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TECHNOLOGY TRANSFER FROM THE VENTURE CAPITAL PERSPECTIVE

Symposium on Technology Transfer for Small Business
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"If man has good corn, or wood, or boards, or pigs to sell, or can make better chairs or knives, crucibles, or church organs, than anybody else, you will find a broad, hard-beaten road to his house, though it be in the woods."

... Ralph Waldo Emerson

The term "Technology Transfer" is relatively new. A common interpretation suggests that within research institutions, such as the universities, government labs, or industrial labs, there is a treasure chest of great ideas that, if unlocked, could create thousands of new products that could not only stimulate our economy, but also renew our leadership in technology and generally be a great benefit to mankind. Others interpret "technology transfer" as simply marketing a better mousetrap.

The perspective of venture capital towards technology transfer depends upon the investment strategy of the fund, its size and the motivations of its general partners.

First, technology only becomes interesting to venture capital after the research phase is completed. This is the very earliest stage of consideration towards building a company on technology that is yet to be developed. First round, or "seed" level, investments generally range from \$50,000 to \$250,000. A fund with \$50-100 million of committed capital simply cannot afford to make such a small investment, recognizing that a "seed" investment takes as much or more time to properly monitor than an investment of \$1-5 million.

Secondly, very few funds invest at the "seed level" simply because it represents higher risk and becomes a time consuming effort on the part of the general partner, that is, to structure a company from its very beginning. A more typical venture investment is focused on companies that have management in place, a proven technology, and are in a position to experience rapid growth.

With that overview, let me present a series of slides which describe the Columbine Funds and specific investments in technologies that are mostly university based.

(SLIDE 1 - COLUMBINE PROFILE)

Columbine consists of two funds, the first of which was closed in 1984 at \$34 million and the second closed in 1989 at \$44 million. There are four general partners, two of whom are located in Denver, one in Phoenix, and one in Houston. There are 44 limited partners, nine of which are located outside of the United States. They consist mainly of pension funds, insurance companies, major corporations, and individuals.

We have a portfolio of 37 investments. Most important is our investment strategy with three major elements - seed and startup level investing, technology driven (with a proprietary position), and located primarily in Texas and the lower four states of the mountain states.

(SLIDE 2 - COLUMBINE, UNIVERSITY-SOURCED STARTUPS)

The next two slides list 17 companies, their university relationship, the nature of the product, and their current status.

Afferon, University of Arizona, has also acquired a license from the NIH in order to provide complete proprietary protection. The product, originally developed to control urinary urge incontinence, has proven to have applications in other areas such as diabetic neuropathy.

Agripro, University of Nevada at Reno, focused initially on hybrid wheat, has proven to be a technical failure. The company was acquired by a major corporation prior to the discovery of the technical problems.

Albion, University of Utah, using Raman spectroscopy, allowed a patient specific anesthesia gas monitor. It was acquired by Ohmeda.

Anesta, University of Utah, developed a method of delivering a anesthetic drug to a child by way of a lollipop. This was a small investment five years ago. No product sales to date, but very active.

Biex, University of California-Davis, is developing a simple test for preterm labor.

CardioPulmonics, University of Utah, has developed a method using hollow fibers to oxygenate the blood and create a major lung assist device. Although the company has just completed Phase I clinicals and does not expect FDA approval for perhaps two years, a successful public offering was completed in January 1992.

Collagenex, developed with initial funding by Johnson & Johnson, working with the State University of New York and now entering Phase III clinicals, now appears to have not only the potential of an effective control of periodontitis, but other applications as well.

Hepatix, Baylor University, is in Phase I clinicals for a liver assist device which has already demonstrated its effectiveness on one patient with a rare liver disease which is normally terminal.

(SLIDE 3 - COLUMBINE, UNIVERSITY-SOURCED STARTUPS - Cont'd.)

Krysalis, University of New Mexico, demonstrated a new material which allowed the construction of a non-volatile memory chip. We were unable to secure funding after three years and the company was shut down.

Nanophase, Argonne Labs, involved a very fine ceramic powder allowing the molding of malleable ceramic. Although the company is still active, it is not likely we will invest further.

Neogen, Michigan State University, was an economic development initiative without a major proprietary technology. In attempts to survive, unrelated products were developed and the company lost its focus, resulting in a relatively unsuccessful public offering.

