



Memo: To File
Confidential Draft

Re: Prize Capital, L.L.C.
Harvard Business School Summary- Draft

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Josh Lerner is the Jacob H. Schiff Professor of Investment Banking at Harvard Business School, with a joint appointment in the Finance and the Entrepreneurial Management Units. He graduated from Yale College with a Special Divisional Major which combined physics with the history of technology. He worked for several years on issues concerning technological innovation and public policy, at the Brookings Institution, for a public-private task force in Chicago, and on Capitol Hill. He then earned a Ph.D. from Harvard's Economics Department.

Much of his research focuses on the structure and role of venture capital and private equity organizations. (This research is collected in *The Venture Capital Cycle*, MIT Press, 1999 and *The Money of Invention*, Harvard Business School Press, 2001.) He also examines the impact of intellectual property protection, particularly patents, on the competitive strategies of firms in high-technology industries. (His new book with Princeton University Press, *Innovation and Its Discontents*, addresses these issues.) He founded, raised funding for, and organizes two groups at the National Bureau of Economic Research—the Entrepreneurship Working Group and the Innovation Policy and the Economy Group—and is a Research Associate in the Corporate Finance and Productivity Programs and serves as a co-editor of their publication *Innovation Policy and the Economy*.

In the 1993-94 academic year, he introduced an elective course for second-year MBAs on private equity finance. In recent years, “Venture Capital and Private Equity” has consistently been one of the largest elective courses at Harvard Business School. (The course materials are collected in *Venture Capital and Private Equity: A Casebook*, John Wiley, 2000 and 2002.) He also teaches doctoral courses on entrepreneurship and empirical methods in corporate finance, as well as executive education offerings. He serves as the School’s representative on Harvard University Patent, Trademark and Copyright Committee and the Provost's Committee on Technology Transfer.



**Prize Capital, L.L.C.
Private Placement Memorandum Format**

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The Opportunity: The Innovation Crisis

Prize Capital represents a new way of undertaking investments in promising, high-return new technologies, one that will complement existing ways of investing. By targeting enormously high potential areas that are receiving inadequate funding, Prize Capital will present a novel way for investors to get exposure to a broad spectrum of approaches in emerging technologies.

Before turning to the specifics of the fund's operation, it is important to highlight why Prize Capital is needed. In this section, we will highlight the changes in the ways in which innovation is being funded, and the opportunities it creates for a new and complementary intermediary. These changes have been taking place in two arenas: corporate research laboratories and venture capital firms.

Shifts in Corporate Research

The past two decades have seen a global movement towards improved corporate governance. Activist shareholders and institutional investors have targeted firms which have been perceived as making ill-advised investment decisions. Many of the targeted firms have ultimately been acquired by other companies or by private equity investors. Meanwhile, firms that have tightened their belts and improved their governance have been rewarded with high stock prices.

We are used to thinking of these changes as a good thing: after all, why should inefficient corporations continue operating as is? But there has been an unintended consequence of these changes, which is much less pleasant: a scaling-back of the type of long-run research that is critical to long-run economic health. During previous decades, corporations were willing to make long-run investments in research facilities and personnel. In many cases, their returns were highly uncertain and very distant.

Scaling back these initiatives—and focusing laboratories more on immediate economic needs—may be the right thing to do from the perspective of the shareholders. While the changes may be rational from the perspective of the individual firms making them,

society as a whole has lost out: the shifts are depriving us of the long-term knowledge that is essential to continued growth and prosperity.

For instance, it is hard to criticize Lucent's board, given the enormous pressures that they were under in the period after 2000 telecommunications meltdown, for trimming dramatically Bell Labs. Bell Laboratories has long been considered one of the "crown jewels" of research world-wide. Funded for generations by AT&T's profits from its long-distance monopoly, its researchers made some of the most fundamental breakthroughs of the 20th century, including playing key roles in the invention of the transistor, laser, and communication satellite. Its researchers were recognized with eleven Nobel Prizes, both for inventions like those delineated above and for more fundamental discoveries in quantum physics and radio astronomy.ⁱ

Yet this august institution is today a shadow of its old self. In 1996, AT&T—facing intense pressure from competitors and investors after telephone deregulation—made the fateful decision to spin out Bell Labs as part of a new entity called Lucent Technologies. The new entity almost immediately undertook a heady series of acquisitions, culminating with the 1999 purchase of Ascend Communications for \$24 billion. These steps were soon revealed to be foolish, when the demand for telecommunications equipment fell sharply. Lucent's stock price rapidly fell from a high of \$84 per share to under one dollar. Under intense pressure from the financial markets, Lucent cut the staff of Bell Laboratories from thirty thousand employees to fewer than ten thousand. It is estimated that only five hundred researchers remain in the basic research unit, whose activities have been dramatically curtailed.

