Assessing the Efficacy and Standardization Potential of Five Competing Venture Capital Investment Evaluation Approaches

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At a general level, this article focuses on the process of rating the potential of entrepreneurial business plans (EBPs) in the investment screening decision. At a specific level, it puts forward a rating regime that has the potential to achieve greater consistency and accuracy in selecting viable EBPs. The article encompasses four elements, flowing from a general level to the specific.

First, a review of the human decision-making, investment decision-making, and venture capital decision-making literature throws the spotlight on the investment screening stage. This is the stage at which investors rate EBPs and make decisions.

Second, the use of decision aids in the continuum from a general business context to a specific venture capital decision application is explored. As a subset of decision aids employed in business, some venture capital firms use business plan evaluation aids (BPEAs) to rate the potential of EBPs in the investment screening stage.

Third, a theoretical framework in the form of a taxonomy was developed to enable the classification and comparison of BPEAs along two axes: 1) *source* of the judgment criteria and (2) *application* of the judgment criteria. The two distinct judgment *sources* in venture capital investment decision-making are a) individual cognition[1] (often lacking any logical or empirical basis) and b) researched venture attributes (based on research into the causes of business success and failure). The two distinct *applications* of the selected investment decision criteria happen through a) unsystematic judgmentalism and b) actuarial modeling. Business Plan Evaluation Aids that use researched venture attributes and actuarial modeling hold the greatest potential for improving the investment screening process.

Fourth, a taxonomic comparison of five existing BPEAs revealed two that hold the greatest potential to improve the screening process: 1) the FVRI System (Fiet, Gupta, et al. [2003]) and 2) the New Venture Template (Mitchell [1995]). It seems logical to conclude it is desirable to use a venture evaluation system based on a combination of researched venture attributes and actuarial modeling.

INTRODUCTION: THE DECISION CONTEXT—FROM GENERAL PRECEPTS TO A SPECIFIC STAGE OF THE VENTURE CAPITAL PROCESS

Fundamentally, this article is about decision-making. Decision theory belongs to no single academic discipline. It is inextricably entwined with statistics, economics, psychology, and a number of applied fields, including business, politics, gambling, and, of course, investing. In this introductory section, we distill from the vast and oftentimes intimidating literature those concepts of classical

decision theory that are relevant to the conduct of venture capital decision-making. More specifically the focal point becomes the screening decisions made for EBPs.

General Features of Human Decision-Making

Since the beginning of time, humans have been required to make decisions, if for no other reason than survival. Remarkably, the process of making decisions was not studied formally until the late seventeenth and early eighteenth centuries. Since its beginning (Pascal [1670/1965]; Bernoulli [1738]), decision theory has provided strategies to guide decision-making. Strategies have their has its roots in a common logic, and yet each is unique in that it is crafted to suit a particular set of circumstances, which it captures in its assumptions and in the procedures that it prescribes for its application.

In the seventeenth century, Pascal and other mathematicians found themselves eagerly employed by gamblers in the French Court who needed to learn how to distinguish between fair and unfair bets. For example, a roll of a pair of dice might produce any of eleven possible sums (2 through 12). Any "generous" con artist would offer a passing patsy six of the outcomes (2, 3, 4, 10, 11, 12) against his five outcomes (5, 6, 7, 8, 9) on a 50-50 wager. He would do so gladly because, as Bross [1953] reports, on 111 rolls of the dice at a dollar a bet he could expect to win 74 dollars while losing only 37 dollars—a profit so tidy he might offer even better odds as an additional inducement to play. Consequently the origins of formal decision theory were prescriptive in nature, as professional decision theorists provided advice on what "ought" to be done. Today such decision theory models are often labeled "normative" (Becker [1967]).

Nonetheless, how we *ought* to behave often differs from how we do, in fact, behave. Since the days of Pascal and Bernoulli, many decision theorists have swung away from prescribing to describing behavior.

Expertise and Decision Making

Expertise is the knowledge and experience people use to make decisions in complex dynamic situations. It has the following five characteristics (Prietula and Simon; Shanteau [1992]): First, expertise is domain specific. Second, expertise is acquired through stages of development, somewhat akin to the mental development of children. Third, expertise is a mixture of analysis and intuition. Fourth, experts employ various thinking strategies. Finally, the thinking of experts is systematic and, indeed, more automated. Much of the literature (e.g., Mintzberg, Raisinghani, et al. [1976]; Doktor [1978]; Isenberg [1984]; Agor [1986]; Parikh [1994]) indicates that executives in business may employ both analytical thinking and intuition in solving daily problems. Expertise is required for executives to develop analytical thinking and effectively apply intuition.

Decision aids can help novices become experts and help experts remain on top of their game. The goal of any decision aid is to provide assistance and structure to improve the accuracy and consistency of human judgment. Roberts [2002] provided a review of the decision aid literature. From simple linear models to sophisticated expert systems employing artificial intelligence, decision aids can offer improvement to the decision-making process in tasks or environments where individuals have proven to perform at less than optimal levels (Roberts [2002: 30]). Decision aids can provide assistance in many ways, from imposing structure on a problem (Todd and Benbasat [1994]) to recombining the problem (Bonner, Libby, Nelson [1996]; Zacharakis and Meyer [2000]), generating alternative hypotheses (Chu [1991]), making recommendations, or providing a final solution (Kowalczyk and Wolfe [1998]). In making predictions, the superiority of formal models, even crude ones, over people's unsystematic judgments has been widely supported in both business and non-business environments (Dawes [1979]; Peterson and Pitz [1986]; Kleinmuntz [1990]; Hogarth [1993]; Hoch and Schkade [1996]; Whitecotten [1996]; Goldstein and Hogarth [1997]; Bell and Carcello [2000]; Zacharakis and Meyer [2000]). Decision aids may be able to correct for the human inconsistency and misweighting of cues[2] that contribute to poor performance (Libby [1981]; Bazerman [1994]). Decision aids are not subject to many of the cognitive biases that individuals are, such as inconsistency, the inappropriate use of heuristics, and the tendency to "satisfice." For example, Butler [1985] demonstrated that a simple decision aid could help overcome the tendency to underweight or ignore salient information.

