TIM80C Lecture 12 (5/7/15)

Agenda

1) Comments on the Midterm Exam

2) Cash Flow Analysis (Financial Strategy)

3) Project
   - Phase II Feedback
   - Phase III Assignment
1) Comments on the Midterm Exam

Graded midterm exam will be returned Thursday of next week (5/14/15)

Corrections will be due the following Thursday (5/21/15)

Final Score = Original Score + (0.6)(Corrections - Original)

or

(0.4)(Original) + (0.6)(Correcting)

Corrections are an opportunity to learn:

- Planning / Time Management
- Course Material (FAST, FS, MM, SC)
- Applying course material to new problems

An important part of problem-solving is being able to adjust the level of detail to the task (problem):

**Example:** FAST Diagram

In class exam → 5-10 minutes

Homework → 20 minutes

Project → 1 hour

Start-up → 7 weeks
2. Cash Flow Analysis

Before we can create a Financial Strategy for the Startup, we first need to understand the flow of cash into and out of the business.

5 Step Process for Cash Flow Analysis:

Step 1: Make a list of all relevant Cash Flows ($) for the Startup:

Cash Flow in (not including funding):
- Revenue from selling the product (sales)
- Licensing technology (Patents) to other companies

Cash Flowing out:
- People: Management, Product development team, Market/Sales, etc.
- Equipment: Computers, lab equipment, materials
- Facilities: Building, office supplies, food, insurance
Step 2: Determine the timing of the cash flows (typically done quarterly).

Cash ($1,000)

Q1Y1 Q2Y1 Q3Y1 Q4Y1

-1,000 -1,500 -1,000 -1,000 -2,000

Time (Quarters)

Facilities: $200K to rent and finish our new office building
People: $500K to hire a product development team
Equipment: $100K for servers

Step 3: Determine the net cash flow for each period (quarter).

Cash ($1,000)

-1,000 -1,500 -2,000

Time (Quarter)

1,000 1,500 2,000
Step 4: Compute the present value of the net cash flow for each period (quarter).

Present Value: the value of a future amount of money in today's dollars.

Money depreciates (loses value) over time due to inflation, i.e., \$2015 > \$2016.

We need to discount the future value of a cash flow in order to get its present value.

Let

\[ FV = \text{future value} \]
\[ PV = \text{present value} \]
\[ d = \text{discount rate (inflation rate)} \]
\[ n = \text{number the periods that FV is in the future} \]

\[ PV = \frac{FV}{(1+d)^n} \]

Present \( \rightarrow \) \( n = 0 \)
Example: Venture capital firm has promised you that they will invest $1M but the investment will be 3 years in the future. How much is that investment worth in today’s dollars?

\[ FV = 1M \]

\[ n = 3 \]

\[ d = 10\% \text{ per year (industry standard)} \]

\[ PV = \frac{1M}{(1+0.1)^3} \approx 750K \]

What if the investment is going to be in 3 quarters,

\[ d = \frac{10\%}{4} = 2.5\% \text{ per a quarter} \]

\[ PV = \frac{1M}{(1+0.025)^3} \approx 930K \]
Example: Based on cash flow analysis, you promise the venture capitalist a $3M return on their $1M investment in 3 years. How much is that return actually worth?

\[ PV = \frac{3M}{(1+0.1)^3} \approx 2.25M \]

\[
\text{RoI} = \frac{\text{Return} - \text{Investment}}{\text{Investment}}
\]

\[
\text{RoI} = \frac{3M - 1M}{1M} = 2 = 200\%
\]

with discounting

\[
\text{RoI} = \frac{2.25M - 1M}{1M} = 1.25 = 125\%
\]
Step 5: Compute the Net Present Value of the Start-up by Summing the present value (discounted) Cash Flows.

Example: Present Values assuming Q1Y1 start date and 10% discount rate

<table>
<thead>
<tr>
<th>Quarter</th>
<th>FV (net)</th>
<th>PV (net)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1Y1</td>
<td>-$1M</td>
<td>-$1M</td>
</tr>
<tr>
<td>Q2Y1</td>
<td>-$1.5M</td>
<td>-$1.46M</td>
</tr>
<tr>
<td>Q3Y1</td>
<td>-$1M</td>
<td>-$0.95M</td>
</tr>
<tr>
<td>Q4Y1</td>
<td>-$2M</td>
<td>-$1.85M</td>
</tr>
<tr>
<td>Q1Y2</td>
<td>$0.5M</td>
<td>$0.45M</td>
</tr>
<tr>
<td>Q2Y2</td>
<td>$1M</td>
<td>$0.85M</td>
</tr>
</tbody>
</table>

NPV = -$3.9M

General Rule: Perform Cash flow analysis for 3-5 years.

NPV > 0 → Start-up will get funding

NPV < 0 → No Funding

Time frame depends on the type of company:
- Software Company typically 2-3 years
- Hardware Company typically 3-5 years
- Pharmaceutical, aerospace, energy typically 7-9 years (not typical VC investments)
Project

Phase II: Overall the work on Phase II was very good

Good \[\ldots\] Excellent

General Comments

- **Conceptual Design**: Most groups have a solid conceptual design but need to work on showing why this is the best design (Selection Criteria) and the plan (Prototypes) for developing the product.

- **Market Strategy**: If the start-up is operating in a large market/industry (e.g., CE) first do a high-level revenue map to determine what part of the market you want to target, then do a low-level (detailed) revenue map to determine the target segment(s)

  Smartwatches $\rightarrow$ College Students/Fitness Tracker
Business Strategy: What is the competitive strategy of the other companies in your target segment (Cost Leadership, Differentiated, Focus)? Explain why?

Phase III:

1) Finish backlog from Phase I and Phase II
   - Product Strategy
   - Market Strategy
   - Business Strategy

2) Business Plan: Organize and integrate the work from Phase I and Phase II into a professional document, i.e. something you could show to investors

3) Cash flow analysis for 3-5 years