

VALUATION MODELS FOR PRE-REVENUE COMPANIES

- **Most Popular Valuation Models:**

Although there are dozens of models and thumb rules which angels use to apply a valuation for a pre-revenue venture, the most popular models seem to be those explained below. Additionally, the four most popular methods for discounting entrepreneurs' revenue forecasts are listed. (Note: Large portions of these explanations have been excerpted from the Members Handbook of the Ohio TechAngels, but updated for the ACA's Leaders Workshop.)

1) The Venture Capital Method (VCM):

OTA generally avoids opportunities which are unlikely to be able to attract venture capital, regardless of how strongly the entrepreneur asserts that a lucrative liquidity event can be orchestrated using angel capital alone. We know from experience that few entrepreneurs adequately forecast the total amount of dilutive capital they will need, so we presume that every successful venture might eventually require support from the VC community. For this reason our DD teams will always calculate value via the venture capital method (VCM).

VCM calculations require a terminal value at five years (at which point OTA is seeking a 10X in order to achieve our targeted 58% IRR.) Each venture will therefore provide the DD team with its pro forma revenues in year five, and then each team member will provide his/her best guess of the fifth year revenues. Their guesses will be averaged and used to enter the VCM Model spreadsheet.

Rather than calculating several valuations based on future cash flows (see the Chicago Method below), the VCM starts by assuming a specific liquidity event and price. Then, based on the timing of investments and the required ROR (rate of return) for each of these investors, the VCM calculates the percentage of the final company which each of these investors must own in order to achieve their targeted ROR. After subtracting any debt from gross sale proceeds, plus, of course, the equity which must be given up to investors, the remaining ownership is the founder and employee's shares, fully diluted.

The VCM then works backwards from this point. At each investment round, the VCM lets you calculate the percentage of the company being given up for a specific investment, implying a pre and post money valuation. Despite some computational complexity, the VCM is one of the most popular methods of valuation because it captures both the effect of dilution and the different ROR required by different stages of investors.

2) Discounted Cash Flow (DCF) or Net Present Value (NPV) Model:

Hereafter simply called DCF, discounted cash flow methods simplify the vast complexities of the business by focusing on the final product of the business.....cash. If we can make a reasonable prediction of the future cash flows of a firm, we can value this stream of cash like we would a bond or an annuity. Since cash flows from startups are not certain or safe, we use a higher discount rate to adjust for the increased risk. For example, during an early stage of a startup, the risk is so high that we may demand a 70% rate of return (ROR). If so, when calculating a DCF, we would use a 70% discount rate for this period of time.

How it works:

Identify all operating cash flows (positive and negative)

Discount them into present value by dividing by: $(1 + \text{discount rate})^{\text{number of years}}$

Add up all the value of all these different cash flows

Advantages:

Easy to use via spreadsheets
Weights the time that capital is injected
Aggregates aspects of risk into the discount rate

Shortcomings:

Naively oblivious to dilution
Suggests a level of accuracy which may be be specious
Generates much discussion about the appropriate discount rate (a nebulous concept for many entrepreneurs)

3) The Chicago Method:

One of the problems with DCF is that it only suggests a single outcome, the "home run." In order to make up for the low probability of achieving that valuation, we use an extremely high discount rate in the early years of the DCF. The Chicago method addresses this risk in a different way, by generating three scenarios: Success, Sideways, and Failure. By estimating the probability of each of these scenarios and calculating a separate DCF on each, we can generate a much better picture of the company's potential. Rather than using the high discount rates (70%) found in a DCF, we can use much more reasonable ROR's (40%) and use the separate scenarios to capture the risk of mediocrity or failure. In the Chicago method, you'll see that the DCF for the success scenario comes in much higher than a simpler DCF, but that it is offset by the much lower probability of success.

Using the DCF process above (and these lower discount rates), we build up a chart that addresses all three scenarios:

	Success	Sideways	Failure
Probability	20%	30%	50%
DCF	20,000,000	5,000,000	1,000,000

In this case, the valuation of the firm would be: $20\% * 20 \text{ MM} + 30\% * 5 \text{ MM} + 50\% * 1 \text{ M} = \6 million

4) The Cayenne Consulting Calculator:

Cayenne Consulting, LLC has devised a set of 25 questions which generate a pre-money valuation range for high-tech seed, start-up, and early stage ventures. They call it the High Tech Start-Up Valuation Estimator and it is available on their website (visit <http://www.caycon.com/valuation.php>). The questions are interesting, but the range of valuations which the site calculates is extremely large. The lowest possible pre-money range is \$480 – 580K. The highest possible range is \$36 – 44 million! OTA DD teams should not suggest that an entrepreneur visit this site until they have first generated the calculator's answer. Why? Because the model's output can be lofty if the venture has current revenues, or is in a huge and fast growing market. Nonetheless, our DD teams need to be aware of this site because it is so popular among entrepreneurs. It is likely our entrepreneurs will use it as a justification for their valuation expectations (due to the often high valuations it generates).

