

Finding Capital for Technology Start-Ups

The past 25 years have seen a dramatic restructuring of the U.S. economy. In 1970, the 500 largest companies accounted for almost 20% of the nation's employment; by 1990, they employed only 11% of U.S. workers. To survive increasing global competition, well-established companies were forced to increase productivity, that is, produce the same value of goods and services at lower cost. That often meant using a smaller work force. From 1991 to 1995, large companies reduced employment by a total of 3 million workers, while small firms created 10.5 million new jobs.

New technologies and improved management techniques were key factors in enabling that productivity increase. At the same time, the rate of innovation in the United States accelerated, and new companies proliferated. Thus, most large companies grew smaller in order to compete more effectively, while small companies proliferated and became the vehicle for innovation. This trend accelerated in the late 1990s, leading to the recognition of what we now call the "New Economy," the basis of which is the small, rapidly growing firm, usually technology-based, funded by equity investment.

Scientists and engineers enter a different world when they launch a business. They must acclimate to a new style of thinking and a radically different style of communication. Business problems often do not have unique solutions or right or wrong answers; rather, they may only consist of a choice of alternative strategies. Unlike technical decisions, business decisions are usually based on incomplete information and are made in an ever-changing environment. Entrepreneurs must be self-assured enough to hold their course in the face of hardship and uncertainty, but sufficiently flexible to adjust their strategy when the market changes. The successful technical entrepreneur must possess intuition and vision, along with analytic and deductive capabilities.

"Build a better mousetrap, and the world will beat a path to your door." No aphorism has led so many people astray. Building a business requires more than a promising idea. A unique technology or novel business

acquire an interest in the technology, or even acquire the company if it succeeds. An additional source of financing—and one that is often overlooked—is federal-grant financing. Federal awards enable a company to build value without incurring debt or giving up equity (see *The Industrial Physicist*, December 1995, p. 34). But federal programs move slowly, and pursuing a federal grant can divert a company from its primary business objectives.

A prevalent myth portrays an entrepreneur sketching the germ of an idea on a cocktail napkin for an eager venture capitalist,

but that rarely happens. The greatest money pool available to companies that have advanced beyond an initial stage is through angel investors, wealthy individuals investing their own money. The term angel originated in the New York theater to describe investors in Broadway shows. Angels may invest individually or participate in groups, so-called bands of angels.

Like venture capitalists, angels provide more than money. Often, they invest in companies in the field in which they made their fortunes. For example, an angel who built a successful software company and sold it to an industry giant is likely to look for investment opportunities in a related sector. Consequently, angels often bring many advantages to a company, including experience, knowledge of the market and competition, and a wealth of personal contacts in both the industry sector and the investment community. Also, because angels invest their own money, they can be more flexible about an exit strategy than a venture capitalist. Because angels are free of the pressure to produce rapid returns, they tend to be more patient and less litigious.

Last year saw a profound shift in the investing patterns of VC funds in U.S. firms. Their investments totaled more than \$48 billion in 1999, an increase of 142% from the \$19.8 billion invested in 1998. According to the National Venture Capital

COMPONENTS OF A SUCCESSFUL TECHNOLOGY-BASED BUSINESS

- A unique technology or business concept
- Experienced and visionary management
- A competent work force
- A significant market opportunity
- A supportive business-technical environment and infrastructure
- Lots of money