Meanwhile, the emerging technology giants have taken a fundamentally different approach to research than their predecessors like AT&T and General Electric. Consider Cisco, the computer networking giant. The firm has eschewed traditional R&D spending for the most part, preferring to acquire smaller firms once they have created ancillary products. Cisco executives regard their central strengths as the ability to identify promising firms, acquire them rapidly, and integrate them into the firm's centralized marketing strategy.ⁱⁱ

Even new technology firms with substantial R&D budgets, such as Microsoft, have taken a substantially different approach from their predecessors. While the software giant's research spending has grown dramatically in the past decade, its scientists and engineers have remained tightly focused on problems relevant to the corporation.ⁱⁱⁱ

Changes in Venture Capital

These changes have been compounded by shifts in the venture capital sector, the leading alternative way in which innovative ideas get nurtured in the private sector. Venture capitalists originally had highly diverse portfolios. For instance, the initial investments during the 1970s of Charles River Ventures, a leading East Coast venture capital fund, included everything from ceramics to semiconductors to pig farming.^{iv}

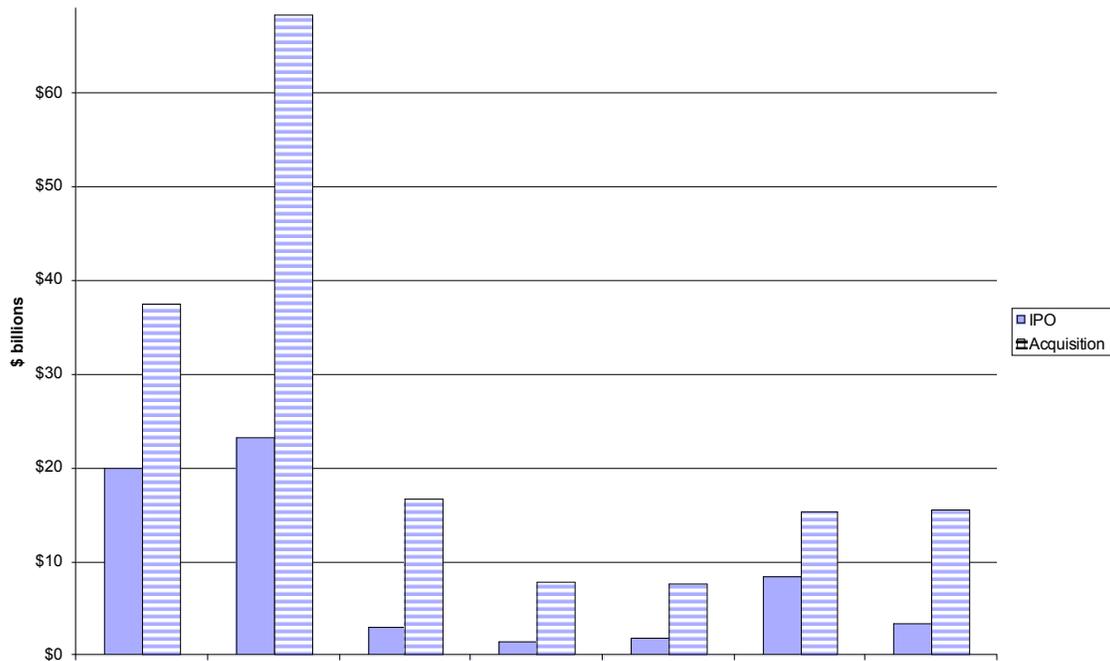
Over the past 25 years, there has been a tremendous narrowing of venture capitalists' portfolios. Software, communications, and healthcare today account for the overwhelming share of the investments. Even within these categories, investments have been highly concentrated, with segments as WiFi networks and on-line communities (to cite two recent examples) emerging as "hot spots" and attracting a disproportionate share of investments. For instance, Charles River Ventures' 2001 fund had nine communication investments and five software deals out of the first 16 firms it backed.^v

These changes by the venture community are a response to external circumstances and pressures. Over the years, funds specializing in less traditional areas, such as advanced materials and the environment, have struggled to generate attractive returns, frequently going out of business or shifting to focusing on more mainstream technologies. Generalist firms have carefully analyzed their investments, and found that they garnered far higher returns from information technology and communications deals than those in more exotic areas.

