

## Does Venture Capital Foster the Most Promising Entrepreneurial Firms?

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**T**he alarming decline in return on early-stage seed investments has contributed to the de facto retreat from the seed financing stage of established and experienced venture capitalists such as First Chicago Venture Capital, Frontenac, Golder Thoma and Cressey, and others.<sup>1</sup> The seed stage in the evolution of a venture is often characterized by an entrepreneur<sup>2</sup> with no more than an innovative idea who seeks the help of a venture capitalist in developing a prototype, writing a business plan, and launching the company.<sup>3</sup> In addition to capital, the venture capitalist is expected to provide a broad range of expertise and to devote a significant amount of time to nurturing the venture. *Time*, *Talent*, and *Treasure* (the three Ts of venturing) are required by both the entrepreneur and the venture capitalist.

In making the decision to participate in the new venture, the venture capitalist has few hard facts to rely on. There may be no products or proven customers, no financial history, and no property, plant, or equipment. Thus, the venture capitalist relies heavily on his assessment of the entrepreneur's ability to develop the new venture. Indeed, in a widely quoted study, MacMillan et al. find that among the five most important criteria used by venture capitalists to evaluate venture proposals, four are concerned with dimensions of the entrepreneur's track record and personal characteristics.<sup>4</sup> Included are the entrepreneur's work experience and familiarity with the industry, relationships with customers and suppliers, personal integrity, focus, the ability to handle sustained periods of intense effort, tolerance of ambiguity and risk, and the ability to build and lead a team of committed employees.

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From the standpoint of the venture capitalist, however, the problem is that the investment decision is made at a time when he cannot accurately assess the entrepreneur's ability to develop a successful venture. In other words, even the most comprehensive due-diligence process—which includes an assessment of the entrepreneur's track record and characteristics (the Jockey), an evaluation of product/service and technology (the Horse), and an analysis of the industry attractiveness (the Race Track)—yields an imperfect predictor of the entrepreneur's ability to “make it happen.”

This study<sup>5</sup> explores the implications of this problem for the decisions of entrepreneurs of varying abilities to involve venture capitalists in developing their ventures and discusses the implications for pricing deals of the asymmetry of information about the entrepreneur's ability that prevails before the investment decision is made. The inability of the venture capitalist to observe the entrepreneur's effort level once their relationship begins is reflected in the structure of their contract.

### **Entrepreneurs and Venture Capitalists**

The act of innovation that involves endowing existing resources with new wealth-producing capacity is central to a new venture.<sup>6</sup> Entrepreneurs are the ones who innovate and create new production possibilities by altering the pattern of production or by uniquely coordinating the production factors. Additionally, entrepreneurs perceive profit opportunities and initiate actions to fulfill currently unsatisfied needs or do more efficiently what is already being done.<sup>7</sup>

An entrepreneurial venture is not restricted to a technologically based firm, a commercialization of an invention which results from R&D, or an innovative cost-reducing process. It may simply involve a new application of existing technologies, a product or service innovation, an innovation in distribution, or a new way or place of doing business. Whatever form it takes, however, there is a substantial amount of *ex ante* uncertainty about the wealth producing capacity of the newly created capital. This uncertainty has two main sources. First, the feasibility and market acceptance (or the production and demand functions) of the innovation are unknown *ex ante*. Will it work? What will it cost to mass produce the product? Will consumers adopt it? At what rate? And at what price will consumers be willing to pay for the product or service? The second source of uncertainty is the pace at which imitation will erode the extraordinary profit or rent from the innovation.<sup>8</sup> Clearly, if the imitation is instantaneous, then rents will not be realized.

