Will the Old Venture Model Work with New Web-Based Start-Ups?

Robert Hendershott

Santa Clara University

Abstract: This paper suggests that the traditional venture capital industry, evolved for relatively capital intensive start-ups like semiconductor firms, is a poor fit for the next generation of web-based start-ups. However, the same forces that make venture capital a poor fit also make venture capital less relevant, providing an alternative path for entrepreneurs to create the next cohort of leading web firms.

Keywords: entrepreneurship, venture capital, Web 2.0.

1. Introduction

Venture investors make long-term, illiquid investments in risky companies. Doing so is only attractive if they can generate high returns from their portfolio. The inevitably high percentage of failures in even high-quality venture portfolios make this a challenge, particularly when investors must earn their required return without excessively diluting entrepreneurs' ownership. The resulting venture investment model is dictated by both competition between investors and the need to maintain entrepreneurs' strong financial incentive to make their companies successful. The venture model, however, evolved for a traditional class of start-ups, e.g., semiconductor companies. This paper discusses why the old venture model may not work well with new web start-ups, and what this means for entrepreneurs.

My conclusion is two-fold. First, the decreasing cost of launching a new Web-based business and evaluating its potential gives entrepreneurs an increasing incentive to create and promptly sell budding businesses rather than pursue the longer, riskier strategy of building a complete business. Second, this change creates challenges for the traditional venture capital investment model, which means that many future entrepreneurs should expect to avoid the venture path. Because the venture industry currently provides many of the resources used by leading new firms as well as a mechanism for rapidly evaluating the evolving potential of new business ideas, a shift away from venture capital changes the game for entrepreneurs. Fortunately, the same forces that make venture capital a poor fit for much of the next generation of Web-based start-ups, in particular increasingly available and sophisticated cloud computing resources, also make

venture capital less relevant. Further, successful start-ups are becoming less dependent on building a complete business as large technology companies like Microsoft, Google, and Yahoo show a healthy appetite for buying young companies that have developed innovative new Web-based applications.

The paper is organized as follows. The first section outlines and discusses the basics of the venture capital investment model. The second section presents a stylized model of venture investment to show why Web entrepreneurs have an increasing incentive to sell their companies early and how this incentive creates problems for venture investors. The last section discusses how venture investors' predicament might impact entrepreneurs creating the next generation of Web-based start-ups.


2. The Venture Model

Venture investment in start-ups is typically "staged," that is, provided in portions over time. These investment rounds typically involve separate issues of preferred stock distinguished as Series A, Series B, etc. as the new company exchanges equity for additional capital. In any financing round the company's *post-money* valuation is the sum of the company's negotiated *pre-money* valuation and the amount invested. Investors receive ownership equal to the investment divided by the post-money valuation while the existing shareholders retain ownership equal to the pre-money valuation divided by the post-money valuation. That is, if a new company receives $6 million in a Series A investment round at a $15 million post-money valuation, the company's pre-money valuation is $9 million (15-6), and the investor(s) receive 40% ownership (6/15) in exchange for their capital while the entrepreneur(s) retain 60% ownership (9/15). If the company later raises an additional $10 million in a Series B investment round at a $40 million post-money valuation, both the Series A shares and the common stock are diluted by 25% (10/40). Consequently, after the Series B, Series A shares would represent ownership of 30% of the company (40*(1-.25)), Series B shares would represent ownership of 25% of the company (10/40), and the entrepreneur(s) would retain 45% ownership (60*(1-.25)). Further investment rounds would have a similar impact on ownership that depends on how much is invested and at what valuation. The key to success is for the company's negotiated valuation to be low enough to entice investors to provide capital while being high enough to give the entrepreneur(s) and other employees an incentive to dedicate their lives to getting the new company off of the ground.

