entrepreneurship might result in a more comprehensive and accurate model for predicting the survival of the "Anatomy of a Start-up" ventures. In other words, could academically derived venture screening criteria be used to "beat the experts" at predicting new venture survival?

In addition, we were interested in exploring the use of publicly available data (i.e., magazine articles) as a source of information for analyzing new venture survival. The use of widely available articles from magazines as a source of data would solve some of the problems identified by Katz (1988, 1989) regarding the need to make data sets widely available to all researchers, and provide for inexpensive access to information on new ventures for research and teaching.

This article is divided into four sections. The first section offers a brief overview of some of the academic literature on new venture survival predictors and describes key aspects of the venture screening questionnaire. The second section describes how the venture screening questionnaire was used to analyze "Anatomy of a Start-up" articles from *Inc.* magazine. The third section presents results from an exploration of the data and a discussion of these findings. The final section of the paper concludes with

some observations about the venture screening questionnaire's usefulness as a method for research on predicting new venture survival.

NEW VENTURE SCREENING CRITERIA

As Cooper and Gascon (1992) indicate, one of the central issues in the academic literature on entrepreneurship focuses on criteria for predicting successful new ventures. A significant amount of research has been conducted to address this issue (e.g., Bull and Willard 1993; Buzzell and Gale 1987; Covin and Slevin 1990; Duchesneau and Gartner 1990; Gartner 1985; Herron and Robinson 1993; Low and MacMillan 1988; MacMillan, Siegel, and Subba Narasimha 1985; Merrifield 1987; Miller and Camp 1985; Roure and Keeley 1990; Sandberg and Hofer 1987, Timmons 1994; Van de Ven, Hudson, and Schroeder 1984; Vesper 1990). The number of new venture success predictors that have been suggested by academic researchers is substantial (Cooper 1993). For example, Timmons (1994) lists over 100 different items, in a 40 page venture opportunity screening guide, that he suggests are useful for discerning new venture success.

Yet research on the efficacy of specific venture success criterion indicates a mixed set of results with few consistent findings (Cooper 1993; Gartner 1988; VanderWerf 1989). In addition, research on new venture success has tended to focus on evaluating the characteristics of a new venture opportunity at a particular point in time, rather than on evaluating the process that entrepreneurs undertake to change (or adapt to) situations to enhance new venture survival. As comprehensive overviews of the venture success/survival literature already exist (Cooper and Gascon 1992; Cooper 1993), the focus of this literature review will be on the logic we used for the selection of questions/variables for the venture screening questionnaire and a brief history of the questionnaire's development. A copy of the venture screening questionnaire is available from the lead author.

The framework used to organize the various new venture survival variables is based on Gartner's (1985) framework for categorizing variables that describe new venture creation into four dimensions: individual characteristics, entrepreneurial behaviors, strategy, and environment. This framework is similar to other categorizations of the kinds of characteristics that influence new venture creation (e.g., Eisenhardt and Schoonhoven 1990; Sandberg and Hofer 1987; Stuart and Abetti 1987; Timmons 1994; Van de Ven et. al., 1984; Vesper 1990). While recognizing the importance of individual, firm, and environmental characteristics that influence new venture success, our study was oriented towards exploring the behaviors of the entrepreneurs: a critical part of the entrepreneurial process is the ability of entrepreneurs, over time, to change their behaviors to modify their circumstances into viable opportunities. A major focus of the venture screening questionnaire, was, therefore, to explore which behaviors may have aided entrepreneurs in their quest to get the odds of venture survival in their favor.

Individual Characteristics

The primary variables explored in this section of the questionnaire focused on the "experience" of the entrepreneurs involved in the development of the new venture. Experience, as defined in this study, is the knowledge or ability of an individual due to circumstances in a particular job, organization, or industry (Hill 199; McCall, Lombardo, and Morrison 1988). Based on previous research on the benefits and liabilities of entrepreneurial experience (Cooper and Gascon 1992; Starr and Bygrave 1992; Starr, Bygrave

and Tercanli 1993; Stuart and Abetti 1990), questionnaire items were included to identify the level of knowledge and ability the entrepreneur (or team of entrepreneurs) had attained at both the beginning and the end of the start-up stories. By identifying levels of knowledge and ability at both the beginning and end of the stories, we hoped to surface information on whether new venture success might be influenced by the aptitude of these entrepreneurs to learn.

Although many studies had treated the knowledge and ability of entrepreneurs as something static and monolithic (e.g., prior industry, entrepreneurial, or managerial experience), we see the capacity of entrepreneurs to learn new knowledge and gain abilities during the start-up process as critical to new venture success. As entrepreneurs involve themselves in the changing circumstances of their new venture creation, they either learn from these circumstances or do not. It is possible that the knowledge and abilities gained before or during start-up could be a liability and a hindrance to success in some industries if the competitive dynamics change and these changes are not recognized (Starr and Bygrave 1992).

