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TOP CONSULTING INTERVIEW PREP

Massachusetts Institute of Technology



Management Consulting Casebook

by
The Consulting Club at MIT

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Table of Contents

Contributions

1. How to Develop a Tailored Case Structure?

2. High Level Case structures

- 2.1 Proposition for a “one-size-fits-all”
- 2.2 The Profit framework
- 2.3 Operations
- 2.4 Growth
- 2.5 Pricing
- 2.6 Mergers & Acquisition
- 2.7 New venture & Start-ups

3. Practice Cases

- | | | | |
|------|-----------------------|----------------|-----------|
| 3.1 | Lymphoma | Pharmaceutical | Difficult |
| 3.2 | Coolarpass | Operations | Difficult |
| 3.3 | Travel Logistics | Cost Reduction | Difficult |
| 3.4 | Pharma+ | Pharmaceutical | Medium |
| 3.5 | Video Interpreter | Strategy | Medium |
| 3.6 | Acquisition Railways | Private Equity | Medium |
| 3.7 | Chemicals | New Product | Medium |
| 3.8 | A Classic brainteaser | Brainteaser | Easy |
| 3.9 | Foodland Turnaround | Profit | Easy |
| 3.10 | Coffee Shop | New Market | Easy |

Contributions

This casebook and its 10 original cases were conceived and executed through the volunteer effort of a dedicated project team at CCM in Spring 2014. The generous fellows are listed below –JC

- Jingnan Lu 2 cases
- Benjamin Lai 1 case
- Ayla Ergun 1 case
- Ani Rajashekar 1 case
- Hasan Celiker 1 case
- Bangqi Yin 1 case
- Patricia Egger 1 case
- Jeremy Curuksu 2 cases + introduction (§1/§2)

1. How to Develop a Tailored Case Structure?

The dilemma

A classic dilemma for consulting practitioners is how much to rely on pre-defined frameworks. When does a structure stop qualifying for “one size fits all” and start “reinventing the wheel”? How to strike a right balance?

Developing a tailored case structure is a frequent source of failure from candidates at case interviews because there is no clear consensus on what represents a good MECE (mutually exclusive, collectively exhaustive) framework. Some consultants (hence interviewers) openly recommend *never* using preexisting frameworks, yet developing multi-prong, structured approaches. This was explicitly advised at a McKinsey social gathering (yours truly!). Other professionals consider reference structures and experience to be invaluable building blocks when developing a tailored case structure.

Who is to say who is right? Well in this casebook we will assume that reference frameworks such as the ones presented in section 2 *should be* leveraged when developing a tailored case structure. This is because we believe that the other type of discourse suffer from inconsistencies and learning issues: it is easy to recommend following your gut and being creative when you have worked in the industry for a few years, but for a beginner to adopt best practices, we recommend to leverage the widely popular frameworks.

The current section provides recommendations for tailoring, and section 2 provides a set of tools and experiences that have proven successful in the past, indeed.

Tailoring

The concept of inductive reasoning is key to develop a tailored case structure. A tailored structure represents an issue tree which can be constructed by following 5 steps:

Step 1: Define one key focal issue

This initial issue should be carefully designed with the client (*a.k.a.* the interviewer).

Step 2: Brainstorm key sub-issues

The second step is where *tailoring* already starts. A classic mistake is to skip steps 2-4 and directly use a popular framework in the lines of those suggested in section 2. Indeed, all sub-issues should relate to the key focal issue in a way that the consultant (*a.k.a.* the interviewee) can easily articulate. But again, one needs to strike the right balance: to efficiently brainstorm and navigate through relevant ideas, the popular frameworks and your personal experiences will both be of assistance.

Step 3: Build an issue tree by clustering sub-issues into MECE categories

Step 3 consists in cleaning the set of issues gathered in step 2. Goal is to avoid redundancies and clarify meanings. Step 2 and 3 are recursive since step 3 might help detect missing issues and send back to step 2.

