

ENTREPRENEURIAL FINANCE: *Venture Capital, Deal Structure and Valuation*

Chapter 8. Financial Modeling

Questions and Problems

1. The cash cycle is the time between when a company pays for inventory and when it receives the cash from its customers. It is defined as the number of days over which the company has its cash tied up in Accounts Receivable and Inventory, minus the number of days in Accounts Payable. Using the summary data presented below, calculate Dell Technologies, Inc.'s cash cycle.

Dell Technologies, Inc.	
Summary Financial Data	
(\$ Millions)	2/1/2019
Revenue	90,621
Cost of Revenue	65,568
Accounts Receivable	12,371
Inventory	3,649
Accounts Payable	19,213

Now use the data from the first part of Section 8.2 in the chapter to calculate the cash cycle for Amazon.com in 2000. Compare these results to your Dell Technologies calculations. What do you think is behind the differences in the two company's cash cycles?

2. You are developing a business plan for a new wholesale specialty goods retailer. You have collected data on typical industry working capital terms. Industry credit terms to customer are 20 days and average inventory days on hand is 30. Suppliers grant wholesalers credit for an average of 15 days. You estimate that adopting the industry terms would produce \$3 million of annual revenue and cost of goods sold will be 70% of revenue.

You are considering alternative terms, including offering new customers 45 days to pay, which you think will increase revenue by 20% to \$3.6 million. A new just-in-time inventory system which includes shipments directly from manufacturers to retailers will reduce inventory days on hand to 25. Finally, to establish strong ties with your suppliers, you will keep accounts payable at 10 days.

- a. Using the industry data, compute the cash cycle and estimate the investment in working capital the business would require.
 - b. Using the alternative terms, compute the cash cycle and estimate the investment in working capital the business would require. What are the pros and cons of the alternative terms?
 - c. The investment in working capital is higher under the alternative terms. Is the change in profit enough to justify using the alternative terms?
3. Download the Working Capital Policy Template (Figure 8.1) and use it to contrast the effects of the following policies on net working capital (use the assumptions reflected in Figure 8.1 as a starting point). Although you cannot assess total profitability, evaluate the impact of each of these changes on profit per day (i.e., determine how much daily and annual profit would increase or decrease).

Considering the change in profit per year, and the change in investment in net working capital, are these changes good ideas?

- a. Product demand is inelastic, so that a \$1 price increase is expected to reduce quantity per day to 95 units. Product demand is elastic, so that a \$1 price increase is expected to reduce quantity per day to 80 units.
 - b. The company sells only for cash so that quantity per day is expected to decline to 90 units. The company sells only for cash, but reduces product price to \$9.90, so that quantity per day is expected not to change.
 - c. The company increases its target materials inventory to 20 days, and its target finished goods inventory to 15 days. As a result, the company is able to more-reliably respond to orders. Therefore, quantity of sales per day is expected to increase to 105 units.
 - d. The company plans to pay its payables in 30 days. As a result, cost of materials is expected to increase to \$4.10.
 - e. The company changes to paying monthly so that the average wages payable balance is for 15 days of work. To offset, it expects it will need to increase wages to \$2.60 per unit.
4. Develop the Year 1 financial forecast (income statement, balance sheet, and statement of cash flows) for Bennis Co. Revenue is projected to be \$800,000, with a gross margin of 34%. Operating expenses (including depreciation of \$30,000) total 20% of revenue, and taxes are estimated to be 35% of pre-tax income.

Bennis wants to maintain a cash balance of 3% of their cost of goods sold. Accounts receivable are 10% of sales, and inventory turnover is forecast at 9 times. Fixed assets of \$500,000 will be needed to start the venture. Accounts payable days are forecast to be 30. If Bennis will be all-equity financed, calculate the entrepreneur's required initial investment.

