Carnegie Mellon University

Carnegie Mellon University
Center for Innovation & Entrepreneurship

Financial Modeling

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My Background

- BS in Accounting – West Virginia University
- CPA, Entrepreneur, Investor, Advisor
- 30 years of largely entrepreneurial experience
  - Public Acctg - Coopers & Lybrand (PricewaterhouseCoopers)
  - Industry – Black Box (BBOX on Nasdaq), Mallett Technology, WiseWire (CMU startup), CoManage, Netronome, Malcovery
  - Worked on LBO / IPO / Bankruptcy (Black Box), Exits (WiseWire to Lycos, Malcovery to PhishMe), VC fundings of ~$100M, commercial bank financing, sales contract negotiations, investor relations, Board level involvement, etc.
  - 2014 Pgh Business Times CFO of the Year (Small Companies)
- Very active in local tech community

Financial Modeling – Main Points

1) Building your model

- Planning considerations and assumptions

2) Testing your model

- Stress test to make sure it works as planned

3) Funding and Cap Table review

- Simplifying the math

Building Financial Models - Setting a Planning Horizon

- Typical timeframe is 3 to 4 years
- Usually monthly detail for first 2 years (obviously gets more difficult to estimate as you go out in time)
- What are you planning toward
  - Initial funding round or eventual liquidity event?
  - Building company to sell? – Shorter term focus, but be careful
  - Building company to become public (IPO)? – Not near as realistic or even desirable these days
  - Building for the long term and see what happens?
- Be realistic in your numbers and the time it takes to achieve them
- You will be viewed as credible / less risky if you are practical and demonstrate good judgment in your projections
- **I just happened to build you a good detailed model ! (posted online)**

Defining Relevant Assumptions

- Document the assumptions you make in building your model – Don't rely on memory (see Notes tab in model)
- Tells the audience a more complete story
- Tells the audience that you understand your own projections
- EVERYTHING affects your cash needs
- What type of company?
- Product or service?
- Build it or Buy it? (i.e. Manufacturer or Reseller)
- Revenues via Direct Sales team or Partners?
- What type / how many employees do you need to build your company and product or service?

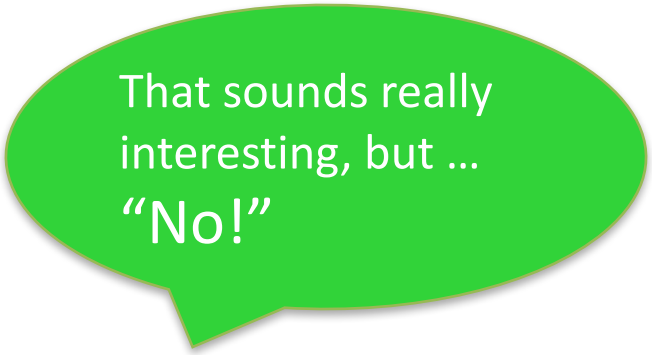
Defining Relevant Assumptions – Notes Example

Expenses

Salaries	Emp Input tab contains all detail of all current & To Be Hired (TBH) positions
Commissions	assumed as % of Net Revenues: 2014 - 8% / 2015 - 10%
Employer Payroll Taxes	10% of Total Comp
Benefits - All	start health insurance in October 2014; Benefits average 8% of Base Comp
Recruiting	modest @ 2014 - $20k / 2015 - $30k
Travel	Ave trip @ $1,100, Airfare - $750, based on headcount & # of Industry Events
Contractors	Mostly for Service Delivery, gaited by revenues & customer needs
Audit, Tax, Accounting	assumed Review for 2014 & then regular Audit for 2015 + Tax Return prep - Fed / PA
Legal	includes corporate/HR guidance, perform all normal contract work in-house
Patent Fees	modest ongoing filing fees + Intl filings under PTC (consulted our patent attorney)
Marketing - Lean Generation	Reduced to Hubspot and Rain King contracts in 2015
Marketing - Awareness	combination of PR Services and White Papers - 451 Group & Gartner
Marketing Events / Shows	carefully attending select, impactful industry events, see detail of shows in Mktg tab
External Development	leveraging outside Dev firm to develop Dashboard & Customer Portal in 1H 2015
Rent / Utilities	assumed modest increase in space at Innovation Depot in Q1 2015
Telecomm/Internet	assumed current run rate of ~ $2k/mo in 2014 & 20% increase in 2015
Insurance - Liability / E & O	increased 2015 coverages for est. revenue increases & Umbrella to $3M
Sales Support	salesforce Enterprise Edition ($25k) & Dialer.com ($2k)

Defining Relevant Assumptions (cont'd)

- What tools do these employees need to do their job?
- Where are you going to put them? How long to stay?
- What physical environment are you going to create?
- What data / telecomm infrastructure will you need?
- What kind of Marketing efforts will you need to gain mindshare in your industry / segment?
- How much will the Sales team travel? Do they need to?
- ALL these assumptions are "big ticket" costs that affect your initial and ongoing cash needs



Speaking of Cash

Cash is not only King …

Cash is KING KONG !!!