Business Plan Evaluation Aids

A BPEA is a highly specialized subset of human decision aids used for the specific purpose of screening entrepreneurial business plans. Any decision aid is used to

provide assistance and structure to improve the accuracy and consistency of human judgment. As the principal tool in the private equity screening decision, the EBP is relied on heavily by investors (Roure and Keeley [1990]; Hindle [1997]; Zacharakis and Meyer [2000]). Venture capitalists reported devoting 8 to 12 minutes on average to evaluating a business plan (Sandberg [1986]). Much of the evaluation is purely intuitive, despite the existence of several decision aids, which might be expected to aid both efficiency and consistency in the decision-making process. Zacharakis and Meyer [2000: 340] concluded that "decision aids are under-used in the VC industry" and that only 24% of venture capitalists interviewed used some sort of checklist or tool to aid in the evaluation of EBPs. There are several types of BPEAs. In the next section, a framework is introduced to enable their classification.

Two Key Components of a BPEA: Source and Application of Judgment Criteria

Venture capitalists employ a variety of criteria when evaluating potential investments in the screening phase (MacMillan, Siegal, et al. [1985]). A survey of both the academic literature and practitioners' practice reveals that the source of judgment criteria and the application of judgment criteria vary significantly when evaluating EBPs.

Source of judgement criteria. The source of the screening criteria used by VC firms can be categorized into two schools, henceforth called 1) the *individual cognition* school and 2) the *researched venture attributes* school.[3] The majority of extant studies in the VC investment decision-making field belong to the "individual cognition" school, which has produced lists of criteria that venture capitalists report they use when evaluating new venture proposals (see Tyebjee and Bruno [1981, 1984]; Bruno and Tyebjee [1985]; MacMillan, Siegal, et al. [1985]; Gorman and Sahlman [1986]; MacMillan, Zeman, et al. [1987]). They are based on what VCs say (espouse) they use to screen investment opportunities.

Typically, mental models, or cognitive maps, can be classified into two coexisting kinds: espoused theories and theories-in-use. An espoused theory is the mental model that people will say they hold if asked to explain or justify a given pattern of activity. This may differ from the theory-in-use, which is the mental model implicit in the performance of that pattern of activity. One cannot ask someone to describe her theory-in-use; one can only hypothesize and test it by observing her actions (Argyris [1996: 44]).

Social judgment theorists suggest that "espoused" decision-making processes may be a less than accurate reflection of "in use" decision-making processes (Priem [1992]; Priem and Harrison [1994]). Zacharakis and Meyer [1998: 58] and Shepherd [1999: 622] found that venture capitalists' "actual" decision policies explain more variance in new venture performance than do "espoused" policies. These two studies concluded that venture capitalists have a poor understanding of their actual decision-making policies.

The results of VC decisions suggest that VCs' espoused criteria and "in use" variants may not be optimal (Zider [1998]) as a basis for either real-world decisions or attempts to explain those decisions using research (Zacharakis and Meyer [1998, 2000]; Shepherd [1999]). Venture capitalists may be able to improve their introspection by reducing the gap between their "in use" and "espoused" decision-making policies by altering the "espoused" policy to coincide with the "in use" policy (Shepherd [1999: 622]). Using "in use" policy to screen business plans has higher predictive ability than using the "espoused" policy (Shepherd [1999]; Zacharakis and Meyer [2000]).

This article seeks to move beyond studying and applying individual cognition models' "espoused" and "in use" policies toward attributes that we know (based on research) are important to the success of new ventures (Mitchell [1998]; Shepherd, Ettenson, et al. [2000]). Basing the source of investment screening criteria on these "known attributes" applies known success factors (or rather, known failure-prevention factors) or viable venture attributes that represent the requirements necessary for success within a particular industry. The individual cognition school and researched venture attributes school as potential sources of judgment criteria are discussed in more detail below.

Does what I think matter—the "individual cognition" school. The majority of extant studies in the VC investment decision-making field belong to what we are calling the "individual cognition" school. Research based on individual cognition has relied on the results of surveys and questionnaires that provided "decision cues" for the researchers to create and test the effectiveness of their models of VC investment decision-making. In seeking relationships between decision cues and the performance of new ventures, such studies have made significant contributions to our understanding of VC decision-making. Prior research on VC decision-making determined criteria espoused by VCs using different emphases. These

include some form of counting (Benoit [1975]; Tyebjee and Bruno [1984]), rating scales (Wells [1974]; Dixon [1991]), ranking scales (Poindexter [1976]; MacMillan, Siegal, et al. [1985]), and trade-offs (Muzyka, Birley, et al. [1996]). Investigators agree that criteria espoused by VCs often are not used in their entirety when investment decisions are made. Even if all criteria are used, the results of VC decisions suggest that VCs' individual cognition is not optimal as the basis of either real-world decisions or attempts to explain those decisions using research (Shepherd [1999]; Zacharakis and Meyer [2000]). Is there a stronger basis for studying the source of investment screening criteria?

Do what works—the "researched venture attributes" school. At the firm level of analysis, one of the goals of many entrepreneurship researchers has been the articulation of clearly recognizable attributes that distinguish viable, successful ventures from ventures prone to failure. The venture performance stream of entrepreneurship research, as a subunit of business strategy research, has concentrated on this task. Strategy researchers propose that superior performance arises from a fit between the competencies of a venture and the key success factors of an industry (Porter [1980]; Andrews [1987]; Shepherd [1999]). When applied to the study of VC investment decision-making, this emphasis may be held to constitute what may be called the "researched venture attributes" school, where success factors or viable venture attributes represent the requirements necessary for success within a particular industry.

A new venture team must commit to a number of viable venture attributes that they believe will lead to success within the competitive environment (Slater [1993]; Shepherd [1999]). Viable venture attributes within an industry remain stable. Hannan and Freeman [1977, 1984] argue that organizations seldom succeed in making radical changes in their core strategy and structure in the face of environmental threats, because they are subject to strong inertial forces. Changes in the core lead to an increased probability of organizational failure and death. If a new venture is to succeed, the attributes required at or near the time it is founded will endure with little variation over its life. Accordingly, detecting the presence of attributes known to enhance venture viability and likelihood of success becomes critical to predicting the performance of a new venture.

Shepherd, Ettenson, et al. [2000] were the first researchers to depart significantly from previous work that focused on "espoused" and "in use" criteria in venture capital deal screening. Prior research into venture capitalists' decision-making typically has relied on reports of individual cognition by practitioners—criteria without theoretically justified foundations. The study by Shepherd and colleagues explored the use of theoretically derived criteria. They reviewed the industrial organization literature to identify criteria (strategies) known to be linked to new venture profitability.