This need drives the use of staged investment in the venture model. Consider a new venture, NewVen, that needs to raise $20 million to (potentially) become a large, profitable business in three years. NewVen's success cannot be guaranteed in advance. Suppose that the odds that NewVen is wildly successful, producing an enterprise worth $300 million in three years, are 20%; the odds that NewVen

is mildly successful, producing an enterprise worth $25 million, are 20%; and the odds that NewVen fails, producing no enterprise value, are 60%. The potential payoffs for the unstaged investment are shown in Figure 1.
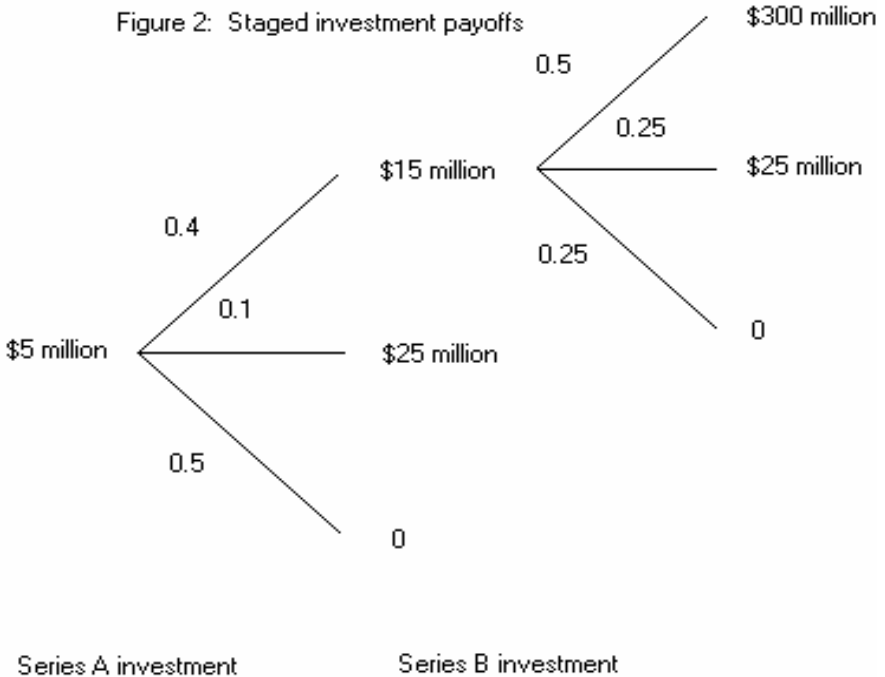
Figure 1: Unstaged investment payoffs
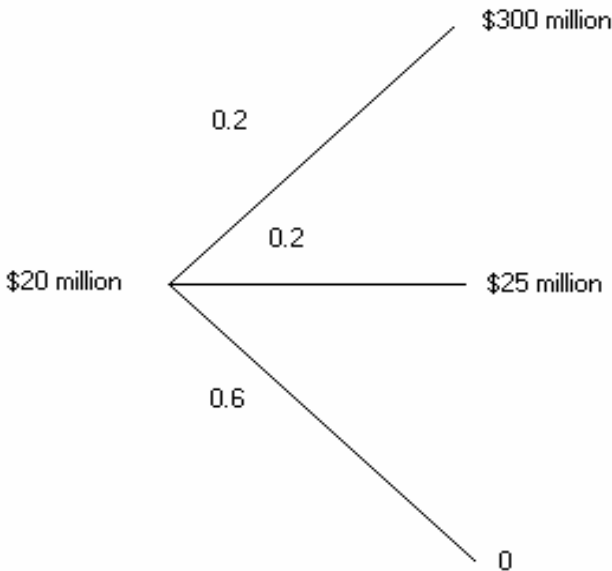
Given these potential payoffs, NewVen's expected value is $65 million (0.2*300+0.2*25) in three years. Because NewVen is a risky opportunity, we will assume that investors demand a 40% expected return on their capital. This means that NewVen's initial value is dramatically less than the $65 million expected future value or, more precisely, that NewVen's initial value is only $23.7 million ($65 million discounted at 40% for three years). Investors' capital represents $20 million (84.4%) of this value, leaving the founders and other employees with only 15.6% (3.7/23.7) of their company.[1] This leaves relatively little for the entrepreneur(s): the expected value of their 15.6% stake is $10m, but this payoff is risky, is divided among all common shareholders, and requires three years of effort. Conceivably, the 15.6% ownership stake does not provide sufficient upside to warrant starting the business, at least for the most talented entrepreneurs and employees. If so, why would we believe that NewVen might turn $20m of capital into a $300m company?