OrthoLogic, Montana State University where it was demonstrated that a low power resonant frequency was capable of moving a calcium ion facilitating bone growth. They are reasonably close to an FDA response to their PMA and have recently completed a successful public offering.

Paradigm, organized to search for a company in the electronics area, based upon technology from the University of Texas, has not proved viable.

Receptor Labs, University of Illinois, is based upon the ability to identify specific peptides far more rapidly than current technology allows. The jury is still out as to whether the technology will be effective.

Rhodon is based upon the research of a world-class scientist at MD Anderson Hospital. The possibility of a simple test to determine the prognosis of metastatic disease following breast cancer surgery looks very promising. Similar tests for other types of cancer metastasis appear to be possible.

Topometrix, originally out of CalTech, has developed into a successful company capable of digitizing and visualizing atomic-sized surface particles. At \$10 million in revenues and growing, we expect them to be the dominant player in this market.

TSA, developed at Utah State, had a product intended to be a simple colorizer drug analysis. However, a combination of the technology and a weak market position caused its demise.

(SLIDE 4 - CONCLUSIONS FROM COLUMBINE'S UNIV. SOURCED TECHNOLOGY)

Some conclusions from the university-based technology investments are that approximately 60%, or 10 out of 17, are medical. Two are agricultural, two are instruments, and two are electronics. The government lab startup is the only materials technology.

Sources are diverse, that is from 14 different institutions. Very few of these opportunities merit a startup investment.

The success rate is high with three companies going public with successful IPO's; two were acquired, two failed, and ten are still very active.

(SLIDE 5 - IS IT A PRODUCT OR A BUSINESS?)

The first question that needs to be asked is, "Is it a product or a business?" Most opportunities are products which in themselves cannot sustain a business and should be licensed to existing companies. Some simple tests to determine if the technology is indeed a basis for a startup:

1. Market size of at least \$100 million per year with the company capable of \$30 million per year in revenues within five years.
2. It must have a strong proprietary position.
3. A basic technology capable of developing a pipeline of products sufficient to sustain corporate development.
4. Knowledgeable founders who are reasonable to deal with.

For instance, a founder who insists he or she will not give up 51% ownership of the company will not secure venture capital financing.

5. The investment or license must be available on reasonable terms.

(SLIDE 6 - VENTURE CAPITALIST OBJECTIVES)

Venture capitalist objectives are clear: To create a successful company capable of being acquired or supporting an IPO in five to seven years. The company should make an outstanding return on investment of meaningful size to the fund. The venture capitalist must be able to influence the company through the board of directors assisting with the hiring of management, establishing short and long range strategies, and support the financing of the company, balancing financing against development benchmarks.

A major objective is to keep the equity investment low, nominally \$5-10 million total, and to efficiently use its capital.

Manage risk by investing in stages.

(SLIDE 7 - UNIVERSITY OBJECTIVES)

Some university objectives are to create value from technology, to stimulate student interest, to satisfy and retain faculty, to generate research support, avoid conflicts, and to foster local economic development.

(SLIDE 8 - LESSONS LEARNED - 1)

Lessons are learned generally from mistakes.

1. Protect the patent position. The inherent conflict is that researchers build a reputation by authoring technical papers. Such disclosures can destroy a patent opportunity.
2. The university should not select a CEO, but let the venture capitalists build the management team.
3. Be careful with whom you deal, checking references and past business associates.

(SLIDE 9 - LESSONS LEARNED - 2)

Other lessons are the following:

1. Few opportunities have real startup potential.
2. Faculty does not have to quit.
3. There is good science at all universities.
4. Analyze the patent position carefully seeking at least a second opinion.
5. Involve the university through stock, support for research, etc.
6. Get a founding CEO (part-time, if necessary) involved early.
7. Market issues are the most common reasons for failure.
8. Set up an off-campus company office immediately.
9. Avoid complex structures.
10. If, for whatever reason, the arrangement is not satisfactory to all parties, retreat gracefully.

(SLIDE 10 - BENEFITS TO UNIVERSITY/FACULTY)

Certain benefits should accrue to the university and/or faculty. First, the value of stock or equity ownership is much greater than royalties or license fees.

Certain research support should accrue from the startup.

A startup company in proximity to the campus keeps the technology in state, boosts economic development, and generates local jobs.