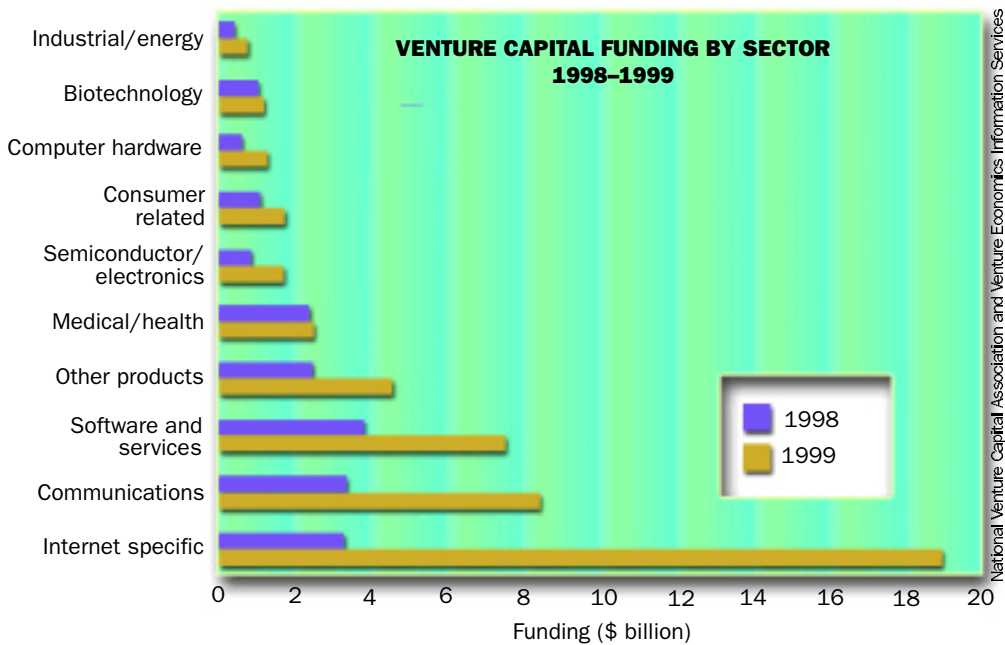
concept is, of course, necessary, but it is not enough. The components needed by a successful technology-based business are shown in the table. All of them must be present for the business to succeed, but the greatest challenge is finding adequate capital.

Acquiring capital

The question most entrepreneurs face is "Where do I look for investment?" The answer depends on the type of business, the stage of development, the state of the market, and the entrepreneur's personal objectives. For example, finding money for a dot-com firm today is not the same as it was six months ago. If your objective is to build a company to \$50 million in annual revenue and run it at that level for 20 years, you are unlikely to attract venture capital (VC) funding. In searching for investment, the investor's objectives must be compatible with those of the entrepreneur.

Depending on the characteristics of the company, there are several possible sources of investment. For entrepreneurs just starting out, funding generally comes from a few private investors, usually friends and family. A small fraction of start-up companies receive VC funding, that is, money raised by fund managers for the purpose of providing investors a high rate of return, typically over 5 to 10 years.

Many technology-based companies are funded by corporations, which may want to



National Venture Capital Association and Venture Economics Information Services

Association, 3,649 firms received VC funding in 1999, for an average investment of more than \$13 million. More meaningfully, the median VC investment in 1999 was about \$6 million.

The distribution of VC investment by industry sector for 1998-1999 is shown in

the figure. The remarkable character of this investment in 1999 is immediately obvious—almost 40% of it went into Internet deals. Investment in this one economic sector last year almost equaled the total VC investment in all sectors in 1998. Even so, VC investment increased in every other eco-

nomics sector as well. The decline in the value of technology stocks in 2000 has not slowed the pace of VC financing. Halfway through 2000, VC investment nationally had already reached \$37 billion, invested in 2,846 companies.

Overall, two features of VC investment are clear—deals are growing larger, and venture capitalists are shifting their investments to companies in later—rather than earlier—stages of development. This is creating what many people call the “capital gap.” The term refers to the difficulty that early-stage companies encounter in raising their first outside round of equity funding, typically in the range of \$500,000 to \$2.5 million. This is well below the range of most VC investments but beyond the reach of the classic friends-and-family investors.

Angel investors are the major resource filling the capital gap. The Securities and Exchange Commission (SEC) defines an

“accredited investor” as one with a net worth of \$1 million, an annual individual income of \$200,000, or a family income of \$300,000. Susan Woodward, formerly chief economist at the SEC and now executive vice president of OffRoad Capital, estimates that 5.7 million U.S. households qualify as accredited investors. The net worth of these households, which can be considered as potentially available for investment, totals \$21 trillion. This amount is more than twice the U.S. gross domestic product and almost double the total market value of all the Standard & Poor’s 500 companies.