Step 4: Prioritize issues and sub-issues

Step 4 consists in re-arranging the set of issues selected in step 3. Goal is to prioritize the most important issues for which data can be gathered and analyzed within a reasonable time frame.

Step 5: Ask questions to validate / invalidate hypotheses and gather facts / figures

Step 5 is where the research and analysis part of the assignment really starts. In an real-life client assignment, the structure provides pointers to delegate tasks in the team and to assess progress in the project.

Hypothesis generation

The key focal issue as well as the sub-issues are often called hypotheses, which is a more direct form of inductive reasoning whereby the researcher starts with an intuitive answer based on its experience or expertise, and gather facts to (in-) validate the hypothesis. Hypothesis-generation is often used because it leads to more focused and thus potentially more efficient data gathering.

Client bias

When developing a structure, it is also important to resist the temptation of following too closely the client's suggestions. A key feature explaining why management consulting met so much success in the past is that diagnosing a problem and identifying root causes both require unbiased and analytical inquiries. Even if business experience and acumen can help prioritize some lines of inquiries, a consulting diagnostic and prescription ultimately must rely on facts and figures.

2. High Level Case Structures

2.1 Proposition for a “one-size-fits-all”

Business Case		
Industry	Competition	Client
Growth Customers Segments Characteristics Needs Profitability Trends Barriers to Entry Risks	Shares Competition basis Prices Competitive Response New Entrants Trends	Capabilities Finances Product Segments Differentiation Profitability Trends P&L / Best Practice Value Chain

1- Industry

How is the industry doing? Is the client growing compared to industry average?
 Define customer segments. What are their characteristics? (demographics, psychographics, needs)
 Are we meeting the needs of the customers?
 Which segments are most profitable?
 How did it evolve recently?
 What are the key barriers to entry? (capital requirement, regulations, access to distribution, IP)

2- Competition

What are the market shares? How did they evolve recently?
 On what competition is mainly based?
 Are our prices in line with competitors?
 What will be the competitive response?
 Have there been new entrants lately?
 Have some competitors change recently? (prices, products, marketing, strategy)

3- Client

What is our client capabilities / core competencies?
 How is our client doing financially? Are there cash reserves?
 What are the different products? How do the products work?
 How does our product differentiate from competition?
 Which products are most profitable?
 How did the different business units evolve recently? Which products have most potential?
 What are costs and revenues? How did they evolve compared to competitors?
 How does the value chain work? Are there been issues with operation, supply, distribution?

2.2 The profit framework

Profit Issue			
Scope	Revenues	Costs	Custom Tree
Industry Why Goals What, How Products Business model	Revenue Streams Price per unit Sales volume Percentages Trends Balance	Cost Breakdown Fixed costs Cost per unit Production volume Trends Balance	Growth Organization Due Diligence Any Issue Tree

1- Scope

How is the industry going? Is the client growing compared to industry average?
 What are the market shares? How did they evolve recently?
 What are the objectives? What are the products?
 How does our business model work and differentiate in the market place?

2- Revenues

What are the revenue streams?
 Define segments (by product line, customer type, distribution channel type, geography)
 For each segment: what are the price per unit and sales volume?
 What percentage of total revenue does each stream represent? (look for high revenue products)
 How revenue streams and percentages have changed lately? And why?
 Does anything seem unusual?

3- Costs

How are the costs distributed?
 What are fixed costs and investments?
 What are the variable cost per unit and production volumes?
 How costs have changed lately? And why?
 Does anything seem unusual?