The rents that may be inherent in the entrepreneurial venture are related to the characteristics of the bundle of tangible and intangible firm-specific assets that are created by the entrepreneur. The entrepreneur's challenge is to amass a set of resources with economic returns that are appropriable by his firm, that have few substitutes, and that are rare, durable, not easily

traded, difficult to imitate by existing and potential competitors, and valued by customers. Such a collection of firm-specific heterogeneous and less than perfectly mobile assets may be valuable to the new venture since it creates asymmetry vis-à-vis the firm's existing and potential competitors or because it constitutes an isolating mechanism<sup>9</sup> that protects the venture from competitors.

Thus, an entrepreneurial firm centers on the entrepreneur's *ability* (talent, skill, experience, ingenuity, and leadership) to combine tangible and intangible assets in new ways and to deploy them to meet customers' needs in a manner that can not easily be imitated.

What are the contributions of the venture capital firm to the evolution of the new venture? Indeed, the most common response is capital, the provision of which, no doubt, is a critical input to the growth of a new venture. However, the risk-sharing provided by the venture capitalists's participation in the venture should not be overlooked. The involvement of the venture capitalist allows the entrepreneur to share some of the *ex ante* risk he would otherwise be bearing alone. Further, there is a growing body of evidence that points to the general management contributions made by the venture capitalist.<sup>10</sup> This includes assistance with business strategy formulation; introductions to bankers, lawyers, and other professionals; help with professional recruiting; and so on. In addition, the affiliation with a reputable venture capitalist may augment the venture's image and credibility among customers, suppliers, and potential employees, who may be more inclined to enter into a business relationship with the venture. The framework presented below attempts to capture the risk sharing as well as the capital and other contributions made by the venture capitalist.

### **The Framework for Analysis**

As the entrepreneur's ability level is not entirely known *ex ante* to the venture capitalist, he anticipates that it will vary considerably among entrepreneurs who approach him. In addition, entrepreneurs are assumed to have varying preference structures and thus to differ in the amount of effort they are willing (and able) to expend in order to develop their firms. Also, the capital requirements of entrepreneurial ventures vary. Thus, the size of the uncertain payoff from the entrepreneurial project is assumed to depend on the ability of the entrepreneur, the level of effort expended, and the capital invested. The expected payoff will be larger the more able the entrepreneur, the higher the level of effort, and the greater the capital investment.

Ordinarily, one observes five distinguishing characteristics of venture capital financing contracts. These are:

- *Sharing Arrangements*—The agreement between the venture capitalist and the entrepreneur involves a risky position for both.

- *Earnout Agreement*—The entrepreneur's share of ultimate profits depends on demonstrated skill.
- *Buyout Option*—Upon termination of duties through resignation or relief of productive controls, the entrepreneur is to be paid a fixed amount that is independent of his demonstrated skill or the eventual cash flows generated by the venture.
- *Performance Requirement*—The entrepreneur has to demonstrate some skill level (measured by agreed-upon milestones) in order to retain control in subsequent periods.
- *Future Financing*—The venture capitalist who has contracted for the first round of financing has a right of first refusal for subsequent financing.<sup>11</sup>

One of the distinguishing features of the entrepreneur's reward system is the relationship between the expected payoff from the project and the entrepreneur's share. The entrepreneur who decides to develop the venture independently is rewarded by the entire profit, while the entrepreneur who involves a venture capitalist will be rewarded by some fraction of future profits. In addition, the entrepreneur who decides to develop the venture alone has the option of using his own assets or of borrowing fully collateralized funds (i.e., the lender is not making a risky loan). The cost of raising such funds may be very high and in many cases prohibitive. Thus, the entrepreneur who develops the venture alone has to decide how much to invest in the venture and how hard to work in order to develop his venture.