We believe that gains in knowledge and ability, even over a short period of time, should be recognizable in the case studies analyzed. In addition, we believe that an entrepreneur's knowledge and ability should not be considered in some broad manner, like years of previous industry experience, but as specific kinds of knowledge and ability that entail aspects of the functions of a business. Certain kinds of functional expertise may be more relevant to new venture success than other kinds.

Entrepreneurs were rated on seven kinds of knowledge/ability in the venture screening questionnaire: (1)*Marketing/Sales:* knowledge of customers and how to sell to them, (2) *Finance & Accounting:* knowledge of resources required to run the type of business the new venture is in, and the ability to monitor and control these resources, (3) *Operations:* how to make the products or provide the services, (4) *Technical Knowledge:* knowledge of industry standards and practices, (5)*Management:* ability to productively use employees, consultants, and other paid experts, (6) *Administration:* planning and MIS, and (7) *Street Smarts:* practical and "real world" knowledge of how an industry really works and how to survive as a new business in this industry.

The level of an entrepreneur's knowledge/ability was rated on a scale of 1 (no knowledge/ability: Novice/Newcomer); 2 (some knowledge/ability: Apprentice); 3 (average knowledge/ability: Journey person); 4 (above average knowledge/ability: Mentor); to 5 (Expert). Ratings of the levels of the entrepreneurs' knowledge/ability were taken for both the beginning and end of the start-up stories, and a composite measure of the change in the knowledge/ability ratings of the entrepreneur(s) was generated (Ending Knowledge/Ability Rating—Beginning Knowledge/AbilityRating = Knowledge/Ability Gained).

We hypothesized that: (1) entrepreneurs with more knowledge/ability (e.g., mentor or expert level) at the beginning of the start-up story would be in new ventures that survived than entrepreneurs with less; (2) entrepreneurs who gained knowledge/ability during the start-up would be in new ventures that survived; and (3) entrepreneurs with more knowledge/ability at the end of the start-up story would be in new ventures that survived than entrepreneurs who had less.

Entrepreneurial Behaviors

It is our view that entrepreneurial behaviors are the primary determinant of venture survival, that is, what entrepreneurs do during the venture creation process changes

the odds toward venture survival (Carter, Gartner, and Reynolds 1996; Gartner 1988; Gartner, Bird, and Star 1992). Based on a previous review of the literature on entrepreneurial behavior (Gartner and Starr 1992), and subsequent empirical investigations on the nature of entrepreneurial behavior (Gartner & Starr 1993a, 1993b; Gatewood Shaver, and Gartner, 1995), we developed a list of five kinds of entrepreneurial activities: (1) Finding and Refining the Opportunity: comprised of 9 different activities, such as, defining the purpose of the business, planning, analyzing competitors; (2) Acquiring Resources and Help: comprised of 15 different activities, such as, finding investors, getting advice from lawyers, getting a loan, acquiring technical expertise; (3) Operating the Business: comprised of 5 different activities, such as, dealing with distributors, managing the day to day operations of the business; (4) Identifying and Selling to Customers: comprised of 5 different activities, such as, identifying specific customers to sell to, selling to customers, managing sales channels; (5) "Outside of the Business" Issues: comprised of 4 different activities, such as, dealing with family problems, spouse, and friends.

For each behavior, an evaluation of the level of effort the entrepreneurs expended on these activities was required. The level of effort was determined by rating the entrepreneur (or team) on the amount of time and intensity expended by the end of the start-up story. Ratings were determined by comparing the entrepreneur to the other 26 start-up stories that were read. Ratings were assigned scores of: 1 (this activity was not undertaken); 2 (little effort); 3 (an "average" amount of effort); 4 (more than average); or 5 (a great deal of effort: top 5%).

We hypothesized that entrepreneurs who expended more effort [e.g., were rated as expending 4 (more than average), or 5 (a great deal of effort)] in any of the activities would be in new ventures that survived compared with entrepreneurs who expended less effort.

Strategy and Environment

As suggested by Cooper (1993), much of the entrepreneurship literature, and particularly the literature on new venture strategy, has focused on identifying variables that predict new firm performance. For this study, as a basis for developing questions that could be used by observers to code the "Anatomy of a Start-up" articles, we chose variables based on the constructs explored and substantiated in the corporate venturing literature (e.g., Buzzell and Gale 1987; Dean, Meyer, and DeCastro, 1993; MacMillan and Day 1987; Miller and Camp 1985), for example: first to entry, degree of innovation, rate of industry growth, size of market, relative price, and relative quality. The corporate venturing approach typically uses PIMS variables that measure firm characteristics in relationship to other competitors and these firms' industry characteristics. This is not to suggest that the remainder of the new venture strategy literature was ignored, but to identify where the questions for the questionnaire used in this study were procured. There were 28 questions in this section of the instrument.