4- Custom Tree

The above P&L delivers a quantitative explanation for the client's profit problem, and spells out potential root causes. Based on this diagnostic, the assignment can then advance to a more qualitative stage of inquiry, into the internal or external circumstances responsible for the observed symptoms, and in the pursuit of tailored solutions

2.3 Operations

Operational Issue			
Business Model	Value Chain	Benchmarks	Action Plan
<p>Industry Value network Regulations Trends</p> <p>Portfolio / SBUs</p> <p>Differentiation in Marketplace</p>	<p>Procurement Suppliers Transportation Storage/handling</p> <p>Processing Procedure Technology Maintenance</p> <p>Delivery (e.g. Packaging)</p> <p>Marketing Promotions Sales Channels Customer Support</p>	<p>Competition Costs per unit Volumes Cost effectiveness Trends</p> <p>Innovations Technologies Product features Business Models</p>	<p>Milestones: Control systems Reengineering Innovation M&A Budgeting Cost reduction Downsizing</p>

1- Business Model

What customer needs do our products address? What problems are they trying to solve?
 Are there important regulations in this industry?
 How is the industry doing overall? How is the client doing compared to the industry?
 What are the market shares? How did they evolve recently?
 Overview strategic business units and product portfolio.
 How does the client compete in the market place? (differentiation, cost leadership)

2- Value Chain

How do procurement, processing, delivery, and marketing work?
 What are the costs per unit for each activity of the value chain?
 How cost-effective are current promotional tools and sales channels?

3- Benchmarks

How does each activity of the value chain compare with competitors? (costs, effectiveness)
 Can we find innovative ideas in-/out-side the organization that have potential for its business?

4- Action Plan

The above analysis delivers a set of opportunities for improving operations. Based on these insights, the assignment can then advance to a more action-oriented stage of inquiry, into the innovations that have potential to maximize value and minimize cost for each operational activity.

2.4 Growth

Growth Strategy			
Market Opportunities	Client Capabilities	Menu of Strategies	Action Plan
<p>Landscape Trends Success factors Regulations</p> <p>Competition Shares Competition basis Prices</p> <p>Consumption Segments Potentials Market sizing</p>	<p>Differentiation in Marketplace</p> <p>Portfolio / SBUs</p> <p>Operations</p> <p>Innovations</p> <p>Finances</p>	<p>Options In-/De-crease prices Price dynamically Change product line Change packaging Change serving sizes Change distribution Increase services Increase marketing Innovate product Innovate model Reengineer model Create alliances Acquire competitors Diversify</p>	<p>Management Spinoff Acquisition Alliance</p> <p>Milestones Budget Structure Policies IT system Training system Control system</p> <p>Risk Analysis</p>

1- Market Opportunities

How is the industry doing (growth cycle)? How is the client doing compared to the industry?
 What are the key success factors in this industry?
 Are there important regulations in this industry?
 What are the market shares? How did they evolve recently?
 On what competition is mainly based? Are our prices in line with competitors?
 Define customer segments (demo-/psycho-graphics, needs); Which segments are most profitable?
 What do customers look-for in each segment, what problems are they trying to solve?
 Are there potential non-consumption or currently over-served consumption opportunities?
 Can we find innovative ideas in-/out-side the organization that have potential for the business?
 What is the total market size?

2- Client Capabilities

What are the client's core competencies and competitive edges? What is the pricing strategy?
 What is the client's current product portfolio? Which products have most potential?
 How does the client operate its value chain? (procurement, processing, delivery, marketing)
 How advanced is the client's innovation culture? (teams, structures, systems)
 How is the client doing financially? Are there cash reserves?

3- Menu of Strategies

What strategic direction(s) best fit the situation? (follow the Ansoff matrix in Fig. x: market penetration, market development, product development, or diversification)
 What are the options for the client to execute that strategy?

4- Action Plan

The above analysis delivers a set of opportunities for growth and innovation. Based on these insights, the assignment can then advance to a more action-oriented stage of inquiry: determine what division or organization should execute the strategy, develop mechanisms to manage the interface with the organization, and analyze risks based on alternative scenarios such as new technology, regulation, market trends, competitive response.

(Exhibit-- Ansoff Matrix)

2.5 Pricing

Pricing Strategy			
Scope	Costs Analysis	Competitive Analysis	Economic Analysis
Objective Short-term Long-term Level of Control Internal strategy Reaction to: - suppliers - market - competitors	Variable costs Fixed costs Breakeven Analysis	Differentiation Prices Costs Strategies Response of Competitors	Need Addressed by Product Willingness of Market to Pay Market Sizing

1- Scope

Is the client motivated by short-term return (increasing profit ASAP) or long-term return (e.g. increasing market shares)?