If the entrepreneur decides to involve a venture capitalist, he solicits bids for his venture and accepts the highest bid offered (the buyout option). After accepting the bid, the venture capitalist determines both the investment level and the entrepreneur's share of ultimate profits so as to maximize his own profits.<sup>12</sup> In addition, once a bid is accepted, the venture capitalist faces the challenge of inciting the entrepreneur to manage the project in a way that is consistent with his profit-maximization objective. Because of the potential for different overall objectives, management styles, and risk preferences, the entrepreneur is likely in many cases to choose actions that are consistent with his own best interest but inconsistent with the venture capitalist's interests. Since direct observation of the entrepreneur's behavior and, in particular, direct control of his actions is not feasible, the venture capitalist resigns himself to the fact that the efforts exerted by the entrepreneur will be made in the entrepreneur's best interests (and not necessarily in the venture capitalist's best interests) and takes this into account as another constraint in his profit-maximization objective.

The sharing agreement depends on the realization of the uncertain ultimate profits to be shared. Thus it is a contingent payoff. It specifies for both profits and losses the sharing contingencies of the uncertain outcome. There is no reason to specify a priori that the entrepreneur will not bear some of the losses. In certain circumstances, it may be beneficial for both

the venture capitalist and the entrepreneur not to insist upon limited liability for the entrepreneur.

A competitive venture capital market place should lead to a bid such that investors can only *expect* a risk-adjusted, zero Net Present Value (NPV) investment. As the skill levels of entrepreneurs are not known during the bidding phase for the venture, the venture capitalist bases his bid on an expectation that is taken over the spectrum of entrepreneurial skills that the venture capitalist may face. Thus, some venture investments will earn extraordinarily high profits because the venture capitalist managed to pick a very talented entrepreneur, while others will result in losses. On average, however, the venture capitalist can only expect a zero NPV investment with a discount factor correctly adjusted for risk.

In order to examine the desirability of involving a venture capitalist, the entrepreneur compares the payoff from the venture under each of the two alternatives.

### Major Findings

Our first result concerns a situation in which the skill level of the entrepreneur is common knowledge. When the entrepreneur's ability is fully known to all participants of the bidding process, then the entrepreneur will always involve a venture capitalist either to share the risks that are inherent in the new venture or because of difficulties in raising capital on his own. Moreover, even in cases in which the need for capital is not essential, the entrepreneur will decide to involve a venture capitalist because of risk sharing. In such cases, because of the entrepreneur's inherent risk aversion, the incentive to share risk is sufficiently high so that the venture capitalist's participation pays off even though the needed capital can be raised elsewhere at the same cost. In this sense, as long as the entrepreneur is risk averse, *the primary reason the entrepreneur decides to involve a venture capitalist is his need for risk-sharing rather than his need for capital.* NeXT, Inc. is a case in point. The seed money for this venture could have been provided by its founder Steve Jobs, "the entrepreneur of the decade," yet he chose to involve an outsider, H. Ross Perot, in providing the bulk of the seed money for the firm.<sup>13</sup> Evidently, the risk-sharing provided by Mr. Perot's participation was worth the equity that had to be paid for obtaining the capital.

If the entrepreneur, however, is risk neutral, he does not have any need for risk-sharing, and he will involve a venture capitalist only if he has difficulties in raising cash on his own.

**Adverse Selection**—In spite of our finding that risk sharing and lack of funds will drive entrepreneurs to seek venture financing, in practice we

observe many new ventures that were not developed with the help of venture capital firms. Examples include such service firms as Visible Changes, Inc., a Texas-based chain of hair salons founded by John McCormack (the “hottest entrepreneur in America”);<sup>14</sup> New Hampshire-based PC Connection, Inc., a mail-order retailer of PC peripherals; Ohio-based Jacor Communication, Inc., a radio station operator; software firms such as Wisconsin-based Persoft, Inc.; manufacturing firms such as Cogentrix, a North Carolina-based owner and operator of cogeneration facilities (the #1 company in the 1989 *Inc.* 500 list).<sup>15</sup>