Their study utilized those non-controversial findings from industrial organization literature that we "know" influence performance to see whether venture capitalists use these variables (criteria) in the manner proposed in the literature. It is important to note that Shepherd, Ettenson, et al. [2000]—though they did not use the term—were the first to explore the use of researched venture attributes as a source of VC investment criteria in an empirical study. Their study was based on having 66 Australian venture capitalists rate the most important researched venture attributes in their assessment of new venture profitability. On average, the most important is industry-related competence. The second tier of importance is competitive rivalry, timing, and educational capability. The third tier of importance is lead time, key success factor stability, and "timing times lead time" interaction (Shepherd, Ettenson, et al. [2000: 450]). Mainprize [2004] empirically tested the relationship between researched venture attributes as the source of investment screening criteria and actual new venture performance.

Accordingly, detecting the presence of attributes known to enhance venture viability and likelihood of success at the screening phase could become critical to predicting the performance of a new venture. Individual cognition criteria—including what VCs say that they do and "in use" behavior, (what they are observed to do)—may be a very poor basis compared with researched venture attributes for either understanding actual decision criteria or building guidelines and systems for improving performance in investment decision-making.

Application of judgment criteria. For any decision-making, the *application* of judgment criteria is as important as their *source*. Just as systematic application of invalid criteria will fail, so will unsystematic application of valid criteria. A good decision means both systematic application and valid criteria. Improper or misweighted criteria lead to inaccuracy and inconsistent decisions (Roberts [2002]). Individuals are generally good at coding information yet poor at combining cues (Libby [1981]; Dawes, Faust, et al. [1989]; Bonner [1991]; Bazerman [1994]). In fact, a general inability to integrate information is a

primary reason human judgment and decision-making are often less than optimal.

Shepherd [1999: 633] found that venture capitalists exhibit limited introspection into the policies they use to assess likely profitability and have a tendency to overstate the least important criteria and understate the most important criteria compared with their "in use" decision policies.

The application of the judgment criteria used by VC firms can be categorized into 1) unsystematic judgmentalism and 2) actuarial modeling.

Unsystematic judgmentalism. A variety of scientists, including meteorologists, statisticians, and psychologists, have been interested in measuring and explaining judgments of confidence and their relationship to accuracy (e.g., see Lichtenstein, Fischhoff, et al. [1982]; Yates [1990]; Gigerenzer, Hoffrage, et al. [1991]; McClelland and Bolger [1994]; Budescu, Erev, et al. [1997]; Harvey [1997]). Many of these studies reported that people are systematically overconfident about the accuracy of their knowledge and judgment. And people tend to express confidence in their judgments that exceeds the accuracy of those judgments. At the same time, the extent to which overconfidence occurs seems to depend on the difficulty of the judgment task. With easy tasks, overconfidence seems to disappear, or underconfidence is observed. With hard tasks, overconfidence seems to be rampant (Klayman, Soll, et al. [1999]). The more confident people are, the more overconfident they are, and, overall, confidence tends to exceed accuracy. These effects result from unsystematic imperfections in the application of judgment criteria (Klayman, Soll, et al. [1999: 217]).

More specifically, research in the field of venture capital decision-making confirms the above. Zacharakis and Shepherd [2001: 312] found that VCs are indeed overconfident and that overconfidence negatively affects VC decision accuracy. They concluded that VCs are prone to "availability bias" (Zacharakis and Shepherd [2001: 312]); that is, the natural tendency to recall past successes rather than failures means that VCs may make the same mistakes again. Most important, they found that if information surrounding the decision is structured in an unfamiliar way, VCs can have difficulties deciphering what each piece of information means and how it impacts their overall accuracy. In other words, much of VCs' investment screening decision-making can be characterized as unsystematic judgmentalism: applying decision criteria haphazardly and inconsistently.

Actuarial modeling. On the other hand, the most highly structured and formal example of a decision support system is an actuarial model. Psychology researchers Elstein and Bordage [1988: 123] stated that "actuarial (statistical) models refer to the use of any formal quantitative techniques or formulas, such as regression analysis, for . . . [deciding] clinical tasks" (cf. Zacharakis and Meyer [2000]). These models enable the judge to consider and rate individual criteria independently using quantitative values. The actuarial model then optimally combines the values assigned to the individual criteria using a weighted algorithm to derive a predicted outcome.

Actuarial models were first used in the insurance industry to derive the payoff risk associated with particular groups of people or individuals in the population. For example, an insurance actuarial model could use a weighted algorithm to consider age, sex, blood pressure, and occupation as inputs to determine statistically the life expectancy of an individual. Zacharakis and Meyer [2000] were the first and have been the only researchers to date to apply actuarial models to venture capital decision-making. In this seminal study they found that properly developed actuarial models have the potential to improve the application of judgment criteria in the screening of EBPs (Zacharakis and Meyer [2000: 324]).

Actuarial models help VCs by weighting decision criteria consistently when screening EBPs. Information cues often bias VCs, like all human decision-makers. Without a decision aid, investors may misinterpret decision cues or ignore other important cues (Zacharakis and Meyer [2000: 324]).

Prior research in venture capital deal screening is vital to the theoretical foundation of this article. Researched venture attributes (Shepherd, Ettenson, et al. [2000]) as the source of decision criteria and actuarial modeling (Zacharakis and Meyer [2000]) as the application together hold great potential to improve venture capital deal screening when present in a BPEA. This article seeks to discover a business plan evaluation aid based on researched venture attributes and actuarial modeling.

EMPIRICAL COMPONENT OF THE STUDY

Research Objective

The research objective was to perform a critical evaluation and comparison of five representative BPEAs to facilitate constructive discussion of the proposition that greater standardization of venture capital decision-making might be both desirable and possible.

Theoretical Framework

The theoretical framework employed in the article consisted of a distillation of the literature cited above.