5) The Dave Berkus Valuation Model:

Dave is one of America's most famous and successful angels, authors, and keynote speakers. Chairman Emeritus of Tech Coast Angels, his **Extending the Runway** is a must read for angel investors. His latest book is the foundation of a course by the same name: **Berkonomics**. Dave's valuation model first appeared in a book published by Harvard's Howard Stevenson in the middle nineties. Ever since it has been one of the best known and most used models, but Dave has thoughtfully updated it for our ACA Leaders Workshop. Here is his latest version.

<i>If Exists:</i>	<i>Add to Company Value:</i>
Sound Idea	\$1/2 million

Prototype	\$1/2 million
Quality Management Team	\$1/2 million
Quality Board	\$1/2 million
Product Rollout or Sales	\$1/2 million

Note that the numbers are the maximum for each class (not absolutes) so a valuation can be \$800K as easily as \$2.5 million. Furthermore, Dave reminds us that "it was created specifically for the earliest stage investments as a way to find a starting point without relying upon the founder's financial forecasts."

6) Bill Payne's Model:

Since their inception Bill Payne has been teaching the ACEF courses around the globe. A founder of several angel groups and the recipient of the Hans Severeins Award, Bill has shared his vast experience with probably more angels and angel groups than anyone. His excellent book *The Definitive Guide to Raising Money from Angels* presents his model on page 73. Notice that it assesses the basic aspects of a start-up venture's challenges and opportunities, assigning a value to each.

This is an extremely useful model because it lends itself to being adapted to the market conditions in any given region. For instance, in Ohio, over the last six years the median value for pre-revenue start-ups seems to hover between \$1.25 million and \$1.75 million. After picking the median then these factors can be applied to it.

Here's a worksheet using Bill's model, completed for one of the Ohio TechAngels' pre-revenue portfolio companies. (Note: Currently we are using a \$1.5 million starting point.)

<u>FACTOR</u>	<u>WEIGHTING %</u>	<u>% OF NORM</u>	<u>COMMENTS</u>
Management weighted @	30%	125%	On Board except sales
Size of Opportunity	25%	115	Could be enormous
Product or Service	10%	110	Disruptive Platform tech.
Sales Channels	10%	70	All foreign and strangers
Stage of Business	10%	125	Prototype works
Other Factors	<u>15%</u>	<u>80</u>	100% international revenues
	100%		
Weighted Average of Norm:		1.0875	
Applied to \$1.75 million =		\$1,903,125	

Note: OTA requires that each DD Team run a minimum of three valuation models and we suggest that Bill's model always be one of them. Notice that the way we use the model results in a rather precise valuation which, of course, Bill would not suggest is accurate. However, OTA likes to chuckle about the specious precision our math generates. This is not a flaw in Bill's model, but reflects how precisely we use it, based on our median at the time. (In the end we average the output from three or more models when we summarize our valuation work for our members.)

7) The Risk Factor Summation Method:

Reflecting the premise that the higher the number of risk factors, then the higher the overall risk, this method forces investors to think about the various types of risks which a particular venture must manage

in order to achieve a lucrative exit. Of course, the largest is always "Management Risk" which demands the most consideration and investors feel is the most overarching risk in any venture. While this method certainly considers the level of management risk it also prompts the user to assess these other risk types:

- Stage of Business Risk
- Funding/Capital Raising Risk
- Regulatory Approval Risk
- Legislation/Political Risk
- Manufacturing Risk
- Sales & Marketing Risk
- Competition Risk
- Technology Risk
- Litigation Risk
- International Risk
- Reputation Risk

The extent of each risk is evaluated in \$250K increments which are added or subtracted from a starting valuation point (OTA is currently using \$1.5 million). This method forces the DD team to converse about each type of risk. However, one of its drawbacks is that it places the main focus on the downside of risks and tends to downplay the upside potential.

Here is a worksheet completed by an Ohio TechAngels Due Diligence Team for the purpose of assigning a pre-money valuation to a pre-revenue medical device company. The venture had a working prototype of a revolutionary technique for disease diagnosis, plus a rather well formed team of impressive experts. However, its initial focus was to only sell outside the United States, hence the comments on the international risks.

