

Final Report Document Format

Chem E 486

Due 5/28/04

The final report document you are preparing is similar to a standard business plan, though I seek a great deal more technical information since you are engineers, not MBAs. There are many great sources for MBA-style business plans on the web (see small sampling below):

<http://www.inc.com/articles/2000/04/18470.html>

http://www.sba.gov/starting_business/planning/writingplan.html (especially check out the samples)

There are a couple of big picture items to note prior to getting into the report details:

(1) For the most part, it is time to stop generating new material (prototypes, models, etc.) and prepare/synthesize what you've got. The finance and communications people have a big task over the next week and need to work closely with the others to accomplish it.

(2) I will be reading the report thinking, "Does what they say make sense technically, and does each section add-up?" For example, if you plan to sell 500,000 units each year, you need to mention how you will market the product, and there are likely to be expenses for marketing in the financial section. Financial people really need to be talking to the manufacturing and marketing people to ensure everything fits together. Communications people need to synthesize and edit the document to ensure it speaks with one voice.

(3) This is not a contest to see who can make the most fictional money. Rather, the goal is to creatively define a new product and a plausible manufacturing process, and then evaluate the financial feasibility of that product and process. If you find that realistic assumptions about revenues and cost of manufacture do not permit the product to be made profitably, that is a perfectly fine outcome.

(4) The product you are describing is what you would envision as the final refined design; it is not necessarily identical to the final prototype you built. It is no big deal if you didn't get the prototype to work perfectly, so long as you learned some useful things from the prototyping exercise and improved the design as a result. (Just think how unrealistic your designs would have been if they were just simulations and you had never tried to build and operate these devices!)

(5) The manufacturing plan should describe how you envision building the refined design. It may or may not involve laser fabrication. If you think something like injection molding is most appropriate, try to find enough information in a Manufacturing Handbook or other source to establish the process flow. If you cannot find what you need, you can assume you will be using laser fabrication (perhaps with some modified materials), and work the economics that way. If the laser fabrication economics do not work, then propose a plausible alternative and indicate how cheaply it would need to be manufactured to meet the 20% financial target.

(6) I do not say how long each section should be because I want you to exercise your own judgment. Try to follow the motto: "Get swiftly to the point, but also revel in triumphs and lessons learned."

Sections of the Report

Executive Summary

- Characteristics of the Market
- Business Concept
- Product Concept
- Financial summary and investment needs
- Recommendation---should the company start, or not?

Market analysis

- The overall market you plan to enter
- Where the market is going
- Specific market segment you are entering
- Customer characteristics
- Customer needs
- Customer buying decisions

Competitive analysis (Benchmarking)

- Primary competitors
- Competitive products/services

Products

- Description of the refined product you envision and its designed function (including pictures, diagrams, etc.)
- Evaluation of your product's performance
 - How well does the product (or final prototype) actually work?
 - What changes do you need to make to the final prototype to turn it into the final refined product you envision.
 - Show mapping of Customer Needs to Quantitative Engineering Traits and describe how the refined product satisfies these traits.
 - How competitive is it vis-à-vis alternative products?
- Describe any future products or services you plan to offer, if any

Manufacturing Plan

- Step-by-step manufacturing process flow
 - Draw and describe proposed process from raw material to finished product
 - Estimate process rates, e.g., time and number of parts processed in each step
- Capital Equipment needed for manufacture plan
- Major maintenance/replacement needs
- Facilities needed for manufacturing (amount of space, required utilities, etc.)
- Waste produced and method for dealing with it
- Plan for operating and supervisory labor

Marketing and sales

- Marketing strategy
- Sales tactics /Advertising

Financial Plan

Cash flow projections (follow the scheme introduced in Chem E 485, though you can add clarifying tables and text)

Analysis

- What are the underlying assumptions and how were they determined?
- Do you make sufficient money to provide 20 dcroroi to investors over the 7 year horizon? If not, what are the major expenses and how could they be reduced?

Recommendations

What are the major remaining technical risks/uncertainties?

What are the major financial risks/uncertainties?

Should the company be started?

Appendix A – Alternative Design Concepts

Alternative design concepts considered at an early stage

Identify design concept chosen and describe how it best addressed Engineering Traits described in “Product” section.

Appendix B – Design Evolution: Modeling/Simulation/Theory

Describe and document (showing results, etc.) the role that chemical engineering modeling/simulation/theory played in the evolution of the design from the initial concept to the final design. Try to convey how this activity provided a deeper understanding or quantitative evaluation of the product that was not readily learned from the experiments available.

Appendix C – Design Evolution: Device Prototyping

Describe and document (showing results, etc.) the role that device prototyping played in the evolution of the design from the initial concept to the final design. Important things to include are initial design faults that were discovered once you prototyped, and improvements made in each subsequent prototype.

Appendix D – Annotated Financial Spread Sheets