The reason these and many other entrepreneurs chose not to use venture capital equity funding lies in part in private information about the ability levels of the entrepreneur. Thus, the entrepreneur knows (or thinks he knows) his own ability level better than the venture capitalist, who does not know what type of entrepreneur he is facing. In order to appreciate the severity of the adverse selection problem, consider the extreme case in which entrepreneurs are risk neutral and no new investment is needed. Under these conditions, when the venture capitalist makes a bid based on the average ability level, then only the entrepreneurs whose ability level is below the average will choose to involve a venture capitalist. This will result in a negative NPV investment. In this case the adverse selection problem is so severe that apart from the worst entrepreneur contracting with a venture capitalist, there will not be any other deals. If entrepreneurs are risk averse, however, or if they have difficulty raising capital, the market does not break down completely. In this case, the announced buyout option bid that is accepted by some entrepreneurs is larger than the bid needed to motivate the least skillful entrepreneur to involve a venture capitalist. The entrepreneurs who accept the venture capitalists’ offers are low-ability entrepreneurs while the high-ability ones develop ventures on their own.

The intuitive reasoning behind this phenomenon is as follows: Suppose the venture capitalist anticipates the worst and enters the lowest possible bid, one that will entice the least skillful entrepreneur. The venture capitalist consequently knows that he will not only attract entrepreneurs with the lowest skill level but, because of the risk-sharing element of the contract, he will also attract some entrepreneurs with higher abilities. Therefore, he expects positive profits. Competitive forces in the venture capital market will drive up the price of the bid. However, the venture capitalist will still get the low end of the spectrum of entrepreneurs since the high-ability entrepreneurs will not be satisfied with the new bid and will develop the project on their own. In order to entice these high-powered entrepreneurs, the bid price needs to be set high. However, the venture capitalist will face large losses since he will not only attract the high-ability, but the low-ability entrepreneurs as well and thus will pay a premium for the projects of the low-ability entrepreneurs.

**Prototype as a Signal**—When venture capitalists are not able to assess accurately the entrepreneur's ability, high-ability entrepreneurs decide to develop the venture on their own because the price offered does not reflect their true ability and is therefore judged unattractive. However, these entrepreneurs might find it worthwhile to invest in information that would communicate their true abilities to the venture capitalist. This information might take several forms, such as the completion of a business plan, a product prototype, or several other signals. If the cost of generating information is not too high, then the higher-ability entrepreneurs will find it beneficial to invest in such information. If venture capitalists know about the possibility of purchasing this information, then its absence acts as a signal that an entrepreneur does not have high ability. This may induce lower-ability entrepreneurs to produce a signal as well. Thus, it is not clear a priori what type of entrepreneur will find it worthwhile to invest in such information.

To explore this issue, consider the development of a prototype as a signal to venture capitalists by entrepreneurs of different abilities. The entrepreneurs have three options at their disposal:

- Involve a venture capitalist without developing a prototype.
- Prepare a prototype and then involve a venture capitalist.
- Develop the project without the help of a venture capitalist.

For convenience, we divide entrepreneurs into three ability groups: low, medium, and high. The question is what each group of entrepreneurs will decide to do with respect to the three options listed above.

First, note that if the cost of preparing the prototype is negligible, then all three types of entrepreneurs will prepare a prototype. The reason is that the entrepreneur who does not prepare a prototype when the option is available signals to the venture capitalist that he is worse than the average-skilled entrepreneur. Thus, if a buyout bid is offered so that only the low-ability entrepreneurs choose to involve a venture capitalist, the venture capitalist will suffer losses. The only way to avoid this loss is to base the bid on the profitability of the venture with the least skillful entrepreneur. But if this is the case, then all but the least skillful entrepreneur will choose to develop the prototype.

This reasoning carries through to the case when the cost of preparing a prototype is non-negligible. In this case as well, the bid is based on the low-ability level and this group does not prepare a prototype.

The three possibilities of actions optimally chosen by the three groups of entrepreneurs are depicted by Table 1. Observe that in all three cases the low-ability entrepreneurs involve a venture capitalist without developing a prototype. The low-ability entrepreneurs who involve a venture capitalist without developing a prototype receive a lower bid, however, than they would in the case where developing a prototype is impossible.