Developing a Basic Financial Model

- Keep it understandable and easy to update – because you will certainly need to update many times
- Based on your assumptions - Build model so that you know what happens if you make changes (sensitivity):
  - Add a body
  - Offer more benefits
  - Purchase more computers / equipment
  - Need to expand inventory
  - Open a new office / location
  - In other words - Add any type of cost

Defining Assumptions – Hiring Costs Example

	Title	Dept	Start Date	Salary	Jan-15	Feb-15	Mar-15	Apr-15	May-15
		(select)							
1	Big Cheese	G & A	1/1/15	$ 80,000	6,667	6,667	6,667	6,667	6,667
2	Chief Idea Guy	G & A	1/1/15	$ 75,000	6,250	6,250	6,250	6,250	6,250
3	Build It Guru	Development	1/1/15	$ 65,000	5,417	5,417	5,417	5,417	5,417
4	Title 4	Development	3/1/15	$ 60,000	-	-	5,000	5,000	5,000
5	Title 5	Sales	5/1/15	$ 55,000	-	-	-	-	4,583
6	Title 6	Sales	6/1/15	$ 50,000	-	-	-	-	-
7	Title 7	Biz Dev	8/1/15	$ 50,000	-	-	-	-	-
8	Title 8	G & A	10/1/15	$ 55,000	-	-	-	-	-
9	Title 9	Sales	1/1/16	$ 60,000	-	-	-	-	-
10	Title 10	Product Mgmt	3/1/16	$ 55,000	-	-	-	-	-
11	Title 11	Development	5/1/16	$ 60,000	-	-	-	-	-
12	Title 12	Development	6/1/16	$ 55,000	-	-	-	-	-
13	Title 13	Development	7/1/16	$ 65,000	-	-	-	-	-
14	Title 14	Development	8/1/16	$ 65,000	-	-	-	-	-
15	Title 15	Sales	8/1/16	$ 70,000	-	-	-	-	-

Defining Assumptions – Hiring Ramp Example

Departments	Q1 15	Q2 15	Q3 15	Q4 15	New
Operations	7.5	10.0	10.5	12.0	5.0
Development	4.0	5.0	5.0	5.0	1.0
Sales	5.5	6.5	8.5	8.5	4.0
Marketing	0.5	1.0	1.0	1.0	0.5
Product Mgmt	1.0	1.0	1.0	1.0	-
Biz Dev	-	1.0	1.0	1.0	1.0
G & A	3.0	3.0	3.0	3.0	-
Total	**21.5**	**27.5**	**30.0**	**31.5**	**11.5**

Includes part-time & contractors or FTEs

Developing a Basic Financial Model

- Build model so that you perform data entry of variables in specific categories:
  - Headcount
  - Operating Expenses (Departments / cost structure)
  - Capital Expenditures
  - Revenues
  - Cost of Goods Sold (forces Inventory needs)
- that, in turn, feed into the 3 main financial statement templates of:
  - Income Statement
  - Balance Sheet
  - Cash Flow Statement

Accounting Basics

INCOME STATEMENT		BALANCE SHEET		CASH FLOW	
	Full Year		Year end		Full Year
Revenue		**Assets**		Cash Flows from Operating Activities	
Product	1,000,000	**Current Assets**		Net income/(loss)	(149,500)
Service	400,000	Cash	500,000	Adjust for non-cash items	
Other	100,000	Accounts receivable	100,000	Depreciation	25,000
Total Revenue	1,500,000	Other current assets	50,000	Adjusted net income/(loss)	(124,500)
		Total current asset	650,000	Changed in working capital	
Cost of Goods Sold	300,000			Change in receivables	(50,000)
		Fixed assets	500,000	Change in other current assets	(10,000)
Gross Profit	1,200,000	Accumulated depreciation	(100,000)	Change in accounts payable	75,000
Gross Profit Margin	80%	Net fixed assets	400,000	Change in accrued liabilities	(10,500)
		Total Assets	1,050,000	Change in Working Capital	4,500
Operating expenses:				Net cash used in operations	(120,000)
Technology	500,000	**Liabilities and Equity**			
Sales	350,000	**Current Liabilities**		Cash Flows from Investing Activities	
Marketing	300,000	Accounts payable	200,000	Purchase of fixed assets	(100,000)
General & Administrative	200,000	Accrued liabilities	100,000	Net cash used in investing activities	(100,000)
Total Operating Expenses	1,350,000	Current portion of long term debt	50,000		
	90%	**Total current liabilities**	350,000	Cash Flows from Financing Activities	
		Long term liabilities		Payment on bank loan	(50,000)
Operating Income (EBITDA)	(150,000)	Bank loan	100,000	Receipt of convertible debt	300,000
		Convertible debt	300,000	Sale of stock	200,000
Interest Income/(Expense)	500	**Total long term liabilities**	400,000	Net Cash provided by Financing	450,000
		Total liabilities	750,000		
Income (loss) before taxes	(149,500)			Net Increase (Decrease) in Cash	230,000
Income Tax Provision	-	**Shareholder's Equity**			
Net Income (Loss)	(149,500)	Stock and additional paid in capital	2,000,000	Cash Balance at Beginning of Period	270,000
		Beginning retained earnings/(loss)	(1,550,500)	Cash Balance at End of Period	500,000
		Current earnings/(loss)	(149,500)		
		Total Equity	300,000		
		Total Liabilities and Equity	1,050,000		