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1. Investors own 84.4% (20/23.7) of the company so they receive $253 million (84% of $300m) with probability 0.2 and $21 million (84% of $25m) with probability 0.2. Consequently, investors' expected value is $54.85 million (0.2*253+0.2*21)) and their expected return is 40% ((54.85/20)$^{1/3}$-1).

The venture model solves this problem by having NewVen raise the $20 million necessary to build the business in two parts, say, $5 million first (the Series A investment) and potentially another $15 million in, say, 18 months (the Series B investment). NewVen will, however, have to "earn" the Series B investment by showing sufficient progress during the company's first 18 months. Suppose that the odds that NewVen makes sufficient progress to warrant the Series B are 40%, the odds that NewVen will be worth $25 million after 18 months (but does not warrant a Series B investment) are 10%, and the odds that NewVen does not warrant the Series B and is worthless is 50%. Further, if NewVen earns a Series B investment, the company has a 50% chance of being worth $300 million, a 25% chance of being worth $25 million, and a 25% chance of ending up worthless. These potential payoffs are shown in Figure 2.

Figure 2: Staged investment payoffs

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                                                        $300 million
                                               0.5
                                                  0.25
                            $15 million                 $25 million
                   0.4
                                                  0.25
                         0.1
 $5 million                      $25 million            0
                   0.5
                                 0
        Series A investment           Series B investment
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By construction, the staged investment payoffs create the exact same distribution of future values as the initial example (20% chance of $300m, 20% chance of $25m, 60% chance of zero); this is the same company but with staged investment. However, the division of ownership between investors and the entrepreneur(s) can be dramatically different. In the second round investment (Series B), the company's expected future value is $156.25 million (0.5*300+0.25*25). This implies that NewVen's post-money valuation in the second round is $94.3m (156.25 discounted at 40% for 18 months).[2] Given a $15

million investment, this makes NewVen's second round pre-money valuation $79.3 million (94.3-15). Consequently, Series B investors receive only 16% of the company (15/94.3).

The expected value for Series A investors is calculated similarly, except that these investors' ownership will be diluted 16% if there is a Series B. To earn 40% annually over the three years, Series A investors must receive just under 25% of the new company in exchange for their $5 million investment, implying a $15 million pre-money valuation in the Series A. Consequently, NewVen's founders and other employees retain 75% of the company after the Series A and over 63% of the company after the second round (assuming that there is a Series B). This increased ownership stems from the higher valuation assigned to the company ($15 million pre-money in the staged Series A versus $3.7 million pre-money in the unstaged investment) and translates into expected value of over $41 million (0.2*0.63*300+0.1*0.63*25+ 0.1*0.75*25) for the entrepreneur(s) as opposed to $10 million without staged investment. Venture investors are able to earn their high returns without sacrificing entrepreneurs' financial incentive to push toward the $300m exit.

3.   A Stylized Venture Capital Investment Model

We can think of the venture model as represented by a two-stage investment process that involves proving the technology (T) and proving that a market for the technology exists (M). Building a successful company requires investment capital of $C = C_T + C_M$. Investing C_T at t=0 reveals whether the technology is viable or the company is worth zero. If the technology proves viable, investing C_M at t=1 reveals whether the market exists. Successful start-up companies, where the technology works and the market exists, are sold at t=2 for W_M. Investments occur at equilibrium (post-money) valuations, V_i, that give venture investors enough ownership to earn their required expected return, which is the multiple R>1 between each round. Therefore, venture investors putting $X into the first (second) round require an expected payoff of $XR2 ($XR) at liquidation.

The probability that the technology proves viable is p_T. The probability that the market exists (conditional on the technology proving viable) is p_M. The second round venture investor provides capital of C_M and receives C_M/V_M of the firm's eventual value. The investor's share, C_M/V_M, of the expected eventual value, $p_M W_M$, must equal RC_M for the second-round investor to earn his required return, so $V_M = p_M W_M/R$.

After the first round, the entrepreneur owns $\alpha=(1-C_T/V_T)$, where $V_T = p_T p_M(1- C_M/V_M)W_M = p_T(p_M W_M - RC_M)$. The first-round venture investor owns the rest, enough to earn (in an expected sense) his required return multiple.