Given the diversity of strategies and environments described in the "Anatomy of a Start-up" articles, we hypothesized one broad strategic and one broad environmental characteristic that might differentiate between surviving and non-surviving ventures: (1) surviving ventures would likely choose niche strategies; and (2) surviving ventures would likely be in high growth industries.

In total, there were 85 questions that comprised the venture screening questionnaire.

New Venture Survival

The measure of new venture survival for this study was a determination of whether the new venture described in each *Inc.* magazine article (Longsworth 1991) was still in operation as of January 1995. This date is nearly 4 years after the last case study that we analyzed was published (September 1990) and nearly 7 years after the first case study was published (February 1988). Although a variety of measures exist for indicating new-venture success (Brush and VanderWerf 1992; Sapienza, Smith, and Gannon 1988), we posit that a venture's ability to survive at least 4 years is a key indicator. To determine whether a company had survived, the ventures described in the case articles were contacted to determine whether they were in operation. For companies that could not be readily located, we queried *Inc.* magazine reporters who may have kept up contact with these organizations or their founders. We were able to determine that of the 27 new ventures profiled in the "Anatomy of a Start-up" series published in Longsworth (1991), 17 of these ventures were still in operation.

USING THE VENTURE SCREENING QUESTIONNAIRE

As described earlier, the "Anatomy of a Start-up" articles were written by journalists as profiles of on going new venture start-ups. Each "Anatomy of a Start-up" article was 12 to 18 pages in length and provided a "summary of the business plan narrative, a biography of the founder, detailed financial projections, and all" (Longsworth 1991, p. iv). The 27 "Anatomy of a Start-up" articles describe a wide variety of new ventures in such industries as services (Landmark Legal Plans, Inc., Buddy Systems, Inc., Blackstone Bank and Trust Co.), restaurants and food service (The O! Deli Corp., Sieben's River North Brewery, Inc., Pizza Now!, Inc.), manufacturing (Microfridge, Inc., Appliance Control Technology, Inc., Animalens, Inc.), and media (Sports Band Network, Sanctuary Recording, Inc.). Although the "Anatomy of a Start-up" articles portray a diversity of types of new ventures, these cases are not intended to represent a generalizable sample that would reflect the population of all new ventures. Of the 27 cases used in this analysis, there were 17 new ventures that were still in operation as of January 1995. A listing of the survivors and non-surviving ventures is provided in Table 2.

Based on a previous evaluation process described in Miller and Friesen (1984), three MBA students were trained by the researchers to evaluate the *Inc.* magazine articles using the venture screening questionnaire. As a way to generate interrater reliability, the lead researcher met with the students to discuss similarities and differences among the ratings given by each of the three individuals on a scoring of three of the cases. The group discussed the process of evaluating each case and worked to develop a consensus regarding how ratings for each question in the questionnaire would be applied in various circumstances. The three MBA students then read the remaining 24 articles in *Anatomy of a Start-up: Why Some New Businesses Succeed and Others Fail* (Longsworth 1991) and completed a questionnaire for each article. The MBA students were told not to read the last chapter of the book, where the outcomes of the 27 cases were discussed. After rating the remaining 24 cases, the MBA students were required to meet together to reach an agreement on a team rating on all 85 variables for each of the cases. When there was a significant difference on the numerical rating on a specific variable among the three students, the students were asked to reach a consensus. Significant differences on the numerical ratings [a significant difference was defined in

TABLE 2 *Anatomy of a Start-up:* Survivors and Failures

Survivors	Failures
Queen Anne Inn	Associated Video Hut Inc.
City Year, Inc.	Blackstone Bank and Trust Co.
The O! Deli Corp.	Sanctuary Recording, Inc.
Wall Street Games	Landmark Legal Plans, Inc.
MicroFridge, Inc.	Oualie, Ltd.
Appliance Control Technology, Inc.	The National
Rusmar, Inc.	Sieben's River North Brewery, Inc.
Gruenberg Video Group, Inc.	Crescent City Communications Co.
R. W. Frookies	Keener-Blodee, Inc.
Filmstar, Inc.	SportsBand Network
Carousel Systems, Inc.	
Pizza Now!, Inc.	
Plastic Lumber Co.	
American DreamCar, Inc.	
Animalens, Inc.	
Buddy Systems	
Neugoren, Inc.	

Miller and Friesen (1984) as instances when Likert scale scores differed by at least two (e.g., 3 to 5, 2 to 4), or when opposites were chosen on a bi-polar scale] occurred on less than 10% of the questions. The group meetings to generate the team ratings for the cases lasted from 1.5 to 2 hours for each case. These team ratings were then entered into a data matrix for subsequent analyses.