**Table 1.**

	<b>Entrepreneur's Ability</b>	<b>Cost of Prototype</b>	<b>Options</b>
		<b>Low Cost</b>	
1.	High		Develop alone
	Medium		Involve a Venture Capitalist with prototype
	Low		Involve a Venture Capitalist without prototype
		<b>Medium Cost</b>	
2a.	High		Develop alone
	Medium		Involve a Venture Capitalist with prototype
	Low		Involve a Venture Capitalist without prototype
		or	
2b.	High		Develop alone
	Medium		Involve a Venture Capitalist with prototype
	Low		Involve a Venture Capitalist without prototype
		<b>High Cost</b>	
3.	High		Develop alone
	Medium		Involve a Venture Capitalist with prototype
	Low		Involve a Venture Capitalist without prototype

To see why the venture capitalist pays a lower price to an entrepreneur who does not develop a prototype when one is possible, observe that when developing a prototype is feasible the investors face an additional adverse selection problem. The case when an entrepreneur wishes to involve a venture capitalist without a prototype is worse in terms of ultimate expected profits, on average, than that of an entrepreneur who wishes to involve a venture capitalist when production of a prototype is not feasible.

There are four cases in Table 1. The results of the low-cost case correspond to the case that was discussed above when the cost of prototype was negligible. In the same way, the high-cost case replicates the case where producing a prototype is not feasible, namely, the low-ability entrepreneurs involve a venture capitalist without a prototype and all the rest develop the ventures on their own.

In Case 2a, where prototype production carries a medium cost, the high-ability entrepreneurs develop the project on their own, the medium level involve a venture capitalist with a prototype (each at his own price), while



the low-ability entrepreneurs involve a venture capitalist without a prototype at a low common price. While this seems the intuitive result for such a case, there is yet another possibility (Case 2b). The low-ability group behaves as before, while the first two groups change their decisions. The high-ability entrepreneur, wishing to take advantage of the risk-sharing benefits that result from involving a venture capitalist but to avoid being bundled together with the price offer to the low-ability entrepreneurs, produces a prototype at a cost and receives a price according to his revealed ability. The medium-level entrepreneurs might wish to do the same. However, the cost of producing the prototype is high enough so that with the prototype they receive an overall compensation that is lower than the one they would get had they accepted the common bid offered to the low-ability entrepreneurs. Given that they do not wish to be bundled together with price offers to the low-ability entrepreneurs, they choose the only option available to them, namely, to develop the project on their own.

### **Implications**

Our analysis of venture capital backed firms suggests that we can expect higher failure rates among these firms than in the population of new firms. This expectation results from the observation that venture capital backed firms are founded by entrepreneurs who are not the most capable ones. Because of the difficulty for the venture capitalist to assess accurately the entrepreneur's ability, the most able entrepreneurs will not find the prices offered by the venture capitalists sufficiently attractive.

To the extent that the findings of this study are empirically upheld, our observations constitute a challenge to the competitiveness of U.S. high technology in the increasingly global economy. The strategically critical U.S. high-technology industry relies heavily—perhaps more heavily than that of Japan and Europe—on venture capital financing. Under the current institutional structure of the venture capital industry, the most promising entrepreneurs will not seek venture capital financing, and are likely to make slower progress in the development and commercialization of emerging technologies. Further, those entrepreneurs that are backed by venture capital are less likely to succeed in developing their ventures because of their relatively low ability. Thus, this study calls for close collaboration among researchers and practitioners in finding new structures of venture capital regimes that will foster venture capital financing of the most promising entrepreneurial firms. Such a venture capital regime will capitalize on the creativity and ingenuity of U.S. entrepreneurs, and it will have an important role in sustaining the competitiveness of U.S. high technology.

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