5. A new venture is expected to require a capital investment of \$2.5 million in fixed assets and an investment of \$200,000 in initial working capital. The capital investment can be depreciated over a five-year period, on a straight-line basis. During the first year of operation, the venture is projected to achieve sales of \$800,000. The sales level is projected to triple in the second year, double in the third year, and increase by 50% in the fourth year. No additional capital investment is needed during the first five years. The projected gross profit margin is 60%, and operating expenses, other than depreciation, are projected to be \$500,000 per year, plus 15% of sales. The venture is subject to a corporate tax rate of 35%, and losses from prior years can be carried forward in computing the tax liability. Based on industry norms and the expected growth rate of sales, the venture is expected to need ending cash equal to 5% of sales for the year, ending accounts receivable equal to 30% of annual sales, ending inventory equal to 10% of annual sales, and ending accounts payable equal to 10% of the cost of sales.
- a. Using a spreadsheet, project the net income, cash flow, and ending balance sheet of the venture for each year, assuming that no debt financing is used.
 - b. Contrast the net income of the venture with the annual cash flows. How do the factors of capital intensity, profitability, sales growth, and cash flow affect the financial needs of the venture?
6. Using the spreadsheet from Problem 5, examine how each of the following changes to the assumptions would affect net income and cash flows. Assume that the other assumptions from Problem 5 are unchanged.

- a. The sales growth (percentage increase) in each year is only half as much as expected.
 - b. The gross margin is 40% of sales revenue.
 - c. Inventory is 30% of ending sales.
 - d. The initial capital investment in the venture is \$4 million. Assume the initial equity investment increases as needed.
7. A new venture requires an initial capital investment in assets of \$2 million. Similar ventures in the same industry have been able to achieve sales levels of 60% to 100% of assets, with profitability on sales of from 10% to 30% (net profit). Demand for the venture's product is expected to grow at a rate of 2% to 13% per year.
- a. Using the midpoints of the ranges, develop a pro forma forecast of the venture for five years, assuming sales growth matches the growth of market demand. How much free cash is the venture expected to generate in each year, or how much additional financing is needed in each year?
 - b. Develop a "worst case" pro forma analysis for five years, assuming all of the uncertainties turn out at the low ends of the ranges. How does this affect the ability of the venture to distribute cash or the need to raise additional capital?
 - c. Develop a "best case" pro forma analysis assuming the uncertainties are resolved at the high end of the range, and evaluate the cash needs or distribution capabilities of the venture under those conditions.
 - d. Suppose you want to develop a pro forma analysis of the worst case in terms of the financial needs of the venture. How would you use the information about the uncertainties of the various assumptions to do so?
8. Think of a product you would be interested in developing, that can serve as the basis for a new venture. What are the critical assumptions on which venture success depends?
- a. Use the Internet to collect information on public companies that are comparable in some ways, such as from prospectuses and annual reports. Identify the information from these sources that you can use to help calibrate the critical assumptions in a financial model of your venture.
 - b. Look up some sources of financial data for industries that are comparable, in some ways, to the one you are considering. Explain how the information from these sources can be used to calibrate a financial model of the prospective venture.
9. Use the following assumptions to develop a five-year set of pro forma statements. Make any additional assumptions you need.
- a. The entrepreneur has \$300,000 to invest in the venture, will raise an additional \$150,000 from family members in exchange for equity, and will borrow \$200,000 in the form of long-term debt. A total of \$600,000 will be invested in fixed assets that can be depreciated on a straight-line basis over five years. The balance of initial investments will be held as cash. New capital investments are needed each year to maintain net fixed assets equal to 1.2 times expected sales in the subsequent year.
 - b. Expected sales during the first year is \$250,000. Sales is expected to double each year for the next two years, to increase by 50% in the fourth year, and to increase by 20% in the fifth and sixth years.

