

**THE USE OF FORMALIZED RATING SYSTEMS IN
EARLY-STAGE
ANGEL INVESTMENT SCREENING**

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ABSTRACT

We examined the formal screening process of thirty-one Angel Investment Groups. Within our sample, over eighty percent of the Angel Investment Groups used a committee of members to perform the initial screening of submitted business plans, while the remaining relied upon the managing partner or senior director to perform the initial screening. Of the Angel Investment Groups that use a screening committee, approximately half also employed a formal scoring system. With respect to the important dimensions used in the scoring systems, the quality/experience of the management team and the competitive advantage of the firm's product or service, including strength of intellectual property protection, were consistently the most common dimensions seen in the scoring systems examined.

INTRODUCTION

Numerous researchers have offered empirically derived lists of criteria reported by equity investors to be most critical to their successful decision making [30, pp. 1051-1056] [24, pp. 119-128] [23, pp. 123-137] [33, pp. 323-346] [21]. Unfortunately the vast majority of empirical efforts in both the venture capital and technology contexts have been conducted in an *ex-post* manner, well-after the decision has been made. As Zacharakis & Meyer (1998) point out, such approaches which rely on expert self-introspection, are prone to recall and post hoc rationalization biases. Using hindsight, successful innovators, investors, and entrepreneurs will create a contemporaneous impression of what led to a successful technology development, rather than remembering the actual sequence of confusing and non-obvious events [6, pp. 147-168] [3, pp. 314-321]. Other common problems of *ex-post* studies are survivor selection bias where only successful technology transfers are investigated or discussed [14, pp. 1097-1120] [29, pp. 154-170], and memory decay where the technology developer or equity investor simply can't remember the important decision points from the past [5, pp. 354-359] [10, pp. 301-331].

Inevitably these biases result in fairly obvious factors, such as "having a superior product," "being aware of market demand," or "leveraging skills from a firm's core competence," as being associated with successful technology development [8]. As such, this line of research has done little in providing early, *ex-ante* predictive models of future technological and entrepreneurial success.

While much of the *ex-post* technology commercialization research is somewhat tautological in nature (i.e., superior products have greater market success), this research has provided the foundation for developing various scoring systems for early technology review. For example, in most structured approaches to technology development, such as the well-known Stage-Gate model [7] [8], the PACE process [22], and a number of Stage-Gate variations that have a more technological orientation [13] [12, pp. 29-33] [1, pp. 267-295] there is typically an early stage technology review process where a proposed technology is formally evaluated on criteria such as market attractiveness, future competitiveness, and technical merit.

Similar formal reviews are made by equity investors when reviewing early stage technology-based business plans and by granting agencies when reviewing Small Business Innovation Research (SBIR/STTR), R&D and other grant proposals (Cooper 1998) [1, pp.267-295] [26, pp.77-94] [20, pp.139-148] [16, pp.673-684].

Many of these early stage assessments now involve some type of multidimensional scoring sheet or rating process [9, pp.21-27]. In fact, within the past decade there has been a stream of complex technology readiness check-lists or calibrated scoring models designed for early stage, or “fuzzy” front-end assessments [25] [19, pp. 2-35] [18, pp.369-384].

This study explores the use of formal scoring systems for early stage, pre-due diligence screening of potential equity investments by Angel Investment Groups.

EARLY-STAGE EQUITY INVESTMENT

Angel Investment Groups are formal networks of SEC defined “accredited investors.” The *Venture Support Systems Project: Angel Investors* (2000) notes, “Angel investing is the major source of funding for the seed (\$25,000-\$500,000) and start-up phases (\$500,000 - \$3,000,000)”, (2000: 9). Similarly, the Angel Capital Association notes, “Angel investing bridges “the gap between individual (family and friends) and institutional venture capital rounds” (2002: 1) While estimates of the total annual equity funding from angels varies dramatically, it is generally agreed that angel investment in early-stage investments exceeds formal venture capital funding, with the majority of angel investment in “pre-revenue firms.” For example, research by Wong (2002) found that 69% of his sample of angel funded firms was firms in “pre-revenue” phases of development.