Participating in a corporate growth is more satisfying to faculty and therefore helps attract and retain faculty.

A local startup allows universities to retain more influence on the technology than through a straight license or royalty.

(SLIDE 11 - SOME POTENTIAL PROBLEMS)

Potential problems can involve loss of faculty, potential conflicts of interest, and loss of control. Most commonly, university/faculty do not understand stock ownership and investment mechanisms.

An equity investment postpones short term cash royalty income for a less certain stock value in the future. Without good communications and careful consideration, there can be a clash of business and academic values.

(SLIDE 12 - CONFLICTS OF INTEREST)

Examples of conflicts of interest is the use of public funds for private gain. The discipline of research contracts versus normal academic freedom may inhibit creativity. There must be a clear understanding of the allocation of faculty time and their loyalty. Issues can be delicate, such as explaining the process to those who do not participate nor benefit.

How does the university split up the pie? Who negotiates the agreement?

Adding to the complication and peculiar only to medical developments is the need for clinical trials to satisfy FDA requirements.

(SLIDE 13 - VALUATION AND OWNERSHIP)

Valuation and ownership are generally the result of subjective judgment. The value of a company depends upon a number of characteristics such as the amount of research funds expended to date, the stage of development (Is it still research?), the size of the ultimate business, etc. How much capital is needed to complete product development and manage clinical testing over an extended period to secure FDA approval? What are the competitive alternatives or threats? Is the proprietary position secured through strong patents, proprietary processes, or manufacturing know-how? Technology assessment by industry experts can be very helpful.

(SLIDE 14 - SOME GUIDELINES)

Certain guidelines are fundamental to a good basis for company development.

Stock ownership is an equitable substitute for lump sum cash payments. If royalties are involved, they are paid only when sales are made. A license to patents or proprietary information must be exclusive. Any minimum royalties are due only when sales start. Any agreement should provide that technology reverts to the owner if not commercialized diligently and timely. Research contracts should include very low or no overhead.

Principle: University, founders, and venture capitalists are in partnership where value is created through increases in the stock price. No one party should extract income before the others.

(SLIDE 15 - SOME MYTHS)

Some common myths regarding business startups are as follows:

1. Faculty must leave the university to start a company.
2. Startup capital is scarce.
3. All really good technology is on the coasts.
4. Venture capitalists give research grants.
5. The business development part is easy.
6. A professor can be a CEO.
7. Stock is of no value.
8. Royalties maximize income.

The following four slides demonstrate a typical sequence of investment in a successful company. Although the subject company example has one founder, a university based technology might involve perhaps two faculty inventors, a department, and the university or its foundation all representing, in aggregate, the founders' portion.

(SLIDE 16 - STARTUP INVESTMENT)

The valuation, agreed to by the founder and the investor, is a subjective judgment post investment value (\$900,000 pre-money plus \$100,000 cash).

(SLIDE 17 - FIRST ROUND INVESTMENT)

Investors usually include the seed round investor plus other venture capital funds. Again, a new yet subjective valuation.

(SLIDE 18 - SECOND ROUND INVESTMENT)

Investor base may include an institution or corporate partner at a much higher valuation reflecting a maturing high growth company.

(SLIDE 19 - PUBLIC FINANCING IPO)

The beginning of a public company which provides a means to liquidity for prior investors and the founders. Note that acquisition by a large public firm at this stage would result in a similar valuation. This is a very successful company, but not equal to the performance of a local company, Exabyte in 1989.

Before leaving the subject of venture capital, I am always compelled to reflect on venture capital as an industry and its effect on maintaining America's technology leadership. In my opinion, the ability of venture capital to accelerate the development of technology into commercial, useable products has been one of America's best kept secrets.

I am also reminded that there has been in place since 1982, a government program called the "Small Business Innovation Research Act" which was recently reauthorized and expanded at the conclusion of the Bush administration. The SBIR program since its inception has generated more commercialization of new products than any other government program in history. A high percentage of the companies in our portfolio have SBIR grants either active or awarded sometime in their development.

Finally, it is clear that the increasing attention to technology transfer, be it from universities, government labs, or an inventor's garage, combined with government support funding such as the SBIR program, venture capital or corporate investment, is without question critically important to maintain our country's leadership in the commercialization of new technology.