- c. Based on industry data, cost of goods sold is expected to be 25% of sales, selling expense is expected to be 12% of sales, and general and administrative expense is expected to be \$100,000 plus 7% of sales. There are no other material operating expenses. The above figures exclude depreciation expenses.
 - d. The interest rate on debt is expected to be 9%, and revenue from short-term investment of cash is expected to be negligible.
 - e. The corporate tax rate is 35%. There is no tax loss carry forward.
 - f. Typical experience in the industry for ventures that are growing rapidly is that accounts receivable equals 20% of ending sales; inventory is 15% of cost of goods sold; accounts payable is 8% of cost of goods sold; wages payable is 5% of cost of goods sold; and taxes payable is negligible.
 - g. The venture needs to maintain a cash balance equal to the lesser of 20% of annual sales or \$50,000.
 - h. If additional financing is needed, the entrepreneur hopes to use long-term debt to the extent that profitability is sufficient to cover interest expense (so that the full tax advantage of debt financing is realized).
10. Download a copy of Table 8.13 and use it to address the following (you may need to “unhide” the hidden columns in the figure):
- a. How much initial cash from equity investors would NewCo need so that it would not be expected to draw on its line of credit during the entire 28 quarters of the pro forma statements?
 - b. How much initial cash from equity investors would the company need so that it would not be expected to draw on its line of credit until Quarter 9 (the 3rd quarter after development)?
 - c. How much initial cash from equity would the company need in order to avoid borrowing if the quarterly rate of real sales growth during the rapid growth period is 15% instead of 25%?
 - d. How much initial cash from equity would the company need in order to avoid borrowing if the gross profit margin is 45% instead of 55%?
11. **SIM** Download a version of Table 8.8 for Morebucks that has simulation capabilities enabled (using the software of your choice) unprotect the worksheet. Use the model to generate 1000 trials, keeping track of Year 3 Sales, Year 3 Net Income, and Operating Expenses
- a. In what fraction of the trials is Morebucks’ Net Income negative?
 - b. Chart the relationships between Sales and Net income and between Operating Expenses and Net Income?
 - c. What can you say about how the sales level and operating expense percentage contribute to Year 3 Operating Profit?
12. **SIM** Download the Excel file that includes Table 8.13 and Figure 8.4 and has simulation capabilities enabled (using the software of your choice) and unprotect the Assumptions.
- Use the file to simulate the performance of NewCo. Run 1000 trials and keep track of net income in quarter 28 and surplus cash in quarter 28 (you can find these items in the chart data portion of the worksheet).

- a. Suppose that if net income is negative in quarter 28, the venture has failed. Try a simple valuation of the equity by finding the average net income (replace the negative net incomes with zeros). Capitalize this average at 40 times (i.e., 10 times annualized net income), and add the average surplus cash. Note that you will need to look at the trials data to find the information for this valuation.
- b. Discount this Quarter 28 value to present value assuming that the appropriate discount rate is 3% per quarter. What is your estimate of the present value of the equity? In what fraction of the trials does the venture fail?
13. Dropdocs.com provides cloud-based storage of files to customers by pre-paid subscriptions of \$110 per year (12 month period). The company has been growing but is losing about \$6 per customer per year. Nonetheless, it seems to have enough cash to fund its growth. The entrepreneur is concerned that the annual subscription may be discouraging some potential customers and that a monthly price of \$10 (\$120 per year) could make the company profitable and might attract more customers. If most customers switch from annual subscriptions to monthly payments, how do you think the change would affect the company's profitability and ability to fund its growth from operating cash flows?
14. Cash needs assessment: Below are the highly simplified financial projections (Income Statement, Balance Sheet, and Cash Flow in \$000) of a venture. Assume the company starts with nothing in period 0, and raises and deploys funds over the first year, so you are seeing end of period 1 balances below. Period 2 is the first period of revenue generation. Use the information to complete the information for periods 1, 2, and 3.

Period	0	1	2	3
Income Statement				
Sales	0	0	800	2000
Expenses	0	0	1200	1900
Net Income	0			
Balance Sheet				
Cash	0	100	300	400
Accounts Receivable	0	0	200	500
Fixed Assets at Cost	0	1000	1100	1050
less Accumulated Depreciation	0	0	100	300
Net Fixed Assets	0			
Total Assets	0			
Accounts Payable	0	400	200	300
Long Term Debt	0	100	150	300
Equity (Paid In + Retained Earnings)	0			
Total Liabilities and Equity	0			
Cash Flow				
Net Income		0		
Depreciation Expense		0		

less Change in Accounts Receivable	0	_____	_____
plus Change in Accounts Payable	400	_____	_____
Cash Flow from Operations	<u>400</u>	_____	_____
Cash Flow from Investing in Fixed Assets	-1000	_____	_____
Change in Long Term Debt	100	_____	_____
Net New Equity Financing	_____	_____	_____
Cash Flow from Financing	<u>_____</u>	<u>_____</u>	<u>_____</u>
Beginning Cash	0	_____	_____
plus Change in Cash	<u>_____</u>	_____	_____
Ending Cash	<u>100</u>	<u>_____</u>	<u>_____</u>