Does the case arise from an internal growth strategy or is the client reacting to recent external events?

2- Cost Analysis

What are the variable costs, fixed costs, and investments?

How costs have changed lately? And why?

What is the breakeven volume for different price points?

3- Competitive Analysis

How does the product compare with competitive offerings and substitutes?

What are the prices of competitive offerings and substitutes?

Do we have information on their costs? On their pricing strategies?

Think about how competitors will react to our proposed strategy.

4- Economic Analysis

What customer needs does the product address? What problems is it trying to solve?

What customers would be willing to pay for this product?

What is the total market size? Are there potential non-consumption or currently over-served consumption opportunities to factor in? (disruptive innovation, blue ocean strategy)

Which phase of its growth cycle is this industry in?

2.6 Merger & Acquisition

Merger / Acquisition				
Scope	Due Diligence			Outlook
	Client	Target	Together	
Motivations Market share Synergies Diversify Shareholders Taxes Reselling Industry Players Shares Regulations Trends	Products Customers Value Chain Procurement Operations Distribution Marketing Culture Management P & L	Products Customers Value Chain Procurement Operations Distribution Marketing Culture Management P & L	Products Customers Value Chain Procurement Operations Distribution Marketing Culture Management P & L	Risks Legal Regulatory Tech Change Competitive response Milestones Form a special unit Get support/commitment to one single culture
Valuation (P/E ratio or NPV)				

1- Scope

What are the objectives? (market share, synergies, product diversification, competitive response, stock value, tax advantages, break target up and sell off parts)

What customer needs do our products address? What problems are they trying to solve?

Are there important regulations in this industry?

How is the industry doing overall? How is the client doing compared to the industry?

What are the market shares? How did they evolve recently?

2- Due Diligence

Compare the potential of business model between the client and the potential target(s), and estimate the potential of a combined model:

What are the product offers, customer bases and market shares, value chains, and cultures?

Are there synergy opportunities to add value through better management?

Estimate revenues, costs, synergy opportunities, and resulting profits.

Value the target using a quick P/E ratio estimate or a more rational Net Present Value computation that factors in discounted cash flows, discounted synergies, and perpetuities

3- Risks and Implementation

Are there any legal reason, governmental regulation, or technology risks why we should not move forward with integrating the proposed target company?

How competitors will react?

Form a separate unit / team that will oversee the integration, get support and contribution from both partners, develop incentive programs to encourage employees to commit to only one culture

2.7 New ventures & Startups

New Venture			
Business Model	Management	Customers	Action Plan
Landscape Value network Competition Success Factors Barriers to Entry Entry Strategy Operations Pricing	Capabilities Finances Current Portfolio Potentials Differentiation Value chain Fit P&L Forecast	Segments Characteristics Potentials Trends Innovations Technologies Product features Business Models Market Sizing	Refine the Business Model Engage with Customers Milestones Fund gathering Budgeting Partnership Control systems

1- Business Model

What customer needs do our products address? What problems are they trying to solve?
 How will the client compete in the market place? (differentiation, cost leadership)
 What are the key success factors? How did market shares evolve recently?
 What are the key barriers to entry? (capital requirement, regulations, access to distribution, IP)
 What are the advantages / disadvantages of starting from scratch vs. acquisition vs. joint venture?
 How will the client operate its value chain (procurement, processing, delivery, marketing)
 How the client will price the product?