Unit of Analysis, Population, and Sampling

The unit of analysis in this study was the BPEA. A search of the literature failed to reveal exactly how many different BPEAs are currently in use by practitioners. The sample BPEAs classified in this section are more akin to the case research method—generalizing to theory (Yin [1989])—than to the survey method—generalizing to an estimated numeric population. The sample of five BPEAs was purposively selected from the population of all BPEAs:

- The Venture Opportunity Screening Guide (Timmons [1994])
- The Bell-Mason Diagnostic (Bell [1991])
- ProGrid Venture (Bowman [1997])
- The FVRI System[4] (Fiet, Gupta, et al. [2003])
- The New Venture Template (Mitchell [1995])

This sample of five cases was considered to be representative of the population.

Investigative Technique: Taxonomic Framework for Comparing BPEAs

The empirical investigation was fundamentally taxonomic. It involved a classification and comparison of five selected BPEA exemplars. The research task was to classify the BPEAs as a prelude to systematic comparison of their dominant, salient attributes. Once almost exclusively the domain and practice of the natural sciences, taxonomy is now practiced in several other disciplines, including the social sciences, computer science, information science, linguistics, and cognitive science (Grove [2003: 2270]). Within these fields, taxonomy has acquired a wide range of meanings no longer restricted to the classic understanding of biology. Taxonomy is now applied in its early sense of organizing things in accordance with particular principles ("taxis": arrangement; "nomos": law) to a broader range of domains after several centuries of being limited to biology and other natural sciences (Grove [2003: 2270]). Grouping concepts that seem similar is a means of generalization and simplification (Fernadez and Eastman [1990]). An essential contribution of taxonomy to a discipline is its ability to disambiguate terminology by representing the relationships between concepts and providing context in which to understand and use domain-specific vocabularies (Maity, Bhattacharya, et al. [1992]; Grove [2003: 2276]).

An effective taxonomic framework is characterized by 1) advancing conceptual understanding and 2) having pragmatic utility. Because of this dual nature, at times one must turn to the practice of taxonomy to discern theory and principles and at other times study theory and principles to establish practice (Fernadez and Eastman [1990]; Grove [2003: 2274]). In other words, taxonomy means both classifying entities and creating new classes. Collections of entities are examined to create a taxonomic structure, and individual entities are assigned to the classes (taxa) created. In this article, the theory and principles from the source and application of judgment criteria (discussed earlier) provide the foundation for discovering a taxonomy of BPEAs. In the discussion section, we turn to the practice of screening entrepreneurial business plans to realize the pragmatic utility of the taxonomic framework.

The sources and application of judgment criteria described in previous sections are combined to form a two-by-two taxonomic matrix that can be used to classify BPEAs. The taxonomic framework has as its horizontal axis the source of criteria: 1) individual cognition or 2) researched venture attributes. The vertical axis consists of the application of the judgment criteria: 1) unsystematic judgmentalism or 2) actuarial modeling (*see Exhibit 1*).

A synthesis of prior research indicates that a BPEA based on researched venture attributes and actuarial modeling holds the greatest potential to improve the deal screening stage in the venture capital decision process (represented by the shaded area in Exhibit 1). In the next section, this framework will be used to facilitate the comparison of all known business plan evaluation aids to determine whether such an aid exists.

RESULTS: CHOOSING A BUSINESS PLAN EVALUATION AID

The taxonomic classification revealed two of the five examined BPEAs hold the greatest potential to improve the deal screening process: 1) the New Venture Template and 2) the FVRI System. Both of these BPEAs use researched venture attributes as the source of judgment

EXHIBIT 1
Taxonomic Framework to Classify Business Plan Evaluation Aids

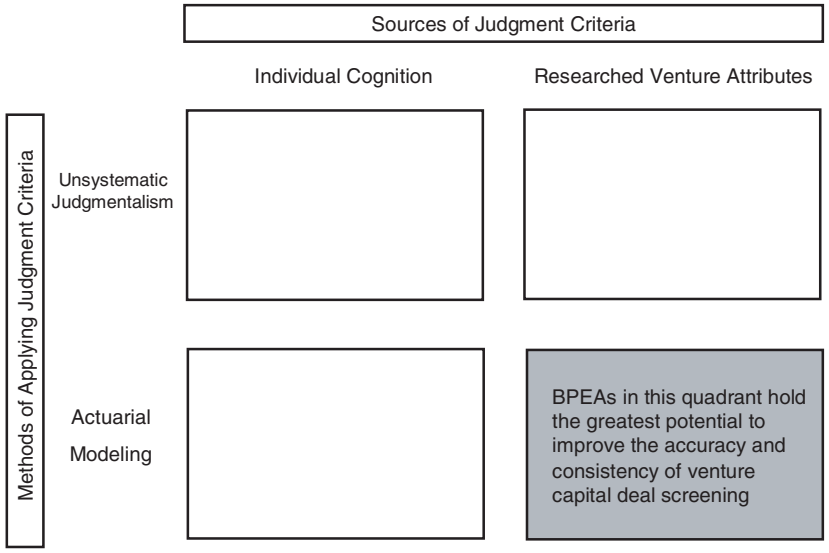
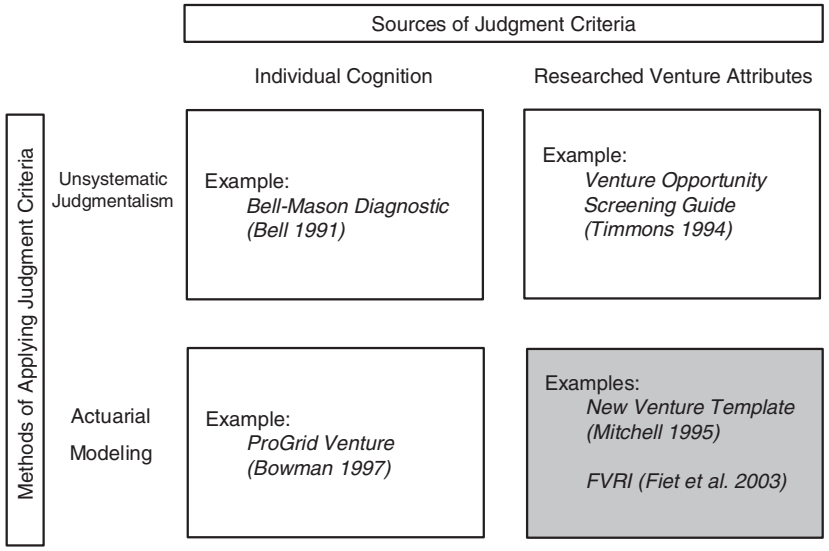


EXHIBIT 2
Classification of Five Selected Business Plan Evaluation Aids



criteria and actuarial models to apply the judgment criteria (represented by the shaded area in Exhibit 2).