Much of the problem, they have concluded, lies in the substantial uncertainty surrounding these technologies. Because they are so intensively involved with portfolio companies—engaging in extensive due diligence, serving on boards, and providing intensive advice—venture investors can only mentor a small number of companies at any given time. Moreover, they (and the entrepreneurs they fund) are reluctant to be situations where a single venture fund is financing direct competitors. Venture investors have proven to be considerably more prescient at selecting promising firms in the information technology and healthcare areas than in other technologies. Concerns about having enough successes lead venture groups not too stray too far from the realm of technologies with which they have had proven success.

These pressures have gotten even greater in recent years. The market for initial public offerings has dwindled away (particularly for the more speculative, unprofitable firms that dominate the portfolios of venture firms): as Figure 1 highlights, the volume of such offerings remains far below the heights of 2000. Groups have had to focus more on building companies that will be attractive acquisition candidates, which again pushes against investments in unfamiliar areas without proven trajectories for successful firms, especially those with founders without well-established track records. As a result, many of the brightest minds are kept from the venture process.

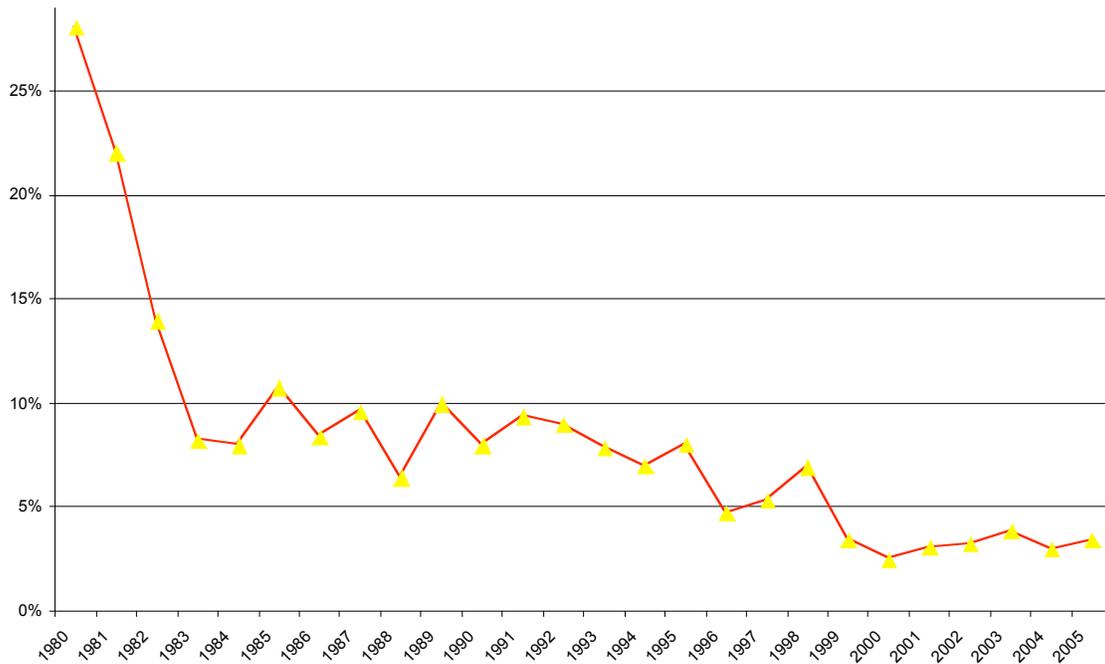
Figure 1: Venture Capital Exits



Source: National Venture Capital Association, *NVCA Yearbook*, Newark, N.J.: Venture Economics Information Services, 2006.