The entrepreneur's ownership is diluted to $\alpha(1-C_M/V_M)$ if there is a second round.[3] The entrepreneur can choose to sell the potential business for W_T after the first round and collect αW_T, forgoing a chance to learn whether the market exists and the company will be worth W_M. The alternative is a gamble that pays the entrepreneur $\alpha(1-C_M/V_M)W_M$ with probability p_M. To guarantee that the second round makes economic sense we assume that $W_T \leq p_M W_M/R - C_M$, that is, W_T is less than or equal to the expected net present value of the second-round investment. If this were not the case, then it would always make sense to sell the (potential) company at t=1.

While in the model the expected value of the second round gamble is guaranteed to be higher than the certain payment W_T, risk-averse entrepreneurs may choose the bird in the hand over the two in the bush. The utility from receiving a sure αW_T could dominate the utility from a gamble that, while it has a higher expected value, pays nothing with probability $1-p_M$. The first round investor, while also risk-averse, is presumably diversified across a portfolio of similar young firms. This makes the investor more willing, even eager, to take the chance of a complete loss in any given portfolio company in exchange for a good chance at a much higher gain in at least one portfolio company. Another way to think about this is that the entrepreneur's discount rate is likely to be much higher than the investor's.

Consider a specific example where C = $30 million (with C_T = $5m and C_M = $25m), W_M = $375 million, p_T = 0.4, p_M = 0.4, and R=2. That is, the firm requires a total of $30m in capital, but only $5m to develop the technology. There is a 16% chance that the firm will end up being worth $375m, and first (second) round investors need to, on average, double (quadruple) their investment. Under these assumptions V_T = $10m and V_M = $75m in order for venture investors to earn their required multiple. If the technology proves itself, the entrepreneur can raise a second round, a gamble that pays them $125m (given the entrepreneur's diluted ownership of $(1-5/10)(1-25/75)$ = 33.3%) with probability of 0.4. The alternative is to sell the company for W_T ($\leq$50) after the first round, with the entrepreneur receiving 50% of the sale price.

To examine the entrepreneur's incentives, suppose W_T = $50 million. Entrepreneurs face the choice of a certain $25 million today or a 40% chance of $125 million in one year. Given risk aversion and time value, presumably some entrepreneurs would choose the sure $25 million despite its lower expected value. Regardless, the entrepreneur choosing to sell does not obviously harm the first-round venture investor, who doubles his $5 million investment on average (making $25 million, or quintuple his $5 million investment, 40% of the time) without any further risk.

However, if W_T is small, say $10 million, the first-round venture investor loses in a sale after the first round. In this case with 50% ownership the first-

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3.   We assume that the company is able to raise a second round whenever the technology proves viable.

round investor receives $5 million 40% of the time, a $2 million expected payoff from his $5 million investment. At the same time, though, the entrepreneur is less likely to choose certainty because the payoff is smaller. Faced with the choice a certain $5 million today or raising a second round for a 40% chance of $125 million in one year, presumably most entrepreneurs would raise a second round.

Generally, as W_T increases, the entrepreneur becomes increasingly likely to choose the sure payoff. If $W_T = \$30m$, for example, then the entrepreneur faces a choice between a certain $15 million and raising a second round for a 40% chance of $125 million in one year. While these two options may be comparable for a risk-averse entrepreneur, selling for $30 million is unequivocally a problem for the first-round venture investor who would invest $5 million and receive $15 million 40% of the time, or $6 million on average, which falls well below the required double. As W_T rises, the increasingly-attractive certain payoff gives the entrepreneur an escalating incentive to sell after the first round, while the first-round investor's preference continues to be raising more money to validate the market.

Traditionally the venture capital industry has avoided this incentive problem in three ways. First, entrepreneurs tend to self-select as being relatively less risk averse, making the higher expected value gamble generally the more attractive choice. Second, venture investors' large ownership stakes typically give them significant say over start-up company decisions (in the above example, the first-round venture investor owns 50% of the firm). Third, venture investors often receive liquidation preferences that give investors first claim on the proceeds from a sale, reducing entrepreneurs' payoffs, particularly from small sales. By reducing the entrepreneur's sure gain from selling early, liquidation preferences help align investor and entrepreneur incentives. As we will see, these solutions are likely to be less effective in the next generation of web-based start-ups.