The second source of early stage, pre-revenue funding is from “Early-Stage Venture Capital Funds”. Early-Stage Venture Capital Funds are professionally managed funds that typically target early stage investments. Since the “dot-com” crash, the majority of large venture capital investments have focused on the later “expansion” stage, with approximately 15% to 20% of venture capital investments still targeted toward early stage firms. The process for investment reviews differs somewhat between Angel Groups and Early-Stage Venture Capital Funds.

Angel Investment Groups typically follow a formal process of evaluating and selecting deals (e.g., [27, pp.331-336]). First, business plans (or detailed executive summaries) are presented to a screening committee of members. This screening committee either informally, or by using a formal rating sheet, screens potential investment candidate firms. The selected candidate firms are then invited to a meeting of the Angel Investment Group for a formal presentation. After the presentation, a vote is taken to determine level of investment interest and commitments. If there is general interest to fund the presenting firm, the Angel Investment Group performs a “due diligence” process on the firm, and then a final agreement of valuation and investment terms (formalized in a “term” sheet) is reached.

A professional managed Early-Stage Venture Capital Fund typically involves a slightly different approach, with a managing partner of the fund championing a particular investment during the process. This might involve a preliminary due diligence process. Afterward, a vote is typically taken among all the managing partners, after which the final detailed due diligence process is undertaken. Many times an Early-Stage Venture Capital group will find and fund their investments by being a member of an Angel Investment Group. While the decision process between Angel Investment Groups and Early-Stage Venture Capital Funds differs slightly, they both involve two important decision processes: the initial screening of potential deals and the due diligence process.

EMPIRICAL STUDY

A list of one hundred forty-two U.S.-based Angel Investment Groups was obtained from Angel Capital Association web-page. An electronic questionnaire was sent to seventy randomly selected Angel Investment Groups asking for: a) a description of their pre-due diligence screening process of business

plans, b) whether or not a formal rating or scoring process was used for their initial screening of business plans, c) if a formal scoring system was employed then a copy of the scoring sheet was obtained, and d) if a formal system was not used, what was the general criteria that was used to screen business plans. The study was conducted during early 2008.

A total of thirty-one usable responses were obtained, for a response rate of 44.28%. In almost every case the respondent was the senior director or managing partner of the Angel Investment Group.

Within our sample, 80.1% (n=25) of the Angel Investment Groups used a committee of members to perform the initial screening of submitted business plans, while the remaining 19.9% (n=6) of the sample relied upon the managing partner or senior director to perform the initial screening (see Table 1).

TABLE 1: SCREENING PROCESS AND SCORING	
	Sample (N=31)
Screening Committee Decision	25
Scoring System with No Weightings	11
Scoring System with Weightings	2
No Scoring System	12
Individual Manager Decision	6

Of the Angel Investment Groups that use a screening committee, approximately 52% (n=13) also employed a formal scoring system. Here we define a formal scoring system as a Likert-style numerical rating scheme on multiple dimensions. Of these, however, only two groups used a scoring system that also employed a weighting system reflecting the importance for the various dimensions. In a weighted scoring system, for example, a ranking of “5” on “management team” might be weighted differently than a ranking of “5” on “intellectual property.”

Eight of the committee-based screening processes employed the 4-star ranking system used in the “Angelsoft” software program. In fact, within our sample, the “Angelsoft” program was clearly becoming an increasingly common way to distribute documents, and allow member feedback, including rankings, of the business plans by screening committee reviewers. Several respondents indicated that they had just starting using “Angelsoft” within the past six months.

The remaining 48% (n=12) of the committee-based screening process used either a consensus process during a screening committee meeting, or a simple ranking or rating on the overall proposal (rather than on multiple dimensions).

With respect to the important dimensions used in the scoring systems, Table 2 indicates what dimensions were most commonly identified within the scoring sheet.

Clearly the quality/experience of the management team and the competitive advantage of the firm’s product or service, including strength of intellectual property protection, were consistently the most common dimensions seen in the scoring systems examined in this study. This is consistent with many of

the studies that have examined the general criteria for selection (e.g., [21] [27, pp. 331-336] [31, pp. 343-357]).