Method of Analysis

Given the number of variables used in the analyses (85) versus the number of cases (27) analyzed, a variable reduction strategy was employed. First we compared the mean ratings on each of the predictor variables between the survival and non-survival groups. We noted that the mean ratings for each variable were not significantly different ($a = 0.05$) between the survival and non-survival groups with the notable exception of the variable "Growth." Because we wished to identify a wider set of variables that could predict survival or non-survival, we decided to consider those variables that displayed the widest absolute different in means such that the correlations among them were not high. In addition, it was found that the measures for gaining knowledge/ability (computed as the difference between the knowledge/ability scores at the beginning and at the end of the start-up cases) for the seven kinds of knowledge/ability were highly correlated with each other. A factor analysis revealed that all of these variables loaded on the same factor. For these two reasons, a new composite knowledge/ability change variable was created (Change in Knowledge/Ability) that was constructed as the mean of the seven knowledge/ability change measure means. Fourteen variables with the widest difference in means between the survivor and non-survivor groups were identified (See Table 3). We then chose to use discriminant analysis, a technique that allows for the identification of variables that best discriminate between two or more groups.

RESULTS AND DISCUSSION

The discriminant analysis resulted in a discriminant function that was statistically significant (Wilks' Lambda = 0.228, $p < 0.001$),suggesting a meaningful difference on the

TABLE 3 Means and Standard Deviations for Top Fourteen Variables

	Survivor		Non-Survivor	
Variables	Mean	S.D.	Mean	S.D.
Growth	3.71	0.47	2.78	0.83
Funding Needs	3.00	0.00	3.22	0.67
Change in K/A	1.22	0.96	1.03	1.25
Identity	3.86	0.53	4.22	0.44
Suppliers	3.64	0.50	3.33	0.50
Entrants	3.21	0.70	3.00	0.00
Distribution	3.50	0.76	3.33	0.71
Selling	3.93	0.62	3.65	0.73
Standard	1.57	1.45	1.00	0.00
Innovative Process	2.86	1.23	3.44	0.88
Patents	3.00	2.08	1.89	1.76
Competition	2.07	0.73	2.22	0.44
Aggressive	2.71	0.73	3.00	1.41
Price	2.57	1.28	3.33	1.00

Growth: *Is this business in a growing industry?* (1)Declining industry: Growth in industry sales is negative; (2) Slow growth industry: Growth is less than growth in economy; (3) Average growth: Growth is same as growth in economy; (4) Better than average; (5) A rapidly growing industry.
Funding Needs: *Are the resource requirements for this business?* (1) Low: The entrepreneur or team has the personal resources to fund the venture; (3) Moderate: The entrepreneur or team can raise the funds for the venture; (5) High: The resources required for the venture are so high that funding is unlikely.
Change in K/A (Knowledge/Ability): *Sum [(Ending K/A Score -Beginning K/A Score) for the 7 kinds of K/A]/7.*
At the *beginning* of the case, how would you rate the level of Knowledge/Ability of the lead entrepreneur (or team) has in this industry? At the *end* of the case, how would you rate the level of Knowledge/Ability of the lead entrepreneur (or team) has in this industry?: (1) No K/A: Novice/newcomer; (2) Some K/A (bottom 25%): Apprentice; (3) Average K/A (middle 50%): Journey Person; (4) Above average K/A (75% to 95%): Mentor; (5) This person (team) is an expert (top 5%): Expert.
(1) In marketing/sales? (market research and evaluation, market planning, product pricing, sales management, direct selling, customer service, distribution management)
(2) In finance? (accounting, capital budgeting, cash flow management, credit and collection management, short term financing, long term financing)
(3) In operations? (manufacturing management, inventory control, cost analysis and control, quality control, production scheduling and flow, purchasing, job evaluation)
(4) In technical knowledge of the product/service? (e.g., knowledge of industry standards and practices, specific knowledge of how to make the product or provide the service)
(5) In management? (leadership/vision, conflict management, teamwork, interpersonal skills)
(6) In administration? (planning, decision making, project management, negotiations, MIS, personnel administration)
(7) In "Street Smarts"? Practical and real work knowledge of how industry really works and how to survive as a new business in this industry.
Compared to the other cases in the *Anatomy of a Start-up* book, by the *end* of the case, how much effort (as indicated by time and intensity) was devoted to the following activities: (1) This activity was *not* undertaken; (2) Little effort (bottom 25%); (3) An "average" amount of effort (middle 50%); (4) More than average (75%to 94%); (5) A great deal of effort (top 5%)
Identity: *Determining the identity of the business (e.g., Who are we?)*
Suppliers: *Dealing with already established suppliers or subcontractors*
Entrants: *Analyzing potential new entrants*
Distribution: *Dealing with distributors*
Selling: *Determining how to sell to customers*
Standard: *Are the products/services of this business:* (1) More or less standardized for all customers?; (5) Designed or produced to order for individual customers?
Innovative Process: *Indicate the degree of innovation, relative to the norms of this industry, of the PRODUCTION/SERVICE PROCESS used by this business. If you are not sure whether was any innovation, write down 3.* (1) Major innovation; (3) Incremental innovation; (5) Similar Offering.
Patents: *Does this business benefit to a significant degree from patents, trade secrets, or other proprietary methods of productionor operation?* (1) No; (5) Yes.
Competition: *How would you rate the advantage of this businesses products/services relative to the products or services of its competitors?* (1) VERY STRONG advantage over competitive or substitute products; (2) MODERATE advantage; (3) MATCHED existing competitive or substitute products; (4) SOMEWHAT INFERIOR; (5) VERY INFERIOR to competitive or substitute products.
Aggressive: *Did this business aggressively attempt to enter this market (i.e., spend more than competitors on marketing, selling, advertising, etc. in order to become the firm with the largest share of the market)?* (1) LESS AGGRESSIVE, sought a small share of the market; (3) SAME aggressiveness as other competitors; (5) MORE AGGRESSIVE than other competitors, sought the largest share of the market.
Price: *Are the PRICES for this business's products or services higher or lower than similar products/services of competitors or substitutes?* (1) Prices are MUCH LOWER than competitors; (2) Prices are LOWER than competitors; (3) Prices are about the SAME as competitors; (4) Prices are HIGHER than competitors; (5) Prices are MUCH HIGHER than competitors.