This increased focus is highlighted in Figure 2, which show the share of investments going to energy, environmental, and industrial applications (essentially, all of “old economy” manufacturing) from venture capitalists between 1980 and 2005. The dramatic decrease from the early 1980s to today is apparent. Despite the press coverage surrounding the interest of groups such as Kleiner Perkins in new energy and environmental technologies, its market share remains very modest.

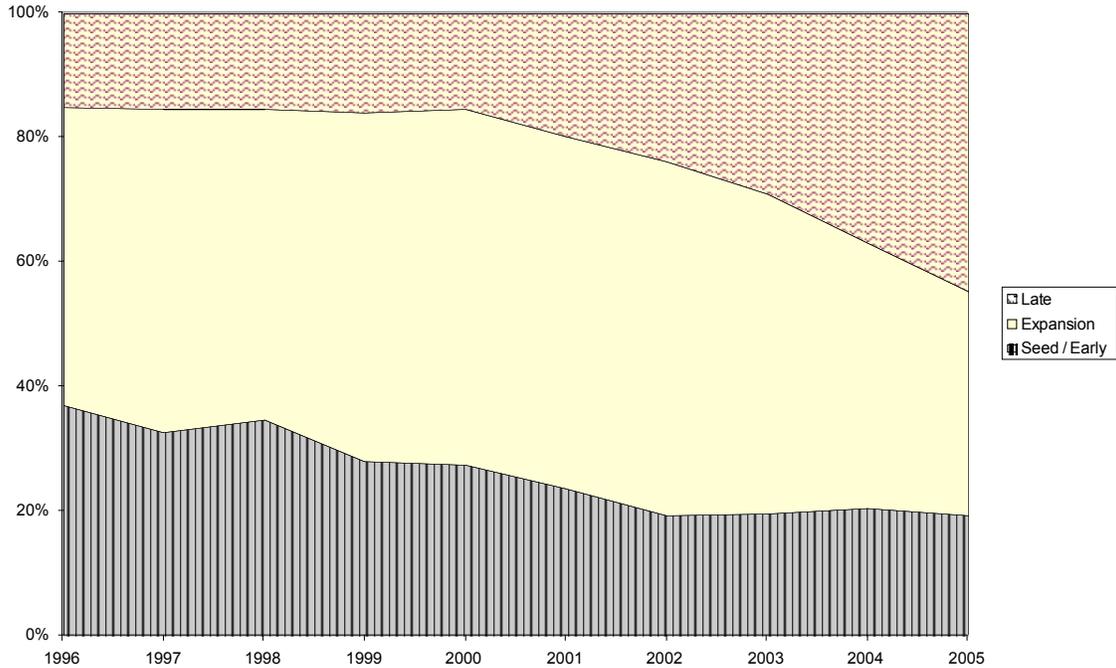
Figure 2: Energy/Industrial Investments as Share of All Venture Investments



Source: National Venture Capital Association, *NVCA Yearbook*, Newark, N.J.: Venture Economics Information Services, 2006.

A related response to these changing dynamics has been a move away from early-stage investing. Figure 3 shows the share of venture investments between 1996 and 2005 which were early stage investments. Once again, the increased emphasis on safer, later-stage investments—and the associated decline in these high-risk investments—is readily apparent.

Figure 3: Venture Capital Investments by Stage



Source: National Venture Capital Association, *NVCA Yearbook*, Newark, N.J.: Venture Economics Information Services, 2006.

Economists often prescribe government intervention in these situations. After all, policymakers should be able to take the long view and consider the benefits to society as a whole. It is natural to expect them to fund valuable research from which the private sector now shies away.