4. The Next Generation of Web Start-Ups

The venture model described above was used to fund early internet companies, firms characterized by significant capital requirements (large C), including at the initial stage (large C_T), and high failure rates but a few very large successes. For example, Hendershott (2004) examined 441 venture-backed dot-com firms initially funded between 1995 and 2000. This group absorbs a large amount of capital, an average of $27 million of private capital and $48 million of total capital per firm. The group also produced relatively few successful companies: 60 (14%) of the dot-coms go public by the end of 2001 and between 5% and 16% of the sample are categorized as eventual "winners" based on different criteria. However, a large amount of aggregate value was created within the sample – a few winners more than make up for the many losers – even ignoring the benefits that accrue to the new firms' users. Ignoring this consumer surplus is likely a

nontrivial omission when many pay relatively little, or in some cases nothing, for the services provided.

There is no reason to expect that the next generation of Web-based companies won't contain similar successes. However, the model for creating web application and web-based firms is evolving in a direction that does not fit the venture model as well. For internet companies the technology stage in the stylized venture investment model might correspond to developing the applications/site, which recently has become very low cost. Large technology companies (Sun and IBM) along with leading internet companies (Amazon and Google) are offering increasingly flexible services that give young companies immediate access to sophisticated technology tools and infrastructure. Because new companies can rent rather than buy, these cloud computing services allow small firms to rapidly introduce new products and experiences at relatively low fixed cost. With cloud computing a small company can scale their web presence and server capacity as demand waxes and wanes. This means that the bulk of the capital necessary for infrastructure build-outs can occur *after* the technology (and market) is proven viable. The total cost of building a successful new company may be largely unchanged, but the cost of failure falls; in the context of the model C_T falls even though C may remain high if the idea is successful.

The first-stage cost (C_T) becoming a smaller fraction of the total cost of building a new company exacerbates the entrepreneur-investor incentive conflict in two ways. First, a smaller first round reduces dilution, increasing the entrepreneur's share of a sale after the first round. While this largely flows through the second round so the potential and expected payoff from continuing also grows, the sure payoff becomes larger in both absolute size and as a fraction of the expected value of the gamble associated with a second round. Recall that in the above example, when W_T = $30 million the entrepreneur faces a choice between a certain $15 million and raising a second round for a 40% chance of $125 million in one year (when C_T = $5m and C_M = $25m). If first round costs are lower, say, C_T = $2.5 million and C_M = $27.5 million, then the choice is between a sure $22.1 million and a 40% chance of $175 million. The latter case provides a larger sure payout that also represents a larger fraction of the respective gamble's expected payoff, making the sure payoff is more attractive when C_T is lower. Second, the smaller first-round investment gives venture investors less ownership and control and limits the impact of standard liquidation preferences (e.g., multiple and participating preferences). Using the same comparison, investor ownership is 50% of the company after the first round if C_T = $5 million and C_M = $25 million, but falls to 26% if C_T = $2.5 million and C_M = $27.5 million.

Of course, if a meaningful fraction of successful entrepreneurs choose to sell after the first round, the equilibrium valuations calculated in the model (e.g., V_T = $p_T p_M (1 - C_M/V_M) W_M$) no longer apply. Valuations would have to fall to provide investors with their required return multiple by giving investors a greater

fraction of the early sale proceeds (usefully, this would also reduce entrepreneurs' incentive to sell early). In a mixed equilibrium of this type venture investors would earn less than their required return in cases when the entrepreneur chooses to sell, but would earn above their required return in cases where the entrepreneur chooses to pursue a second round, giving investors on average their required return.

The result would be that the less risk-averse entrepreneurs (who are not interested in selling early) subsidize the entrepreneurs that are inclined to sell early. These types of situations are generally not stable, in particular if the less risk-averse entrepreneurs have other options. Historically, venture investment was often a critical complement to an entrepreneur's creativity and passion when a new company was created. Without resources beyond the reach of most entrepreneurs it simply wasn't possible to create a new semiconductor company, or even internet company. However, the cost of launching a new Web-based company has fallen dramatically. Posting on his blog in June 2007 Guy Kawasaki claims that the cost of creating a new web-based community, Truemors.com, totaled a bit more than $12,000.[4] Arguably, this understates the cost that most entrepreneurs, who cannot count on receiving similar publicity, would face to launch a new site. However, the trend is unmistakable: Lynch (2008) describes how nine Web 2.0 start-ups launched with less than $50,000.