TABLE 4 Standardized Canonical Discriminant Function Coefficients

Variable	Coefficient
Identity	−0.86145
Entrants	0.42922
Suppliers	0.74645
Growth	1.01971
Standard	0.63297
Funding Needs	−0.84676
Change in K/A	0.35479

discriminant score between the survivor and non-survivor groups. The discrimination between the two groups was possible with only seven variables: change in knowledge/ability (CHANGE IN K/A), determining the identity of the business (IDENTITY), analyzing potential competitors (ENTRANTS), dealing with already established suppliers (SUPPLIERS), the standardized or customized nature of the product (STANDARD), the "fundability" the new venture (FUNDING NEEDS), and the rate of industry growth (GROWTH), with the additional seven variables used being redundant. This discriminant function correctly classified 85.2% of the cases, another demonstration of its differentiating power.

Next we examined the relative discriminating power of the seven variables (see Table 4 for the standardized discriminant function coefficients for the variables). All variables were effective discriminators of venture success or failure, but GROWTH, IDENTITY, FUNDING NEEDS, SUPPLIERS, and STANDARD were particularly useful. It should be noted that some caution must be taken in interpreting the relative importance of these variables in light of possible correlation's among them.

It should be noted that this discriminant analysis generated a set of variables that served to differentiate between survivors and non-surviving firms. These variables, taken as a whole, are measures that might be appropriate as a way to predict subsequent venture's survival. A single measure, by itself, is less useful for differentiating between surviving and non-surviving firms. The following discussion of each of the individual variables that proved to be a significant predictor, should be considered in this context.

Individual Characteristics

The hypotheses that entrepreneurs with more knowledge/ability at the beginning, or at the end of the case, were in surviving firms, were not supported. None of the "beginning" or "ending" measures of knowledge/ability predicted venture success or failure. This study appears to confirm overviews of research on prior experience and its effect on start-up success that indicate that prior experience is not a consistent predictor (Cooper and Gascon 1992). Indeed, a close reading of the venture cases suggests that prior industry experience may often be a liability rather than a benefit. Starr and Bygrave (1992) suggest that entrepreneurs with prior experience can suffer from biases and blinders, strong ties, the "success syndrome," and the liabilities of staleness, sameness, priciness, and costliness that make it difficult to navigate the uncharted waters of a new venture start-up. For example, the lead entrepreneur in the article about the chair manufacturing company, Keener-Blodee, Inc., had "expert" level knowledge/ability in the furniture industry, yet his "big company" furniture background was a major hindrance in providing him with the skills to run a start-up company with meager capital. Because

he didn't know how to start and run a small company, Keener-Blodee quickly ran out of cash when sales and cash flow were not sufficient to cover the high overhead the company carried. The dictum that industry experience is crucial for venture success (Brokaw 1991) may be appropriate in a limited number of circumstances. Industry experience may be of value in managing functional aspects of the business where the "rules of the game" have not changed. Given that an inherent aspect of entrepreneurship is often changing the rules of the game, knowledge of yesterday's rules may not lead to future success.