Despite this appealing logic, governments if anything appear to be moving away from these types of long-term investments. Consider, for instance, the recent shifts at the Defense Advanced Research Projects Agency (DARPA) of the U.S. Department of Defense. DARPA has long been famous for making bets on emerging technologies at their earliest stages, such as when in 1966 Charles Herzfeld after an hour’s discussion (and no formal proposal) agreed to fund the development of what would become the Internet. Many of today’s critical information technologies, from the computer routers commercialized by Cisco to the search algorithms underlying Google, emerged from DARPA-sponsored research. Yet as the President’s Information Technology Advisory Commission has recently highlighted, DARPA is increasingly moving away from basic academic research, putting a far greater emphasis on short-term projects with well-defined deliverables. Even in areas as seemingly fundamental to national defense as cyber-security, the Agency has abandoned funding projects likely to take more than five years to come to fruition. Similar concerns have been articulated about research choices at the National Institutes of Health. Energy research represents another such area:

research by both the public and private sectors has fallen sharply in inflation-adjusted terms since 1980.^{vi}

Together, these changes suggest the opportunities that Prize Capital seeks to address. Many long-run, fundamental technologies are not attracting the kind of investments they deserve, even if they can solve fundamental problems facing society today, and even though the potential returns, if successful, would be very substantial. Prize Capital presents a new model to address exactly this problem in a novel and powerful way.

The Concept of Prize Capital

Overview

The essential idea of Prize Capital is to use inducement prizes to profitably address these market failures. Working with a non-profit partner, who will provide objective and unbiased contest judging and administration, it will offer prizes and encourage market demand in selected new technologies, thereby creating profitable investment opportunities. The prizes will be designed to attract innovators from a variety of settings—universities, start-ups, established corporations, and individual inventors—to focus on a single, critically important goal. Prize Capital will participate in the returns not of a single firm, but rather in each of the competitors. As a result, it will be able to overcome the limitations that preclude other investors from funding venture investments while substantially reducing the risks that investors face.

Prizes as a spur to innovation

Inducement prizes have been used as a tool to spur innovation for centuries. Inducement prizes offer unparalleled leverage to create radical breakthroughs. Rather than funding research with unclear results, large prospective inducement prizes encourage the best minds to focus and then solve a well defined problem. The efficiency of the approach attracts corporations, entrepreneurs and maverick thinkers to develop alternative approaches to solving major problems.^{vii}

Several examples of successful prizes are:

- 1714: The British Parliament creates a series of large cash awards, or “Longitude Prizes,” for an accurate means of determining time while at sea, which stimulated discoveries that revolutionized ocean navigation.
- 1775: The French Academy of Sciences offers a prize for a process to convert salt to sodium carbonate. When the discovery was made in 1795, it stimulated the modern chemistry industry.

- 1919: French-American hotelier- Raymond Orteig offers a prize for the first non-stop flight between New York and Paris, won in 1927 by Charles Lindbergh, whose flight triggered rapid growth of the commercial aviation industry.
- 1993: A group of 25 utilities, representing a quarter of the nation's electric customers, offer the “Golden Carrot Prize” to hasten the commercialization of energy-efficient, less-polluting refrigerators. As a result, enough energy was saved in 2005 alone to avoid greenhouse gas emissions equal to those from 23 million cars — all while saving \$12 billion in utility bills.
- 1995: The X PRIZE, established by an American entrepreneur, rewarded the first team to fly build a rocket ship that was able to 100 kilometers twice within a two-week period. This was accomplished in 2004. Moreover, this \$10 million prize leveraged over \$100 million in direct investment by companies chasing the prize.

Nor does this activity show any sign of waning. For instance, NASA has received congressional approval for \$250 million in prize money for the “Centennial Challenges,” while Congress has approved \$100 million in prize money related to the production of hydrogen.

The Prize Capital Approach

Prize Capital has created an innovative approach to use prize competitions to generate attractive returns. Prize Capital, in conjunction with non-profit organizations such as the X PRIZE Foundation, will organize a series of prize competitions around energy and the environment: for instance, it is exploring Mega Prizes focusing on fuel, solar energy, and energy efficiency. Each prize will consist of a multi-million dollar cash prize purse, and a substantial Advance Market Commitment by users. The steps that will lead to the awarding of the prize in the competition will be carefully developed by consultation with the non-profit organization and outside experts.

Instead of making a traditional equity investment up-front in carefully selected firms, such as venture funds do, Prize Capital will participate in all firms that enter a given competition. When a team sign up for a competition it agrees to an entry fee in the form of an assignment of certain rights.

