

# TEACHING NOTE ON VALUATION OF HIGH-TECHNOLOGY VENTURES

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(Revised, February 2001)

Valuation is not a precise science and can be quite complex. Yet, understanding and estimating company value is one of the entrepreneur's critical tasks. The entrepreneur wants the highest possible valuation for the company; the investor, usually less optimistic, recognizes that most business opportunities face great uncertainty and wants a lower valuation.

## **Rates of Return Required by Investors**

The required return on investment will vary depending on the type of investor and the perceived risk of the investment. The following table illustrates the range of returns required by private investors and venture capitalists for investing in new ventures:

Required Return		
3X	Triple investment in three years	44.2%
	Triple investment in five years	24.6%
5X	Quintuple investment in three years	70.9%
	Quintuple investment in five years	38.0%
10X	Ten times investment in three years	115.4%
	Ten times investment in five years	58.5%

Venture capitalists and "angels" financing seed or startup companies require compound annual returns exceeding 50%. For later stage financing, investors require compound annual returns of 30% to 40%.

## **Factors Affecting Valuation**

Prospective investors must evaluate the risks of the specific investment. Some of the risks which must be evaluated include: (i) market risk, (ii) technology risk, and (iii) management risk. The potential rewards for investors must compensate for these risks. The greater the perceived risk of the investment, the greater the required return on investment. Though analysis may help identify and assess the risks and potential of a venture, the final determination of value will be based on the experience and judgment of the investor.

The critical questions that investors must consider include:

- What is the potential of this venture? What can go right?

- Is the market large enough and ready for the product(s) to be supplied by this venture?
  - Does the venture possess any sustainable competitive advantage? Can this round of funding create any sustainable competitive advantage?
  - Does the management team have the skills, knowledge, contacts, experience and resources to execute the business plan for this venture? Is the management team committed emotionally and financially to this venture?
- What is the downside of this venture? What can go wrong?
  - Given the business and financing strategy of the venture, what is the likely dilution that would occur based on later rounds of financing?
  - How will investors be able to liquidate their investment in this venture? Will the company be able to "go public"? How attractive will the venture be to a potential buyer?
  - How has the company fared since inception? Have they met their business and financial targets? What realistic milestones must be achieved to raise future funding at ever increasing valuations?
  - Can the management team and the investors work together effectively? Has trust been established? Is their good "chemistry" between the management and investors?

In addition to the internal factors, the outside environment must also be considered, including: (i) the state of the economy, (ii) the condition of the stock market and the venture capital industry, and (iii) the industry of the venture itself. The more favorable the outside environment, the easier to raise money on favorable terms.

### **Valuation Methods**

Although there are several valuation methods used by financial theorists, entrepreneurs often times simplify the valuation process. They apply a relevant price-earnings ("P/E") ratio to a firm's future earnings in order to determine a company's value at a future point in time. This future expected valuation is used to: (i) assist in determining the attractiveness of a given opportunity and (ii) assist in structuring a deal with potential investors today.

In our class, we will use the following method to value a given company in a given year:

$$\text{FIRM VALUE } (t) = f(t, P_t, M_t)$$

$$\text{FIRM VALUE } (t) = P_t * M_t$$

where

t = year number

P<sub>t</sub> = after tax profits in year t (also called net income)

M<sub>t</sub> = relevant price-earnings multiple or P/E ratio applicable in year t

How do you determine P<sub>t</sub>? As we have discussed, this is a difficult number to estimate. This requires the entrepreneur to develop reasonable pro forma income statements. It could be helpful to use a range for P<sub>t</sub> to understand how sensitive your analysis is to changes in P<sub>t</sub>.

How do you determine M<sub>t</sub>? M represents the relevant price earnings multiple applicable to a given

company in a given year. This number is also difficult to estimate. However, you can estimate M by examining the P/E multiples of comparable publicly traded companies today and then adjusting the median upwards or downwards for the unique characteristics of your company.

How do you determine t? Typically, t ranges from 3 to 5. It is very difficult to project earnings beyond a five year period.

Another important question: What portion of the company should investors receive if they are willing to invest today?

$$\text{INVESTOR SHARE OF COMPANY'S STOCK} = \frac{I * (1 + r)^t}{\text{FIRM VALUE}(t)}$$

where

I = amount invested today

r = required rate of return on investment

t = year number (or number of years)

How do you determine I? Your cash flow projections should tell you how much funding you require in order to successfully operate your business. The amount required should allow you to meet enough milestones in order to be able to raise your second round of financing.

How do you determine r? Conceptually, r is determined by exploring the risk associated with a given venture. The greater the risk of the venture, the greater r must be in order to compensate the investor appropriately. Typically, start-up investors require a rate of return of 40 - 70%.

It is important to remember that these techniques can only provide a benchmark. These techniques will never provide the answer. Typically, negotiations occur between the investors and the entrepreneurs, and ultimately, deals happen.

### Example

Firm A requires \$500,000 in order to start its business. The firm expected to earn \$1 million in its fifth year. The investor has reviewed the company's business plan and believes that she is entitled to a 50% return on her investment. Publicly traded companies in this industry trade at approximately 15 times earnings (there is no material difference between these companies and Firm A). What portion of the company should the investor receive today?

$$\begin{aligned} \text{FIRM VALUE}(5) &= \$1 \text{ MM} * 15 = \$15 \text{ MM} \\ \text{INVESTOR SHARE} &= \frac{\$500,000 * (1.5)^5}{\$15 \text{ MM}} \\ &= \$3,796,875 / \$15 \text{ MM} = 25.3\% \end{aligned}$$

## **Summary**

The previous discussion has outlined one method of estimating firm value. It is important to remember that no single approach will ever provide the "correct" answer. Value is determined by the evaluator's perception of opportunity, risk, the time horizon for analysis, and other investment alternatives available.

Nonetheless, the true purpose of valuation analysis is not to arrive at the "answer", but to:

- identify and understand critical assumptions affecting value
- develop realistic ranges of value based on these assumptions
- understand the way in which the value of the business is being carved up to satisfy the needs of owners, lenders and investors.

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Note: This teaching note is based upon one created by Adam Berman. It is for use in courses sponsored by the Stanford Technology Ventures Program (STVP).