TABLE 2: SCORING DIMENSIONS FOR SCREENING	
	Percentage Mentioned in Scoring Sheet (N=13)
Quality/Experience of Management Team	100.0%
Competitive Advantage of Product or Service (Including IP Protection)	92.3%
Attractiveness/Growth/Size of Market	84.6%
Transaction/Valuation Characteristics	61.5%
Business Model/Strategy	46.2%
Quality of Pro-Forma Financials	38.5%
Scalability	30.7%
Geographical Location	30.7%
Exit Strategy	23.1%
Prior Performance	15.4%
Stage of Technology Development	7.7%

It is also interesting to note, however, that in the two formal weighted scoring systems examined, the competitive advantage of the firm’s product or service, including strength of intellectual property protection, were weighted somewhat higher than the quality/experience of the management team. In contrast, in the screening processes that did not use a formal scoring system, the senior director or managing partner respondent almost always mentioned that, in his or her opinion, quality/experience of management team was the most important dimension.

It is interesting to note that firm valuation, or other transaction characteristics, were the fourth most common dimension seen in the scoring system. In addition, while only four of the scoring systems mentioned location, all of the Angel Investment Groups indicated a geographical preference, or requirement, within their application process.

CONCLUSION AND DISCUSSION

At one level, the responses suggested that there were extreme differences in opinion regarding the use of formal scoring systems in early stage, pre-due diligence screening decisions. On one hand, a number of Angel Investment Groups utilized a formal scoring system, with two groups even formalizing the process to the point of providing different weights to the different dimensions, then ranking the proposals based upon a weighted sum of the ratings for the different dimensions. On the other hand, several respondents clearly challenged the validity of any scoring process, or as one manager from an angel group located in

the Northeast wrote, “We specialize in early stage deals and question the utility of a scoring system in our environment.”

At another level, there was great consistency between the angel groups within our sample. Every group that used a formal rating system for their initial screening decision had quality/experience of the senior management team as one of their dimensions in the rating sheet. Similarly, all the respondents of the angel groups that did not use a formal scoring system indicated that they thought that the quality/experience of the management team was most important to the screening process. As one respondent succinctly argued, “I’m sure we could quantify the weightings but don’t because it probably wouldn’t add much value since it would be highly skewed to the management team.”

While there is certainly a difference of opinion regarding formalized screening and scoring systems for early stage equity investment screening, there remains an even broader question to still needs to be answered – do early stage reviewers and screeners actually have any ability to predict future success?

Given the hindsight and memory decay biases inherent in *ex-post* analysis, a few researchers are starting to examine technology commercialization or success within an *ex-ante* framework. Some of the *ex-ante* research has examined the decision making process among equity investors, such as venture capitalists (e.g., [34, pp. 311-332] [28, pp. 381-401] [4, pp. 411-436] [33, pp. 323-346]) For example, Zacharakis & Meyer (2000) conducted a controlled experiment by providing a sample of experienced venture capitalists with different levels of information on 25 non-associated investments, and found that venture capitalists had, at best, a prediction accuracy of less than 40 percent, and that this prediction accuracy decreased as more information was provided. Astebro (2004) studied 561 R&D “low-technology” Canadian projects’ evaluations from the mid-1990s, and tracked their success over time. The research suggests that the factors of technology opportunity, developmental risk, expected profitability, and intellectual property protection provided the greatest explanatory power.

Galbraith, DeNoble, & Erlich (2006) tracked sixty-eight early-stage technologies from government and defense research laboratories, universities, and small firms for approximately two years after grant funding, and found that the initial expert assessments based upon a formal scoring system on the average provided no predictive power. Only experts with current scientific responsibility appeared to have some predictive capability of future success. In several follow-up *ex-ante* studies, they also found that expert reviewers were particularly bad at managing Type II errors; that is, recommending investments in technologies that later proved to be failures [11] and that reviewer discussions after hearing a firm’s formal presentations did not result in any additional ability to predict future success even though greater consensus was achieved [17].

While only a few *ex-ante* screening studies have been published, these findings tend to challenge the validity of early-stage screening processes, regardless of whether or not a formal scoring process is used, or at least these studies challenge using non-technical experts in early stage screening. In fact, this may be the primary reason why such emphasis is placed upon the quality and experience of the management team – most members of Angel Investment Group screening committees are not technical experts, but rather serial entrepreneurs, investment portfolio managers, physicians, attorneys, and retired executives. Clearly, much more research needs to be accomplished in this area, particularly in the areas of accuracy of prediction and assessments by equity investment investors and business plan screeners.

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