Prize Capital will charge each entrant in these competitions a fee. These will be in several forms, namely:

- a) The right to purchase up to TBD % (estimated to be TBD%) of the firms’ equity in each subsequent financing. Prize Capital will have the right (but not the obligation) to co-invest in every round that each team's financings. However, Prize Capital will not take any board seats or ask for any special rights. Rather, it will invest as a passive “tag-along” investor on identical terms in a considerable



- number of direct competitors. And/Or,
- b) The right to a small royalty (TBD %) of sales related to IP developed during the competition. And/Or,
 - c) Firms that are uncomfortable with the equity purchase option , will have the right to “opt out” of this requirement in exchange for a higher royalty (TBD%) of sales related to IP developed during the competition. Or,
 - d) For larger companies, where equity financing of the project is not an option and which may be reluctant to share rights to their technology, an entry fee.(\$TBD)

The critical feature of the model is its ability to create value, regardless of which team wins a given competition.

Prize Capital thus is designed to enable investors the ability to “bet on every horse in the race.” Prize Capital permits investors to share in the success of the competition winners, as well as in the success of those that may not win the competition but may win market share in the commercial market. The diversification within the class of direct competitors is designed to mitigate the firm-specific risk that would occur if only the winner attracted an investment. Moreover, the fund may also generate attractive returns even if none of the contestants actually wins the stated prize.

Prize Capital will offer several incentives to competitor firms in order to encourage participation in its competitions. In addition to the actual prize awarded to the competition winner, Prize Capital will make loans of up to \$ TBD (estimated to be \$ 100,000) to firms who enter the competition and who need the capital to file patents to protect their intellectual property. (It may also provide additional loans, convertible into equity, for the youngest firms.) Prize Capital will work with potential customers to secure Advanced Market Commitments for the competition winners, in order to ensure the market demand is present. Most importantly, the competition will focus the attention of potential investors, consumers, regulators, and many others, on the promising new area under development.

The funds provided by Prize Capital are not intended to be the sole source of financing for the competitors of each prize. More generally, the competitors will also raise capital from traditional sources (i.e., for a start-up, venture capitalists; for an established firm, internally generated funds.) As firms mature, Prize Capital will encourage venture industry investment into the individual firms, with Prize Capital making tag-along investments. Thus, Prize Capital will get both the benefit of diversification and the management expertise of the venture capitalists.

Frequently Asked Questions about the Prize Capital Model



Is Prize Capital a venture capital fund?

As noted above, Prize Capital is a new type of financial intermediary which is designed to solve a new class of challenge. Nonetheless, it shares important elements with both venture capital and hedge funds.

Like a venture capital organization, Prize Capital will make equity or equity-linked investments in companies developing emerging technologies. Akin to the best of venture investment, these investments will be focused not on incremental, me-too improvements, but on fundamental breakthroughs that have the potential to have a profound impact and generate attractive returns. Prize Capital will also make investments not only in the initial financing rounds, but also in subsequent financings. Finally, similar to an effective venture investor, it will not provide just capital, but also certification and publicity to the firms that it works with.

At the same time, there are substantial differences between Prize Capital and the typical venture firm. Rather than just backing one firm, Prize Capital will hold an equity or an equity-linked stake in all the competitors in a given competition. This will only be possible, of course, because Prize Capital is a “hands off” investor, not involved in shaping strategy or providing governance at particular firms. Rather than making “bottoms up” investment decisions as potential transactions present themselves, the fund will employ a “top down approach.”

Is Prize Capital a hedge fund?

In terms of its fundamental economic role, Prize Capital is very akin to a multi-strategy hedge fund whose investments focus on a given technology. Prize Capital brings some of the best ideas of hedge fund investing to early-stage investments. In particular, Prize Capital’s investments in all competitors will allow firms to engage in a hedging strategy. Rather than having exposure to simply one or two emerging companies, Prize Capital’s investors will possess holdings akin to a portfolio of options for all the relevant players in the industry. This approach will allow investors to limit their non-systematic investment risk.

Of course, in some other respects, Prize Capital is quite different from hedge funds. The primary difference stems from the illiquid nature of these investments. As a result, the holding periods and restrictions on liquidity will need to be greater.

Why is Prize Capital an attractive investment?

Prize Capital combines many of the key features of venture capital pools, hedge funds, and index funds in a novel manner that will generate attractive returns. Like venture funds, Prize Capital enables exposure to cutting-edge technologies and facilitates the success of the firms it backs by creating visibility for the companies and facilitating

market relationships. Like hedge funds, Prize Capital provides exposure to important economic opportunities while minimizing firm-specific risk through diversification. Like an index fund, Prize Capital seeks to objectively and systematically gain exposure to all relevant innovators, and thus is able to operate on a broader scale than more “hands-on” investors.