Lower start-up costs enabling less risk-averse entrepreneurs to avoid subsidizing their more conservative peers by bypassing venture funding creates a "lemons" problem (Akerlof (1970)) where eventually only conservative entrepreneurs receive venture funding at valuations that reflect their preference to sell after the first round. Because this valuation is relatively low (in our example where $C_T = \$5m$, $C_M = \$25m$, and $W_T = \$30m$ the first-round valuation falls from $10 million to $6 million if all entrepreneurs are expected to sell early, leaving the entrepreneur with 17% ownership instead of 50%), conservative entrepreneurs would have limited incentive to start a company. Potentially, the venture model for finding, developing, and vetting new Web-based businesses breaks down.

Fortunately, the same changes that are making the old venture model a poor fit for many new internet businesses are also providing this next generation of start-ups with alternative paths. Consider Apple's applications store (App Store).[5] The App Store showcases and sells applications for the Apple iPhone and iPod Touch. Developers can post their programs (games, productivity tools, etc.) for free download or sale. There is virtually no cost to developers (Apple currently charges a $99 annual fee for the developer package), although Apple takes 30% of all sales. This corresponds to an extremely low C_T – one developer reports spending less than $5,000 developing his application, with $3,000 being spent on going to the Apple World Wide Developer Conference.[6] In this situation

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4. http://blog.guykawasaki.com/2007/06/by_the_numbers_.html
5. www.apple.com/iphone/appstore/

financing is no longer a crucial complement to an entrepreneur's creativity and passion.

Despite extremely low development costs there is reason to believe that App Store applications include significant business opportunities. Reportedly, over 10 million applications were downloaded in the Store's first five days.[7] The potential market for individual applications appears to be large: free application Tap Tap Revenge alone was reportedly downloaded over a million times in the first two weeks after being launched and a popular game, Trism, reportedly generated $250,000 profit in its first two months as a $5 download.[8] Because the App Store presents the top-selling applications in various categories (currently 23), it is relatively easy for potential customers to find, and buy, popular programs. Success feeds upon itself because successful applications are presented more aggressively in the Store. Less popular programs can potentially slip into obscurity. To some extent this mimics the venture model where early success yields more capital to fund additional progress, culminating with a few eventual big winners.[9] Already the App Store seems to be largely hit-based (Frommer (2008)), although we can anticipate that over time the App Store will add user ratings, reviews, and recommendations along with enhanced search, becoming more of a long-tail site (Anderson (2004)). The end result is that in the next generation of Web-based start-ups venture capital may not be necessary to prove either the technology viable or that a market exists.

On the other hand, traditional venture investors are not ignoring the potential value in new internet firms. In March 2008 prominent venture firm Kleiner, Perkins, Caufield & Byers created a $100m investment initiative specifically dedicated to helping launch companies that leverage the iPhone/Touch platform.[10] While the old venture model will not fit well with much of the next generation of internet start-ups, venture investors may innovate and create a new model that does. Conceivably organizations like Y Combinator have already taken the first steps in this direction; creating Venture 2.0 to fund and support Web 2.0 start-ups.

In the meantime, entrepreneurs should recognize that venture capital may play a smaller role in their future start-ups, and plan accordingly. Self-funding the launch of a new site or application and delaying substantial expenses until a product proves popular can cause short-term pain, but it also brings the potential for long-term gain because the entrepreneur captures a larger share of the start-up's eventual value. Skipping the first round of venture investment also saves time, and it does not preclude an entrepreneur from eventually deciding to pursue venture investment and building a complete company rather than selling the

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6.   http://gifterapp.com/blog/files/bedd9a6a1425818f49ef0645cc71044c-1.html
7.   http://www.apple.com/pr/library/2008/07/14appstore.html
8.   http://blog.wired.com/gadgets/2008/09/indie-developer.html
9.   While this example focuses on the App Store, increasingly powerful and sophisticated search optimization plays a similar role for general Web-based businesses.
10.   http://www.kpcb.com/initiatives/ifund/index.html

budding business early. That the old venture model is a poor fit for new Web-based start-ups is likely to be a much bigger problem for venture investors than for entrepreneurs.

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