2- Management

What are the accreditations and competencies of the management team?
 How is the client doing financially? Are there cash reserves?
 What capital structure (debt vs. equity) and allocation of funds can be considered?
 What is the client's current product portfolio? Which products have most potential?
 How does our client currently differentiate from competition?
 Will current operational workflow benefit in/from the new business?
 How the new business will fit with the rest of the product portfolio? (synergy, cannibalization)
 Forecast costs, revenues, and ROI with time horizon

3- Customers

Define customer segments (demo-/psycho-graphics, needs); Which will likely be most profitable?
 Can we find innovative ideas in-/out-side the organization that have potential for the business?
 What is the total market size? Are there potential non-consumption or currently over-served consumption opportunities to factor in? (disruptive innovation, blue ocean strategy)

4- Action Plan

The above analysis delivers a better understanding of customers, competitors, innovators, and the overall potential of the client's new venture. Based on these insights, the assignment can then advance to a refinement and implementation stage: integrate new features in the business model, engage with customers through surveys and promotional campaigns (free trial, demonstration), articulate milestones that will bolster the new value chain.

3. Practice Cases

Lymphoma

Consulting Club at MIT
Category: Pharmaceutical
Difficulty: High



Case written by Jingnan Lu, PhD

1) Introduction

A pharmaceutical company is developing a therapy for lymphoma. The CEO came to you for help in designing the clinical trial. How should you proceed?

2) Type of Case and Expectations

Common pharma case to test candidate's understanding of the industry.

3) Suggested Framework

- Lymphoma disease space (types and stages of lymphoma, epidemiology, existing therapy, pros and cons, etc)
- Client's therapy (treatment or management, which indication, safety, etc)
- Indication selection (type and stage)
- Clinical trial location and phases (US or other countries, safety, efficacy, etc)
- End point measurement

4) Recommended Strategy for Interviewee

(Q: Question, M: Math, C: Creativity)

- Q: Are there different types of lymphoma?
- Q: What are the different stages of lymphoma?
- M: What is the patient population and distribution in each type and stage?
- Q: How many new patients per year?
- Q: What is the disease's epidemiology?
- Q: What is/are the existing treatment(s)?
- Q: Is the client's therapy for management or treatment?
- Q: Has it show promising result for both types of lymphoma?
- C: What is the client's funding situation?
- Q: What is the current prognosis of this disease?

5) Data

Lymphoma patient population:

Most common type of cancer in developed country

Total case in US: ~700,000; new case per year: ~10% increase

Types of lymphoma:

75% non-Hodgkin lymphoma, 25% Hodgkin lymphoma

Stages and prognosis of lymphoma:

Table 1 in Exhibit

Current treatment:

No treatment, only management therapies to alleviate symptoms using radiotherapy and chemotherapy. Not specific for lymphoma. Risks and harm outweigh the benefits

Client's therapy:

Non-aggressive management therapy intended for both types of lymphoma

Low risks and safe shown in animal studies

Funding availability:

Client has sufficient funds to run multiple trials

Five-year survival rate:

Percentage of patients that are alive five years after their disease is diagnosed

6) Proposed Conclusion

a) Start the trial in the U.S. and target only patients with non-Hodgkin lymphoma:

- a. U.S. has one of the largest lymphoma patient population and growing number of patients each year.
- b. Clinical trial is costly (~\$2B on development of a drug and mostly spent on clinical trial); start with only one indication at first and once it passes Phase II, can consider launch the other one.

b) Recruit patients from the Distant Stage group and use 5-year survival rate for trial end indication. Most patients were diagnosed as distant and the 5-year survival rate is the lowest among the other stages of lymphoma. It is easier to prove efficacy in the 5-year survival rate of Distant patient population.

c) If asked: Phase I-safety (figure out dosage, frequency, clearance, side effects etc); Phase II-efficacy (5-year survival rate); Phase III-final confirmation on safety and efficacy (large trial, double blind, randomized, placebo-controlled); Phase IV-post marketing surveillance.

7) Exhibits

Table 1:

Stage at diagnosis	5-year survival (%)	Percentage of cases (%)
Localized	82	27
Regional	77	19
Distant	60	45
Unknown	67	9

1) Presentation

Your client is a brewing company located in Maine, Coolarpress. Demand recently propelled up when Jason Segel featured in an episode of 'How I Met Your Mother' drinking a screw cap beer and helping Randy (Will Forte) to start a brewing company named Wharmpess. Beside company name identification, Coolarpress' beers are sealed with screw caps. Coolarpress' CEO wants your help to adapt to the increased demand.