The "change in knowledge/ability" measure was found to be one of the predictors of venture success. Given that this measure is the difference between beginning and ending knowledge/ability scores, it should be recognized that individuals with beginning knowledge/ability scores of "expert" would have a knowledge/ability change score of zero or negative. This result might be an indication that potential entrepreneurs who are perceived to "not have all the answers" (i.e., are not experts) at the beginning of the start-up process are more likely to have flexibility, "the ability (or inability) to recognize and react to the completely unpredictable." (Brokaw 1991, p. 54). It should also be noted that the seven "change in knowledge/ability" measures were highly correlated, which might suggest a "halo effect" among specific kinds of changes in knowledge/ability. Also, it might have been difficult, from the information provided in these articles, for the raters to have made more specific judgments about differing types of functional expertise a particular entrepreneur, or team, might possess.

Entrepreneurial Behaviors

Very few of the entrepreneurial behavior measures proved to be significant predictors of subsequent venture survival. Of the 38 variables that measured different entrepreneurial behaviors, only three measures were significant predictors. Entrepreneurs who devoted more effort to: (1) working with established suppliers or subcontractors and (2) analyzing potential new entrants were more likely to start a new venture that survived. Entrepreneurs who devoted less effort to: (3) determining the identity of their business were more likely to start a new venture that survived. Analyzing potential new entrants is one aspect of surveying the marketplace for competitive threats.

It seems that this analysis supports the insights from *Inc.* magazine: "Competitors are to be respected. . . . When start-ups ignore that, they turn arrogance into red ink" (Brokaw 1991, p. 67). Working with established suppliers or subcontractors may be interpreted as a measure of the entrepreneur's ability to focus on internal issues that impact the new venture's expenses and costs of goods sold.

There are a number of speculations appropriate for explaining the incidence of entrepreneurs devoting less effort toward determining the identify of their firm. Entrepreneurs with more complete and specific visions of the future of their organizations might be more able to accomplish the specific tasks necessary for venture survival (Duchesneau and Gartner 1990). Another explanation might be that ventures where entrepreneurs needed to reformulate their new venture's identity are likely to have initially chosen a competitive strategy that wasn't working in the marketplace, which would, therefore, require greater effort to revise the venture's identity. Assuming the liabilities of newness and smallness (Aldrich and Auster 1986), the resources available for adaptation are likely to be minimal, prompting failure because the new firm could not survive long enough to find a viable niche.

Strategy and Environment

Two strategic variables and one environmental variable proved to be significant predictors of new venture survival. New ventures that survived focused on customized products or services, thereby supporting the hypothesis that new ventures pursuing a niche strategy would be more likely to survive. New ventures that were started in growing industries were more likely to survive, thus supporting many previous studies (MacMillan et al. 1987; Merrifield 1987; Stuart & Abetti 1987) demonstrating this effect. New ventures started with the venture team's personal resources or readily available funding were more likely to survive is an intriguing finding. This measure is a subjective evaluation of the observer's view of the new venture's need for funding and the ability of its entrepreneurs to satisfy the venture's funding needs. For example, some of the ventures that survived needed funding that could be satisfied easily through the entrepreneur's personal savings and easily available credit (e.g., the entrepreneurs in "Queen Anne Inn" could fund the renovations to the inn through their personal savings and through mortgages on the property), while other ventures required substantially more funding, but the entrepreneur had the capabilities for acquiring these resources through joint ventures, stock sales, and other fund raising mechanisms (e.g., the entrepreneur in "R.W. Frookies" sold stock to suppliers and distributors as a way to raise capital and lower his production and distribution costs).

The failed ventures seemed to need resources that were far beyond the capabilities of the entrepreneurs to raise, but this result may also reflect a perception by the raters that some ventures required such a substantial amount of resources to become viable that the possibility of generating a reasonable return on the investment appeared unlikely (e.g., Sieben's River North Brewery required such a substantial investment in equipment for a brewing beer, that generating profits from beer sales as a brew-pub, would not be sufficient to repay investors.)

The different aspects of the "fundability" of a venture (i.e., the entrepreneur's ability to raise funds, the resource needs of the venture, the rates of return required by different investors, and the ability of the venture to generate income to repay investors) needs more study to analyze these interactions. It would be particularly valuable to ascertain how entrepreneurs might make changes in their ventures' strategies vis-à-vis their ability to acquire funding.

Comparing Predictions

We were curious as to whether the discriminant analysis was more accurate at predicting venture survival than the experts' predictions offered in the *Inc.* magazine articles. We grouped experts into four categories for comparison: industry experts, competitors, venture capitalists and financiers, and customers. We classified a non-survival prediction based on whether the expert specifically indicated the venture would not survive. If there seemed to be doubt as to whether the expert predicted survival or non-survival, the prediction was classified as a prediction of venture survival.

Given that 17 of 27 ventures survived (63% survival rate), we thought it prudent to bias the expert predictions toward predicting survival, rather than failure in instances where there might be any ambiguity. For many of these ambiguous predictions, the experts offered a qualification, such as "Yes, the venture may succeed, if the entrepreneur makes the following changes. . . ." In predictions where experts offered a qualification,

we specified these predictions as: predicting survival. For all 27 cases analyzed there were a total of 114 predictions made by the experts: 36 by industry experts, 29 by competitors, 25 by venture capitalists and financiers, and 24 by customers.