A description and analysis of each BPEA follows.

Venture Opportunity Screening Guide

The Venture Opportunity Screening Guide (VOSG) (Timmons [1994]) is a paper-based decision aid that contains two stages. In the first stage, the Quick Screen is designed to enable a potential investor to screen several plans (e.g., 100 plans) down to a select few (e.g. 5 plans) using an abbreviated version of the complete criteria. After the initial screening stage, the full version of the VOSG includes 55 cues rated on a continuum from high potential to low potential. Of these cues, 43 use qualitative anchors at each end of their continuum, and the remaining 12 cues are anchored with quantitative values. Timmons derives the 55 cues from a list of criteria for evaluating venture opportunities based on his experience plus a variety of studies in the field of entrepreneurship. Research by Timmons [1994] suggests that the sources of the 55 judgment criteria used in the VOSG are based on "researched venture attributes." The VOSG, does not however, include a method to synthesise or combine the values assigned to the 55 individual criteria to determine the overall potential viability of the EBP. Without an algorithm or some systematic means to weight the importance of each cue to the overall viability of the EBP, unsystematic judgmentalism will be the method to which the decision-maker will in all likelihood default when applying the decision criteria. The tool does not provide a summary of the analysis in graphical form.

Bell-Mason Diagnostic

The Bell-Mason Diagnostic (BMD) (Bell [1991]), released in 1992, has gained growing acceptance among investors, multinationals, corporate advisors, government bodies, and VC practitioners, among them Philips, Motorola, Mitsubishi, Coopers & Lybrand, the Canadian Business Development Board, NanYang Venture Capital (Australia), and the Scottish Enterprise Board. The BMD purports to evaluate companies seeking venture capital quantitatively (Bell [1991]). Coopers & Lybrand's Gordon Bell and Heidi

EXHIBIT 3

12 Dimensions and 4 Stages of the Bell-Mason Diagnostic

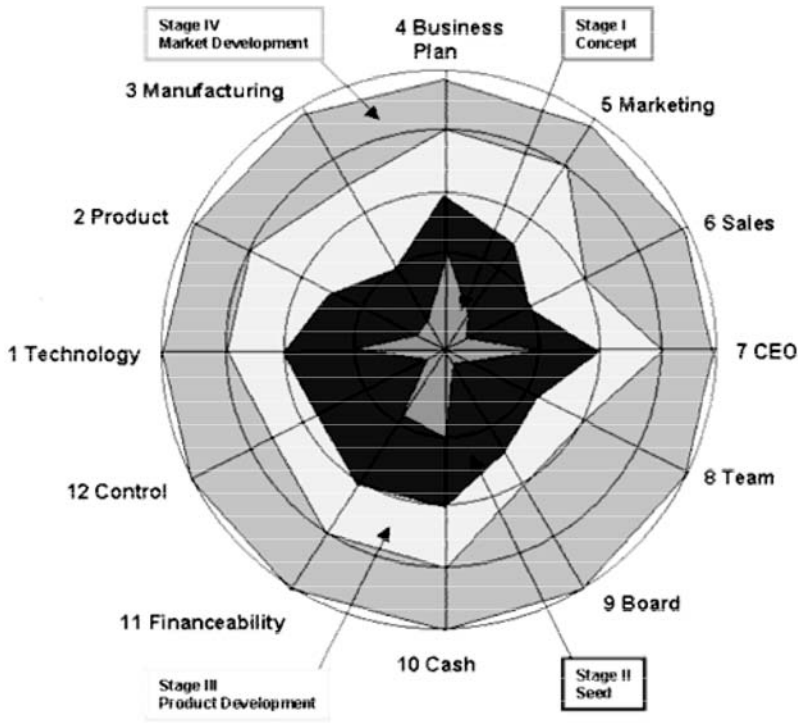


EXHIBIT 4

ProGrid Venture Characteristics and Associated Decision Cues

The Venture	The Connectors	Benefit/Impact
Advance	Validation	Market Size
Advantage	Business Plan	Market Share
Status	Business Team	Competition
Capability	Investors	Rate of Return

Mason developed the BMD over a 5-year period. The BMD is a rule-based tool that is applied manually (paper based) to characterize and plot the status of a high-technology venture at predetermined stages (discovery, definition, development, and deployment) in its growth. The BMD is designed to evaluate 12 dimensions (independent variables) (*see Exhibit 3*) and plot them against an "ideal" at each stage using 12 dimensions on a relational graph.

The diagnosis is carried out by "answering a series of 100 yes/no questions that are derived from 600 'rules' for the success of a new venture" (Bell [1991: 271]). Bell does not cite any literature, academic studies, or empirical research in determining the source of the 600 rules upon which the 100 cues are based. The rules used to drive this decision aid are based on Bell's "experience and understanding" (Bell [1991: 271]) from working with hundreds of ventures. Accordingly, BMD is considered in this comparison to be of the "individual cognition" school in terms of the source of criteria for decision-making. A user of the method responds to cues (questions) with a dichotomous "yes/no" answer. There is no flexibility for relative responses. The Bell-Mason Diagnostic does not include a method to synthesize the responses to the "yes/no" cues to determine the overall potential viability of the EBP. Without an algorithm or some systematic means to weight the importance of each cue to the overall viability of the EBP, unsystematic judgmentalism is the method the decision-maker will most likely use to apply the judgment criteria.

ProGrid Venture

ProGrid Venture (Bowman [1997]) is a software-based BPEA that comprises 12 cues that concentrate on 3 characteristics (4 cues per characteristic) of an opportunity: 1) the venture, 2) the connectors, and 3) the benefits/impact (*see Exhibit 4*).

The evaluator responds to the 12 cues using a 4-point ordinal scale. Each of the 4 points is qualitatively anchored. Bowman derives the 12 cues based upon his experience and testing with commercial clients. The source of the 12 cues appears to be individual cognition, as no literature on venture capital or new venture success attributes are cited. ProGrid Venture applies the judgment criteria using an actuarial model operationalized by computer software. As a BPEA, ProGrid Ventures enables the judge to consider and rate the 12 cues independently using a 4-point ordinal scale. The actuarial model then optimally combines the values assigned to the individual criteria, using a weighted algorithm to derive the potential viability of the new venture.