To be sure, Prize Capital’s funds will lack several of the attractive features of these institutions. For instance, it will not seek to duplicate the intensive monitoring and governance provided by venture funds, and will lack the liquidity that many hedge funds enjoy. But all-in-all, it represents a powerful new model for realizing value from addressing the fundamental challenges facing our society today.

Won’t investing in multiple contestants create a conflict of interest?

A natural concern is that by investing in competitors, Prize Capital will face a conflict of interest. To address this concern, the following rules and protocols have been created in order to avoid any favoritism or even perceived favoritism:

- The rules of the competition are 100% transparent and are published on a website for public viewing.
- Prize Capital does not administer or judge the competitions. The competitions are managed by an independent and objective non-profit organization.
- Prize Capital and the non-profit follow strict policies to avoid a conflict of interest or even the perceived conflict of interest. Prize Capital will serve as a passive investor, not serving as a director or play an advisory role with any company. Prize Capital does not take a board seat or perform any management advisory services for any of the competitors and therefore has no mechanism to influence their actions.

What is Prize Capital’s relationship with the non-profit organization that will run the competition?

Once the rules for a prize are established, Prize Capital will enlist an independent and objective non-profit partner with an expertise in inducement prizes, like the X PRIZE Foundation, to review and refine the rules, to manage the competition, and to judge the final results. The non-profit will help recruit the expert panel of advisors, politicians, and celebrities, and attract the publicity which will benefit the firms participating in the contest.

In December 2005, Prize Capital and the X PRIZE Foundation signed an exclusive agreement, which led to an enhanced partnership and an additional expansion of rights in December 2006. As part of the agreement, Prize Capital will raise funding for each prize, as well as cover the expenses associated with the administration of the prize and the



third-party experts needed to assess and validate contest entries. As the General Partner of each fund, Prize Capital, LLC has also agreed to pay a share of its carried interest (up to 20%, depending on the amount of funds for the contest raised by the X PRIZE Foundation) to the X PRIZE Foundation in return for its services. As noted in the Appendix, the category targeted in the initial competition is biofuels.

What if nobody wins the Prize?

Prize Capital will own equity interests in the pool of competitors. Innovation does not require a final winner. Technologies will most likely be developed and commercially exploited by competing firms even if the innovation(s) fall short of the prize being awarded. There can be substantial commercial gains, even if the defined challenge is not achieved.

What are Prize Capital's future plans?

Prize Capital's model should be scalable to other technologies as well. Initially, it will focus on insuring the biofuels competition is a success. Ultimately, the intention is to launch additional competitions in its first five years of existence. Each will focus on critical problems with huge potential economic payoffs, but which are nonetheless attracting woefully insufficient funds from corporations and venture capitalists today.

While normally a private equity organization launching many distinct funds in so short a period might pose reasons for concern, it is important to reiterate, however, that Prize Capital will operate as a passive investor. It will not seek to direct the strategies of the firms in which it takes an equity stake; rather it will shape and focus on selecting the appropriate categories for offering prizes. In this way, it can maintain a larger portfolio than would typically be associated with an investor in early-stage firms. At the same time, its managers are aware that expanding tool rapidly will diffuse both the attention that can be devoted to each technological competition and the publicity that each contest will generate.

References

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- ^{iv} Liles, Patrick, *Charles River Ventures*, Case study, Boston, Mass.: Harvard Business School, 1975.
- ^v Sahlman, William A. *Charles River Partnership XI*, Case no. 9-804-052, Boston: Harvard Business School Publishing, 2003.
- ^{vi} For a discussion of changes at DARPA, see Markoff, John, *Pentagon Redirects Its Research Dollars*, *New York Times*, April 2, 2005. For data on energy R&D, see “Declining Investment in Energy R&D,” *New York Times*, October 29, 2006.
- ^{vii} For a detailed history of prizes, including discussion of the examples noted below, see Kalil, Thomas, *Prizes for Technological Innovation*, Washington: Brookings Institution, 2006.