In matching the predictions of these experts to the actual survival or non-survival of these new ventures, we found that industry experts correctly predicted survival or non-survival in 55% of the predictions, competitors in 55% of the predictions, venture-capitalists and financiers in 40% of the predictions, and customers in 38% of the predictions. In reviewing the predictions, we were struck with the frequency in the number of qualifications given by the industry experts and competitors. Both industry experts and competitors were likely to predict the survival of a venture if certain characteristics of the venture could be modified. Venture capitalists and financiers, on the other hand, were more likely to predict the non-survival of a venture, without offering any recommendations for how the venture might be changed to improve its chances for survival.

We speculate that one reason that venture capitalists and financiers were less accurate in their predictions of venture survival is an inherent bias toward assuming that most ventures do not survive because they might believe that entrepreneurs are incapable of making changes in their ventures. Resource providers may believe they have little ability to make changes in a new venture, beyond the decision to fund, so they may make a determination about a venture's ability to survive based on the existing situation. Industry experts and competitors may be more inclined to take the role of the entrepreneur, and therefore, seek to identify how the present situation might be modified to enhance a venture's chances of survival. It seems that the optimism of the industry experts and competitors that obstacles could be overcome was indeed, a more accurate predictor.

An implication of these "Anatomy of a Start-up" cases may be that entrepreneurs do find ways to solve obstacles that stand in the way of success. On the other hand, since firms in this sample were more likely to survive (63% survivors), a different sample of firms with higher rates of non-survivors might likely tip the scales for predicting non-survival in favor of the more pessimistic resource providers.

CONCLUSIONS

This research examined scholarly and practitioner predictions of venture success using an idiosyncratic dataset: *Inc.* magazine articles. Before offering any further insights about the findings, we believe it is prudent to identify some of the limitations of this approach.

Limitations of the Research

As was noted earlier, the *Inc.* magazine articles are unlikely to be a generalizable and representative set of cases depicting all new venture start-ups. The start-ups profiled may represent an editorial bias toward depicting successful start-ups in growth oriented businesses (*Inc.*—"The Magazine for Growing Companies") rather than depicting successful small start-ups or start-ups in more stable markets that might be successful.

The actual events, behaviors, and experiences depicted in these *Inc.* start-ups have been filtered through the biases of: the entrepreneurs' stories as told to the *Inc.* reporters, the reporters' interests in creating an engaging article for *Inc.* magazine readers, and the magazine's editorial stance that guides what key issues might be explored or described in articles that are published.

Whether the measures reflect the actual events and occurrences of a particular start-up is, therefore, open to some speculation. Few variables seemed to have power to differentiate between survivors and non-survivors. Either most variables don't matter, that is both surviving and non-surviving start-ups may behave in similar ways and exist in similar circumstances, or the ability of raters to ascertain subtle differences in various start-up cases may be limited. One might speculate that the lack of significant differences in mean scores between survivors and non-survivors across most variables in the questionnaire may indicate an inability of the raters to ascertain more than gross differences among various start-ups. So, what could have been observed (the information presented in the *Inc.* article), and what was ascertained (the rater's ability to correctly perceive specific information about each start-up), are both subject to significant bias.

One can't help but notice that each *Inc.* start-up story does appear to provide enough information for people to offer a judgment about a start-up's likely success. But was the information consistently presented in the same level of detail, and on the same level of comprehensiveness across all articles? Was the information consistently reliable, given that over a dozen different writers were authors of these stories? Some concern is warranted.

The expert's predictions, as depicted in the articles, and as measured in this study, may be unreliable. It could be that anyone will offer speculation about the future of a business based on little information, or inconsistent information, and, therefore, these predictions by the experts were naive guesses, rather than predictions based on some sort of heuristic or reasoned assessment that would be representative of a group norm (i.e., a venture capitalist's perspective). One might suggest that the experts' opinions were solicited in order to generate some controversy in an article to make it more interesting to read. More reasoned, or more cautious predictions by certain experts may not have been published because they appeared to be less interesting to readers. Rarely did an expert have an opportunity to comment on more than one start-up case, while our model is based on an evaluation of 27 cases.

Group prediction percentages, for each type of expert, were based on an aggregate of individual predictions for specific start-ups. Each expert, given an opportunity to evaluate all 27 cases individually, may have made a more accurate percentage of correctpredictions. The data used—articles and expert commentaries—have significant limitations that warrant some skepticism regarding certain findings. But, certain aspects of this study merit recognition.