Two graphic displays in the form of charts summarize the analysis of the actuarial model. Chart 1 (The

Venture Grid) plots the current grid position for the venture using two axes (dependent variables): 1) the venture attributes and 2) the expected commercial value of the venture. This graph also compares the "position" of the venture being analyzed to other ventures that have been evaluated previously using the tool (*see Exhibit 5*).

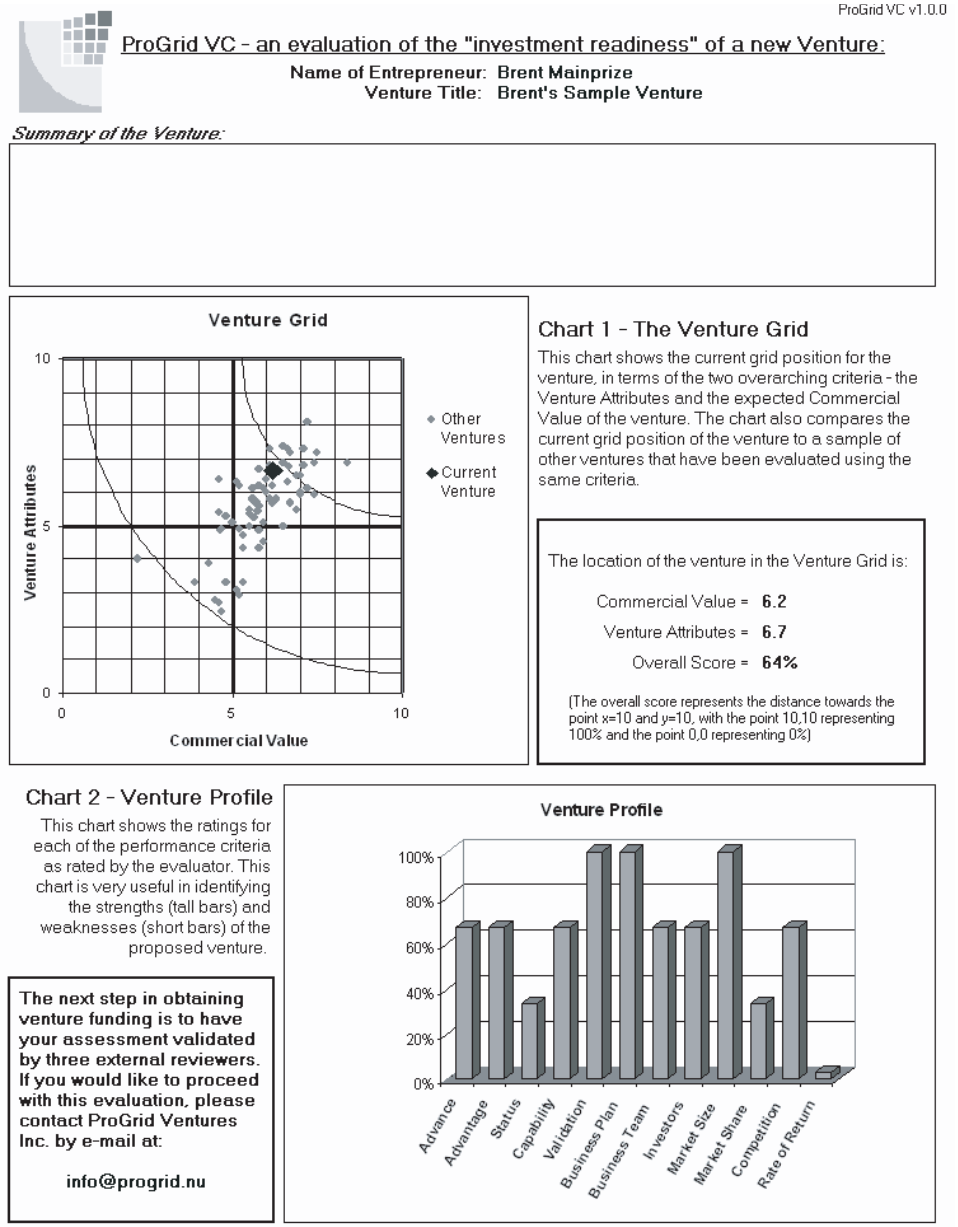
Chart 2 (Venture Profile) is a bar chart indicating the evaluator's responses to the 12 cues (*see Exhibit 5*). In sum, the strength of the actuarial model and the graphs used to apply the judgment criteria is overshadowed by the fact that the source of judgment criteria is individual cognition.

FVRI System (Fiet et al. [2003])

The FVRI System is a paper-based BPEA that purports to enable an investor to predict the wealth-creating

EXHIBIT 5

ProGrid Venture's Summary Charts and Analysis



potential of venture ideas. The fundamental underpinning of the FVRI System is based on its authors' theoretical research (Fiet, Gupta, et al. [2003: 2]). "Ideas with the potential for wealth creation must be found in inefficient markets for information and must be based on specific information, not general information. The application of general information, on average, leads to the generation of normal economic profit, which is insufficient to justify entrepreneurial risk taking" (Fiet, Gupta, et al. [2003: 2]). In contrast, the application of specific information may lead to above-normal returns and the possibility of creating new wealth because those who possess it can monopolize its application (Hayek [1945]; cf. Fiet, Gupta, et al. [2003]). In all cases, to create new wealth, the idea must consist of specific information and must be found in a market that is not widely traded, so that it will not have already been discovered and commercialized by someone else (Casson [1990]). The BPEA uses 51 cues to assess 4 wealth-creating attributes: 1) fit, 2) value, 3) rarity, and 4) inimitability.

The investor evaluating business plans enters his/her responses to the 51 cues using 45 Likert scales (from 0 to 5) and 6 cues that require numeric values. The FVRI System enables the judge to rate and enter values for the 51 questions (judgment criteria) independently. The computer-based actuarial model then allows the investor to combine optimally the values assigned to individual criteria using a weighted algorithm to derive the wealth-creating potential of a venture idea. More specifically, each of the four wealth-creating attributes includes several factors (judgment criteria). The user is instructed to select and rank the four most important factors (those with the highest rating) for each attribute. The FVRI System then requires that the user assign weights to each factor, indicating their level of importance to the respective attribute. The sum of the weights for all four factors must equal one. Individually, the user may represent them as varying decimal fractions of one.