Angels invest \$15–\$30 billion annually in a total of 30,000 businesses. Thus, their investments are smaller, averaging between \$500,000 and \$1 million, and the money is distributed over more than 8 times as many companies as VC funding. However, that level of investment only corresponds to 0.1% of the potentially available resources of accredited investors. Efforts are under way to improve entrepreneurs’ access to angels and to educate potential angels about the risks and rewards of early-stage investment. Interest is also growing in relaxing regulatory requirements that limit the types of investments offered to accredited investors.

Focus your business plan

When the entrepreneur approaches an angel or VC investor seeking financing, the investor wants to know the answers to a few simple questions:

- How much do you want?
- What are you going to do with it?
- How much will you make it grow?
- When will I get it back?

The answers to these questions comprise the elements of the business plan (see *The Industrial Physicist*, October 1999, pp. 27–31). Often, a technical entrepreneur devotes too much of the business plan to describing the wonders of the technology, rather than addressing the critical issues of defining the market and competition and explaining how the product or service will be sold. The conversation

between the entrepreneur and the investor can be stated simply. The entrepreneur says, “Give me your money and I’ll make you rich,” and the investor responds, “Why should I believe you?” At the heart of every investment decision is the question of trust. As the old (but true) saying goes, investors invest in people, not in business plans.

Investing in an early-stage company involves substantial risk, which has several components. For technology-based companies, there is the *technology risk*—will it work, will it be reliable, and can it be manufactured at a competitive cost? Technical questions have technical answers that can be obtained in the laboratory. Unforeseen difficulties may lead to delays or necessitate changes, but the management of technical risk is a well-developed art and generally does not pose insuperable barriers.

The second risk is *management risk*—do the people in charge have the experience and know-how to build a business? Often, investors rely on the track record of the company’s lead individuals to assess this risk. If the company gets into trouble, the investors may find it necessary to strengthen or change the management. This is why the issue of control is so important for a start-up firm. Entrepreneurs must recognize that to attract investment, they will have to relinquish some control of the company. Consequently, they must be confident that they are compatible with the investors and that both sides share a common vision of the company’s goals and objectives.

By far, the most difficult risk is *marketing risk*. Will there be a market for the product or service when it is developed? What will the competition be at that time? Will the global economy be booming or mired in recession? There is no way to know the answers to all these questions, so investors generally shy away from opportunities that present too many marketing risks. An entrepreneur must present a plan strong enough to ensure that the company is likely to survive even if unforeseen factors arise.

Some investors also talk about *execution risk*. This refers to the risk that even an experienced management team in an attractive market may be unable to execute its

business plan. Dissension may develop within management, or between management and its financial backers. Marketing factors may change, and the entrepreneurial team may lack the flexibility to cope. As the company moves from start-up, to development, to production, management needs to change, and the principals must be willing to accept new roles as the company develops. Success brings new demands and new challenges, and the ability to cope with success constitutes another form of risk.

Confronted by an investment opportunity at the earliest stage, how does an investor evaluate the risk involved? One way is through the business plan, which should present a road map for risk reduction. It should identify the principal areas of uncertainty and explain how the entrepreneur plans to cope with these issues to reduce risk. However, no business plan can anticipate all the twists of fate that lie ahead. Ultimately, investors’ decisions are governed by their confidence in the entrepreneurs.

Many scientists and engineers have built successful businesses. In doing so, they have made the transition from an analytic style of thinking—breaking down the problem into its constituent parts and focusing on the details—to a synthetic style. The latter involves integrating often-incomplete information about multiple factors into a strategic whole—seeing the big picture. Successful technology entrepreneurs have mastered a different style of communication, one that enables them to explain their goals and objectives to investors effectively and succinctly, without great technical detail. Not every technology has the potential to become a commercial success, and not every technologist can become a successful entrepreneur. Those who make the effort will face daunting challenges, but they potentially can reap great personal and financial rewards. □

B I O G R A P H Y

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