Implications for Scholarship and Practice

This research stems from prior efforts to ascertain the critical factors that experts use to make judgments about venture success (MacMillan, Siegel, and SubbaNarasimha 1985; MacMillan, Zemann, and SubbaNarasimha 1987; Merrifield 1988; Roure and Kelley 1990), but with a difference in the type of information analyzed: magazine articles rather than business plans. The choice of magazine articles as a source of data for this study grew out of our interest in finding materials in the popular press that students could readily find for practicing venture screening skills. Implicit in this interest is a perspective that individuals can be trained to identify critical success factors in the start-up situations they encounter.

As in other academic studies of new venture success (Cooper 1993), the primary

value of this exercise involves making "more obvious" the significant variables that observers use to make judgments about predicting venture success. One of the frustrations we experienced in analyzing the expert's predictions in the magazine articles was our inability to glean consistent and general "rules of thumb" for making predictions about new venture success from their observations. The experts tended to speak to the specifics of the particular venture opportunity, rather than to general principles that might be used to guide other entrepreneurs in other situations. In other words, the reasons given by the start-up experts lacked "theory."

We would assume that the advantage of academic research on new venture success predictors is a body of knowledge, "rules of thumb," a theory or theories to explain why certain factors affect certain circumstances, that might be used as guidelines that could improve an entrepreneur's chances for success. This study, therefore, began with a belief that academic research can lead to knowledge, that, in all likelihood, can be taught and learned, and prove to be useful for enabling individuals to better undertake entrepreneurial activities.

The 85 variable screening questionnaire offered a way to comprehensively focus on many of the details concerning the start-up of a business that might be overlooked in a cursory overview of an entrepreneurial story. Paying attention to the details involved in a start-up might be one important aspect of learning about entrepreneurship. Yet only a few of these variables appeared to be important for differentiating between surviving and non-surviving firms. Knowing which details to pay attention to is an important aspect of developing the knowledge necessary to improve an entrepreneur's ability to improve odds of new venture survival.

The use of the venture screening questionnaire as a way to predict new venture survival could be significantly improved to achieve this objective. First, the venture screening questionnaire could be compared to other methods of prediction to see whether the venture screening questionnaire helped individuals better predict venture survival. Such a test might be accomplished by assigning individuals to different "conditions" where some individuals would receive the venture screening questionnaire as an aid, while other individuals would make their predictions without using the venture screening questionnaire. A comparison of the prediction accuracy between the two groups might indicate that individuals using the venture screening questionnaire were able to correctly identify surviving vs. non-surviving potential ventures. Second, the venture screening questionnaire, itself, can be improved. Given the low discriminating power of most of the items in the questionnaire, most items should be dropped. The validity of the seven variables identified to predict venture success needs further exploration. Third, there should be comparisons conducted with other venture screening exercises (e.g., Merrifield 1987; Roure & Keeley 1990) to determine the strengths and weaknesses of these approaches. Finally, we encourage more effort toward generating venture screening questionnaires through in-depth field studies (e.g., Hisrich and Jankowicz 1990).

We suggest that venture screening questionnaires be applied to other start-up cases that can be found in business case books, biographies, autobiographies, newspaper articles, and published oral histories. These sources provide a rich database of information that can be analyzed, not only for the knowledge that researchers can gain through careful reading, evaluation, discussion, and analysis, but also through the cumulative benefits of generating information that can be aggregated, quantified, and analyzed in a more rigorous manner.

Although the writers and editors of *Inc.* magazine probably did not expect their ideas to be the subject of a scholarly empirical test, the ideas of journalists writing for the practitioner audience are ripe for exploration and analysis. The results of our analyses were not completely consistent with the advice from *Inc.* magazine (see Table 1). Our findings seem to support the *Inc.* advice that entrepreneurs be flexible (point 1), and understand their competitors (point 4) and customers (point 2). Our findings do not support *Inc.*'s belief that "the strongest companies were led by people with experience in their industries" (point 3). *Inc.*'s remaining two issues, "it's the sales cycle" (point 5), and "being the boss" (point 6), did not surface as variables significant in our analyses.

Finally, we hope that this academic approach toward gleaning wisdom from these various stories of start-ups from *Inc.* magazine, might be viewed as "scholarship of application" (Boyer 1990), where researchers attempt to apply theory and knowledge in useful and meaningful ways. There is substantial empirical evidence about the nature of new venture start-ups in scholarly journals that can be used as evidence to test the ideas proffered by journalists and other writers about the phenomenon of entrepreneurship. To assume that academic research will, by osmosis, reach the consciousness of journalists, entrepreneurs, and public policy makers, is a bit optimistic. The community of academic researchers in entrepreneurship will not likely influence the public's beliefs and behaviors about entrepreneurship without a more concerted effort to develop bridges between the academic and practitioner worlds. Certainly, there are many ways to develop these bridges. We believe that part of this process involves engaging the imagination of the "non-scholarly world" in their everyday realm: using popular books, magazines, and newspaper articles about entrepreneurship as the fodder for scholarly analysis.

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