As stated above, the actuarial model used to apply the judgment criteria of the FVRI System is one of its strengths. Perhaps an even greater forte of the FVRI System comes from the source of its judgment criteria, researched venture attributes.

Fiet, Gupta, et al. [2003] surveyed prior literature in the fields of industry organization economics (Chamberlain [1933]; Bain [1956]; Porter [1980]; Oster [1990]), the resource-based theory of the firm (Wernerfeldt [1984]; Dierickx and Cool [1989]; Barney [2002]), and the competence literature (Fiet [1996]; Venkataraman [1997]; Shane [2000]) to derive their four independent researched venture attributes to predict the wealth-creating potential of venture ideas: (fit, value, rarity, and inimitability).

New Venture Template

The New Venture Template (Mitchell [1994]) is a Web-based software decision aid that enables an investor to systematize his or her approach to the EBP screening process. The BPEA uses 15 cues to assess 6 viable venture attributes.

The investor evaluating EBPs enters responses to the 15 cues using a 9-point Likert scale. The New Venture Template as a BPEA enables the judge to consider and rate the 15 cues (judgment criteria) independently. The actuarial model driven by the software then optimally combines the values assigned to the individual criteria using a weighted algorithm to derive the potential viability of the new venture in terms of *profitability* and *survival*.

Two graphic displays in the form of charts summarize the analysis of the actuarial model. The first graph determines the "profile" of the venture by plotting the current grid position for the venture using two axes: 1) the potential profit (labeled "Is it a business?") and 2) the expected survival of the venture (labeled "Can you keep it?"). Within this grid, a set of 14 venture prototypes is compared with the venture being evaluated to determine with which prototype it is most highly correlated. The 14 prototype profiles are scattered in four general quadrants: long term/lower profit, long term/higher profit, short term/lower profit, and short term/higher profit (*see Exhibit 6*).

The second graphical display is a radar chart indicating the evaluator responses to the 15 cues. It positions the venture under scrutiny in relation to the prototypical venture (indicated by the gray shaded areas) with which it is most highly correlated (*see Exhibit* 7).

As stated above, the actuarial model used to apply the judgment criteria of the New Venture Template is one of its strengths. As with the FVRI System an even greater forte of the New Venture Template is the source of its judgment criteria, researched venture attributes. The next section shows the New Venture Template is the BPEA that holds the greatest potential, among the five models evaluated, to improve the deal screening process.

Our comparison was fundamentally taxonomic. Following the theoretical framework constituted by the ven-

EXHIBIT 6
New Venture Template Profile Chart

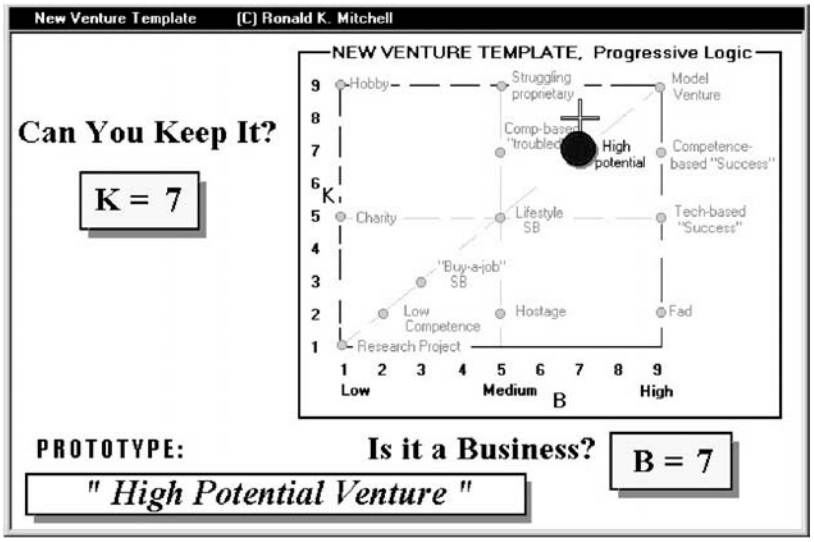
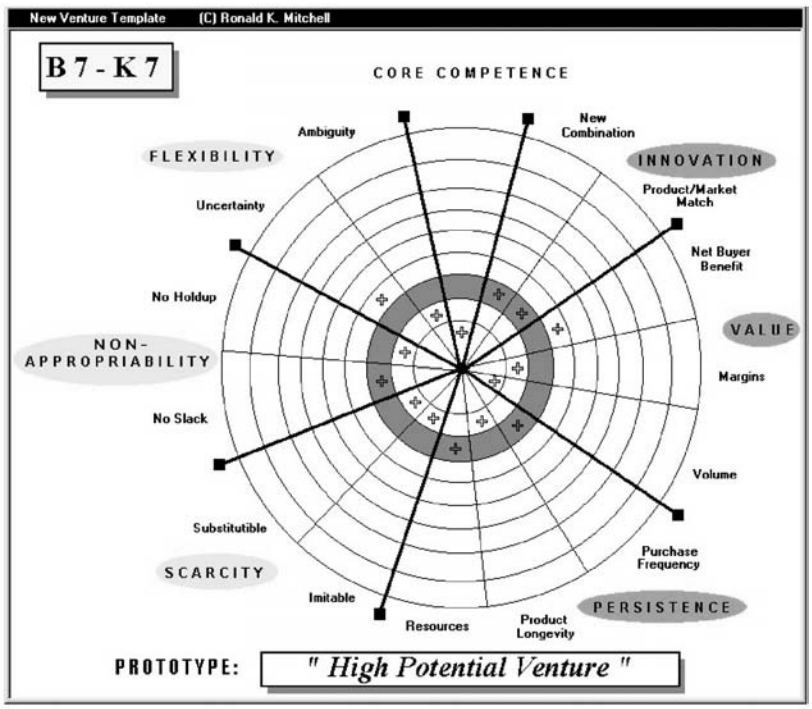


EXHIBIT 7
New Venture Template Radar Chart



ture capital decision-making literature, eight key aspects of each BPEA are compared:

1. source of judgment criteria
2. application of judgment criteria
3. format
4. number of judgment criteria (independent variables)
5. dependent variables
6. visual output
7. practitioners using the BPEA
8. the overall potential of the BPEA to improve deal screening

A summary of the comparison is presented in Exhibit 8.