Starting point = \$1.5 million to which add/subtract in \$250K increments (two maximum) for:

<u>Risk Factor:</u>	<u>+ / --</u>	<u>\$</u>	<u>Comments:</u>
1) Management	++	\$500K	Outstanding backgrounds, very high confidence in abilities and relevant backgrounds & experience, except sales
2) Stage of Business	+	\$250K	Prototype demonstrated
3) Funding/Capital Raising Risk	--	(\$250K)	International is off-putting to investors; we are uncertain who other potentially interested investors might be, so the syndication challenge will be daunting
4) Legislation/Political Risk	0	0	Foreign risk under International
5) Manufacturing Risk	+	\$250K	Refining prototype seems very achievable; parts are all off the shelf; all domestically/readily available
6) Sales & Marketing Risk	--	(\$500K)	Haven't met the in-country sales team; can't assess in person; we won't travel to Africa to meet them prior to funding

7) Competition Risk	+	\$250K	Need to verify lack of competitors, but none apparently have similar technology
8) Technology Risk	+	\$250K	Prototype only needs converting to C++
9) Litigation Risk	0	0	Neutral; Average; All sales outside U.S.
10) International Risk	--	(\$500K)	100% of revenues will be from ascending countries; possible political turmoil; corruption in the payment stream will supposedly be minimized via 100% credit card transactions solely
11) Reputation Risk	-	(\$250K)	Due to international risk, Foreign Corrupt Practices Act concerns & contract sales team we cannot meet
12) Potential Lucrative Exit	+	\$250K	Disruptive Platform Technology which scales quite easily; could be many large cash bidders after less than \$5 million of capital invested

<u>SUMMARY:</u>	<i>Starting Point</i>	<i>\$1.50 million</i>
	<i>Plusses</i>	<i>\$1.75 million</i>
	<i>Minuses</i>	<u><i>\$1.50 million</i></u>
	<i>Suggested Pre-Money Valuation this round</i>	<i>\$1.75 million</i>

8) Replacement Method or "All-In" Method:

Often entrepreneurs will dwell on the vast amount of sweat equity which they have expended to date, suggesting that their venture is worth, at the minimum, the combined value of all such "replacement costs." (This view is most often touted when a venture has received significant grant money.)

The reasoning is that if five executives have worked two years without pay, and each would normally have been receiving \$200,000 salaries had they continued at their last position, then the venture must be worth at least \$2 million pre-money. The entrepreneur then adds to this amount all the assets on the balance sheet, plus all grant monies received to date, plus those awarded but not yet funded.

OTA's usual reaction to this viewpoint is that all the effort and money spent to date is past input and not reflective of the venture's likely allure to future acquirers. In other words "Don't confuse input and effort with output and results." Said differently, past effort has the same value as the amount of runway behind you when landing an airplane.....all that matters is the amount of runway ahead of you. This Replacement Value approach is well explained on page 62 of the **"Age of the Angel: Best Practices for Angel Groups and Investors"** published by the National Angel Organization (now the National Angel Capital Organization).

9) "The Rule of Thirds:"

This thumb rule is based on the premise that those bold enough to invest in ventures at the pre-revenue stage deserve to own a third of the venture, regardless of the industry or likely amount of future dilution. The founders retain a third, and the remaining third is reserved to attract a management team.

This means that for every dollar investors provide the post-money valuation increases by 3X. Therefore, one obvious shortcoming of this rule is that it rewards/motivates entrepreneurs to raise as much capital as possible, regardless of the amount actually needed.

Another shortcoming is that the 1/3 reserved for management clearly over weights the initial size of the option pool during Series A. However, when looking back from the vantage point of the day of the exit the option pool often does soak up much of the equity. This is especially true if multiple VC rounds have transpired and the management option pool as been refreshed several times (usually to the detriment of the angels).

Perhaps the greatest value of this thumb rule is that it addresses the reality that founders frequently refuse to give up more than a third of their venture to the initial angel investors. Obviously this has implications on the range of pre-money valuations likely to be negotiated. For instance, if the Series A is a \$1 million round then the pre-money valuation, based on the founder's ceding a maximum 33% to the angels, won't be negotiated below \$2 million. Of course providing less capital will lower this valuation. A \$500,000 round could result in only a \$1 million pre-money valuation, but this increases the financing risk later. (For a detailed explanation of the "Rule of Thirds" see page 63 of the NACO Best Practices book cited above.)