Accounting 101 - Reconciliations

INCOME STATEMENT	
	Full Year
Revenue	
Software	1,000,000
Service	400,000
Other	100,000
Total Revenue	1,500,000
Cost of Goods Sold	300,000
Gross Profit	1,200,000
Gross Profit Margin	80%
Operating expenses:	
Technology	500,000
Sales	350,000
Marketing	300,000
General & Administrative	200,000
Total Operating Expenses	1,350,000
	90%
Operating Income	(150,000)
Interest Income/(Expense)	500
Income (loss) before taxes	(149,500)
Income Tax Provision	-
Net Income (Loss)	(149,500)

BALANCE SHEET	
	Year end
Assets	
Current Assets	
Cash	500,000
Accounts receivable	100,000
Other current assets	50,000
Total current asset	650,000
Fixed assets	500,000
Accumulated depreciation	(100,000)
Net fixed assets	400,000
Total Assets	1,050,000
Liabilities and Equity	
Current Liabilities	
Accounts payable	200,000
Accrued liabilities	100,000
Current portion of long term debt	50,000
Total current liabilities	350,000
Long term liabilities	
Bank loan	100,000
Convertible debt	300,000
Total long term liabilities	400,000
Total liabilities	750,000
Shareholder's Equity	
Stock and additional paid in capital	2,000,000
Beginning retained earnings/(loss)	(1,550,500)
Current earnings/(loss)	(149,500)
Total Equity	300,000
Total Liabilities and Equity	1,050,000

CASH FLOW	
	Full Year
Cash Flows from Operating Activities	
Net income/(loss)	(149,500)
Adjust for non-cash items	
Depreciation	25,000
Adjusted net income/(loss)	(124,500)
Changed in working capital	
Change in receivables	(50,000)
Change in other current assets	(10,000)
Change in accounts payable	75,000
Change in accrued liabilities	(10,500)
Change in Working Capital	4,500
Net cash used in operations	(120,000)
Cash Flows from Investing Activities	
Purchase of fixed assets	(100,000)
Net cash used in investing activities	(100,000)
Cash Flows from Financing Activities	
Payment on bank loan	(50,000)
Receipt of convertible debt	300,000
Sale of stock	200,000
Net Cash provided by Financing	450,000
Net Increase (Decrease) in Cash	230,000
Cash Balance at Beginning of Period	270,000
Cash Balance at End of Period	500,000

Newco - Market Analysis

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Market Size	$100M	$110M	$121M	$133M	$146M
Newco Penetration	0.5%	0.9%	1.65%	3.0%	4.1%
Unit Sales	50	100	200	400	600
Average Selling Price	$10k	$10k	$10k	$10k	$10k
Newco Revenue	$500k	$1M	$2M	$4M	$6M

* Use Toggle cell(s) for sensitivity testing

Developing a Basic Financial Model

- Product is you'll reasonably know the "bottom line" results of your planned operations and the integrity of your assumptions
- This result will tell you if your operations are going to produce adequate positive cash flow to internally fund cash needs OR if you need to plan on external funding sources
- Key milestones are your path to profitability and your cash flow breakeven point
- If you use this "modular" format, you'll have a model that lends itself well to sensitivity testing
- Use a "toggle" cell to quickly create "What If" scenarios
- Questions so far ? ……..