DISCUSSION AND IMPLICATIONS

Despite the weaknesses inherent in all the BPEAs scrutinized, the taxonomic comparison of five existing BPEAs revealed two that hold potential to improve the screening process: 1) the FVRI System (Fiet [2002]) and 2) the New Venture Template (Mitchell [1995]). So it can be said that BPEAs developed by entrepreneurship researchers and practitioners for future studies and investment decisions should have as their fundamental underpinnings researched venture attributes and actuarial modeling. It can be unequivocally stated that unsupported individual cognition is an inadequate source of investment screening judgement criteria, and unsystematic judgementalism is a flawed, outmoded way to apply judgment criteria. This unsatisfactory combination characterizes the state of the art of the venture capital industry.

However, BPEAs developed using researched venture attributes (as the criteria source) and actuarial modeling (as the method of applying criteria) for the purpose of rating the viability of entrepreneurial business plans not only hold the greatest potential to improve the consistency and accuracy of the investment screening decision but improve research into investment decision-making in general.

VC firms that commit to a disciplined method of applying venture evaluation take an

EXHIBIT 8
Summary of Taxonomic Comparison of Five Business Plan Evaluation Aids

	Venture Opportunity Screening Guide (Timmons 1994)	**Bell-Mason Diagnostic** (Bell 1991)	**ProGrid Venture** (Bowman 1997)	**FVRI System** (Fiet et al. 2003)	**New Venture Template** (Mitchell 1995)
(1) Source of Judgment Criteria	"Researched Venture Attributes"	"Individual Cognition"	"Individual Cognition"	"Researched Venture Attributes"	"Researched Venture Attributes"
(2) Application of Judgment Criteria	Unsystematic Judgmentalism	Unsystematic Judgmentalism	Actuarial Model	Actuarial Model	Actuarial Model
(3) Format	Paper-based	Paper-based	Software (resident application)	Paper-based	Software (web-based, ASP)
(4) No. of Judgment Criteria	55	100	12	51	15
(5) Dependent variables	Four: (1) Value Created to end user, (2) Market Demand for idea, (3) Robust markets, margins and returns, (4) Fit with Team and Market for optimal risk/reward balance	Four: (1) Technology/Product, (2) Business Plan & vision, (3) People, (4) Finance/Control	Two: 1) Venture attributes, 2) expected commercial value	Four: (1) fit, (2) value, (3) rarity, (4) inimitability	Two: (1) Potential Profitability, (2) Potential Survival
(6) Visual output	Manual via a paper continuum	Manual via a paper graph	Computer generated graphs	Manual via a paper calculations	Computer generated graphs
(7) Practitioners using the BPEA	Unknown: used as part of textbook in undergraduate and graduate entrpereneurship programs	Licensed to: a) Coopers & Lybrand (1990) for startups, b) Digital Equipment Corp. (1991) for corporate ventures, c) Australian Ventures (1997), d) Diamond Technology Partners (1999) for IntraVentures	Licensed to: a) LaunchWorks Inc. b) Ontario R&D Challenge Fund c) Alberta Ingenuity Fund, d) Canadian Foundation for Innovation e) PRECARN Associates Ltd.	n/a	Licensed to: a) a North American Venture Capital Conference Provider (1997), b) Lucent Technologies (1997) for corporate ventures, c) a Canadian Aboriginal Capital Corporation –Tricorp (2000)
(8) Potential to Improve Deal Screening	Medium	Low	Medium	Medium-High	High

important step toward eliminating decisions based on unsystematic judgmentalism and adopting new decision-making policies based on the use of actuarial modeling to improve investment decision consistency. Adopting a consistent venture evaluation method could foster organizational learning. Venture evaluation methods may be the hub of knowledge that one generation of venture capitalists could pass down to the next generation within a firm. The method used for venture evaluation may come to represent an important strategic asset for a VC firm (Shepherd 1999: 84).

In the field of medicine the diagnosis procedure performed by a licensed doctor and a "medical quack" differ substantially. The two primary differences are the source of the criteria used in the diagnosis and the method employed to apply these criteria to diagnosis. Let us deal first with the issue of the source of evaluation criteria. A medical doctor uses diagnosis criteria based on scientific evidence.

A medical quack uses diagnosis criteria based on what he or she "espouses" to be important through his or her *individual cognition*. The accuracy of diagnosis by a medical doctor exceeds that of a diagnosis by a medical quack.

Unfortunately, the practices most prevalent in private equity investment parallel those of quack medicine. Many venture capitalists base their investment screening decisions on individual cognition rather than researched venture attributes "known" to cause business success and failure.

The results of venture capitalists' decisions indicate that their individual cognitions are clearly not optimal as the basis of either real-world decisions or attempts to explain those decisions using research (Shepherd [1999] Zacharakis and Meyer [2000]).

A diagnosis performed in the medical field to determine a patient's prognosis is analogous to the assessment of an EBP to determine the investment potential. In both fields, the accuracy of the decision is dependent, in major part, on the source of the judgment criteria. Doctors and investors who use decision criteria that have been demonstrated by researchers to be important, rather than unsupported capricious outputs of individual cognition, reach more accurate decisions.

ENDNOTES

[1]The majority of extant studies in the venture capital investment decision-making field belong to the "individual cognition" school, which has produced lists of criteria that venture capitalists report they use when evaluating new venture proposals (see Tyebjee and Bruno [1981, 1984]; Bruno and Tyebjee [1985]; MacMillan, Siegal, et al. [1985]; Gorman and Sahlman [1986]; MacMillan, Zeman, et al. [1987]). They are based on what the VCs say (espouse) they use to screen investment opportunities (Zacharakis and Meyer [2000]). Individual cognition is tantamount to choosing investment decision criteria based on "gut feel."

[2]A decision cue is a stimulus that provides information to the judge about what to do.

[3]It took many months to conceptually organize these two schools of thought. It was Dr. Kevin Hindle who coined the terms "individual cognition" and "researched venture attributes," through which the conceptual classification of these two schools became possible.

[4]FVRI is an acronym for the four attributes of the decision model: 1) Fit, 2) Value, 3) Rarity, and 4) Inimitability.

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