

## TEACHING NOTE ON VALUATION OF HIGH-TECHNOLOGY VENTURES

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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		IRR
3x	3x in 3 years	44.2%
	3x in 5 years	24.6%
5x	5x in 3 years	70.9%
	5x in 5 years	38.0%
10x	10x in 3 years	115.4%
	10x in 5 years	58.5%

Venture capitalists and "angels" financing seed or startup companies require compound annual returns exceeding 50% to compensate them for the high level of risk in early stage ventures. For later stage financings in more mature (less risky) companies, 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, (ii) team, (iii) technology, (iv) product, and (v) business

model. 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 it is for the entrepreneur to raise money on favorable terms.

### **Valuation Methods**

Although there are several valuation methods used by financial theorists, entrepreneurs oftentimes 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 value 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>? This is a difficult number to estimate. It requires the entrepreneur to develop reasonable financial projections that accurately forecast the future revenues and expenses of the company. 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?

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 in an efficient marketplace, and ultimately, deals happen based upon market demand for a company's stock and an entrepreneur's willingness to sell a portion of her company.

### **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?

$$\text{FIRM VALUE (5)} = \$1,000,000 * 15 = \$15,000,000$$

$$\text{INVESTOR TARGET RETURN} = \$500,000 * (1 + 0.5)^5 = \$3,796,875$$

$$\text{INVESTOR SHARE} = \$3,796,875 / \$15,000,000 = 25.3\%$$

### **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. Most importantly, it is determined by an efficient market.

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 a business is being divided up to satisfy the needs of owners, lenders and investors

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