Basic Financial Terms / Metrics

- **Burn Rate** – Trending amount of cash you consume in a given month = Cost of Goods Sold + Operating Expenses + Cap Ex + Current Debt Obligations
- **Runway** – Amount of cash currently on hand to cover Burn Rate, which is likely growing over time
- **EBITDA Breakeven** – Point at which profitability / income from operations is reached on a sustainable basis (more than a couple months)
  - EBITDA or Earnings Before Interest, Taxes, Deprec, Amortization
- **Cash Flow Breakeven** – Point at which positive net cash flow is reached on a sustainable basis (remember cash is King Kong!)
- You will burn cash before you sell
- Expenses/cash outlays precede sales/cash collections

Projected Income Statement

	Q1 15	Q2 15	Q3 15	Q4 15	Projected 2015
Revenues	$ 350	$ 500	$ 650	$ 900	$ 2,400
Cost of Service	$ 180	$ 200	$ 220	$ 250	$ 850
Gross Margin	$ 170	$ 300	$ 430	$ 650	$ 1,550
Gross Margin %	49%	60%	66%	72%	65%
Operating Expenses	$ 600	$ 725	$ 850	$ 950	$ 3,125
EBITDA	$ (430)	$ (425)	$ (420)	$ (300)	$ (1,575)
Monthly Gross Burn (Burn Rate)	$ (260)	$ (308)	$ (357)	$ (400)	$ (331)
Ending Headcount (FTEs)	**23**	**26**	**29**	**29**	**27**

Testing / Reality Checking Your Model

- You won't build the perfect model the first time; you may not do it the 3rd or 4th time
- Point is, you have now built a model that can be tested for validity, completeness and integration
- Don't let your potential investors tell you your model doesn't flow or that it breaks when tested (do a Test Run)
- Perform "what if" analysis - Add more headcount; increase certain operating costs; increase, then decrease your revenues
- Does the model behave and respond in the way you had envisioned?
- Remember the "toggle" cell to quickly create "What If" scenarios

Reality Checking Your Model

- Great way to test for reasonableness is to compare to peer companies or at least your industry metrics
  - Search for the early year financials of those companies
- Find out who the public companies (or private if you know someone who will share info) are in your space and obtain their financial data – even %'s will help
- Ask advisors / potential investors for metrics on similar companies
- Internet is FULL of information

Reality Checking Your Model - Metrics

Metrics (in $000s)	2014	2015	2016	2017
# Employees (ave)	21	29	42	59
# Sales Reps (ave)	5	6	9	14
# Customers Renewed in Period	7	17	62	124
# Customers New in Period	10	45	62	106
# Customers @ Period End	17	62	124	230
Revenues / Employee	$ 54	$ 523	$ 864	$ 972
Revenues / Sales Rep	$ 247	$ 2,527	$ 3,863	$ 4,247
Ave Deal Size	$ 67	$ 246	$ 275	$ 310
EBITDA	$ (2,124)	$ (1,480)	$ 1,050	$ 3,012
EBITDA / Employee	$ (99)	$ (51)	$ 25	$ 51

Figuring out Your Audience

- You've built your model – now what?
- It is very likely your audience will know more about finance than you will **ever** know, so it can be intimidating
- The more sophisticated the potential investor, the more you need to be prepared
- Committing those assumptions to writing and stress testing your model in advance place you on more firm ground
- If you are approaching a party for the first time, you need to give them your Business Plan as well (at least Exec Summary)
- It is MUCH more effective for them to know the story of your business **before** reviewing your financial model
- If you are going for another round of financing from an existing party, you can limit this to a narrative update

Figuring out Your Audience

- Investors will quickly see if you have been realistic in your model (you likely won't go from sales of $1M - $10M in 1 year)
- The financial model needs to be credible
- Profitability and cash breakeven do INDEED matter
- Investors are looking for companies to be "Capital Efficient"
- Investors won't want to see your model projecting a large external cash infusion every year
- Cash flows from operations need to reach the point of self funding
- Questions so far ? ……..

Funding Calculation – Angel Round

Initial External Funding Round

	Angel Round	Calculated as
Pre-Money Valuation	$ 2,000,000	Negotiated
O/S Shares - Pre Angel	3,000,000	Fixed
Price / Share - Angel Round	$ 0.67	Value / Shares
New Money $ - Angel Round	$ 500,000	Negotiated
New Money Shares - Angel Round	750,000	New Money / Price
New Money %	20.0%	New / Post Shares
Post-Money	$ 2,500,000	Pre + New Money
O/S Shares - Post	3,750,000	Pre + New Shares

Capitalization Table (Fully Diluted)

	Pre-Angel		Post-Angel	
Founders	2,000,000	66.7%	2,000,000	53.3%
Management	500,000	16.7%	500,000	13.3%
Friends & Family	100,000	3.3%	100,000	2.7%
Employee Pool - Granted	100,000	3.3%	100,000	2.7%
Employee Pool - Ungranted	300,000	10.0%	300,000	8.0%
Angel Capital Group	-	0.0%	750,000	20.0%
Total	3,000,000	100.0%	3,750,000	100.0%

Summary

- Be realistic and conservative
- Thoughtfully consider then document your assumptions
- Include the critical resources you need to build company
- Build the model the right way the First time
  - In "modular format"
  - Takes patience
- Stress test your results – "What if I change . . .?"
- Remember (and respect) who you will be approaching
  - They have the money that you need to build and survive

Questions / Follow Up

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