2) Type of Case and Expectations

The goal is voluntarily unclear to prompt the candidate to discuss objectives. Explain that many customer-orders are being delayed, that there is a problem with operations. In addition to quantitative components, this case refers to popular issues typical of operation cases: capacity constraint, bottleneck, scheduling. Solutions can come in many flavors: 8 "buckets" of solution are mentioned here.

3) Suggested Framework

- Supply chain and operations
- Demand versus capacity, analysis of bottlenecks
- Strategies to match supply with demand

4) Recommended Strategy for Interviewee

(Q: Question, M: Math, C: Creativity)

Q: How does the production process work?

Q: Has anything changed in the manufacturing process?

Q: What are the capacity constraints and bottlenecks?

M: Compute queuing deficits

C: List some specifics for standard approaches to solving capacity constraint operation issues: optimizing, expanding, outsourcing, price changes

C: Pro-actively gauge the impact of suggested solutions (pros/cons table)

5) Data

Supply Chain: Brewing, filling, bottling in-house every day non-stop from 8am to 6pm, empty bottles are delivered every morning from manufacturing facility across the street, caps are ordered every month from a supplier located in Florida

Before the episode of How I Met Your Mother aired on TV:

Demand = 2000 bottles / day

After:

Demand = 5000 bottles /day

Capacity: 5000 bottles can be imported per day maximum

Candidate should brainstorm and propose the following hypothesis:

Bottlenecks create inventory build-up and manufacturing short-fall

Sterilizing: 5000 / day

Filling: 4500 / day

Capping (=putting a cap): 4000 / day

Quality control: 95% (consider only quality control of bottling to simplify in the case)

Conclusion: See exhibit

5000 bottles imported per day lead to dramatic queue = deficit of 1000 bottles per day

Here is a menu of solutions ranked by speed of implementation:

(the candidate should suggest at least three options)

1) Add more shifts:

Implement a continuous production process (24/7)

2) Fix/Reduce the bottlenecks:

Analyze production line and see if we can squeeze more bottles out of each shift

3) Raise prices

4) Move Q&A before the bottlenecks:

5% out of 4000 is 200. If quality control is shifted before the bottlenecks, then bottlenecks can operate at 100% (or close to it...). This solves for ~200 bottles per day

5) Look for labor-saving technologies that can boost production

6) Outsource production (or part of it) to manufacturing facility across the street

7) Outsource production (or part of it) to a bottler

8) Build another production line

Additional databanks/questions for good candidates:

What are the factors to consider when choosing the optimal inventory order size (shipment) for screw caps?

- 1) Carrying Costs: costs associated with storage, insurance, and financing the inventory
- 2) Ordering Costs: costs associated with accounting, labor (...) when placing an order

Given an optimal inventory order size for screw caps given by the EOQ formula (Economic Order Quantity), how many screw caps should be shipped per order?

$$EOQ = \sqrt{\frac{2 \times R \times O}{C}}$$

R = Annual Unit Requirement (consider 360 days per year)

O = Cost of placing an order (here O = \$100),

C = Cost of carrying a unit of inventory per period (here C = \$.10)

The candidate might compute R (360×5,000 = 1.8m) and solve for EOQ.

But an astute candidate will see that 5,000 is 10,000/2, which simplifies the numerator.

One gets $EOQ = \sqrt{3.6b} = 60,000$ units per shipment (= 1 shipment every 12 days)

You have presented your recommendations to the CEO. He opts for extra shifts. What are the pros and cons of adding more shifts using current workers?

Pros: Save on hiring and training cost of new employees, and flexibility to get back to former production levels if demand softens

Cons: Possible worker burnout, might lower quality control rate, lower profit per bottle

6) Proposed Conclusion

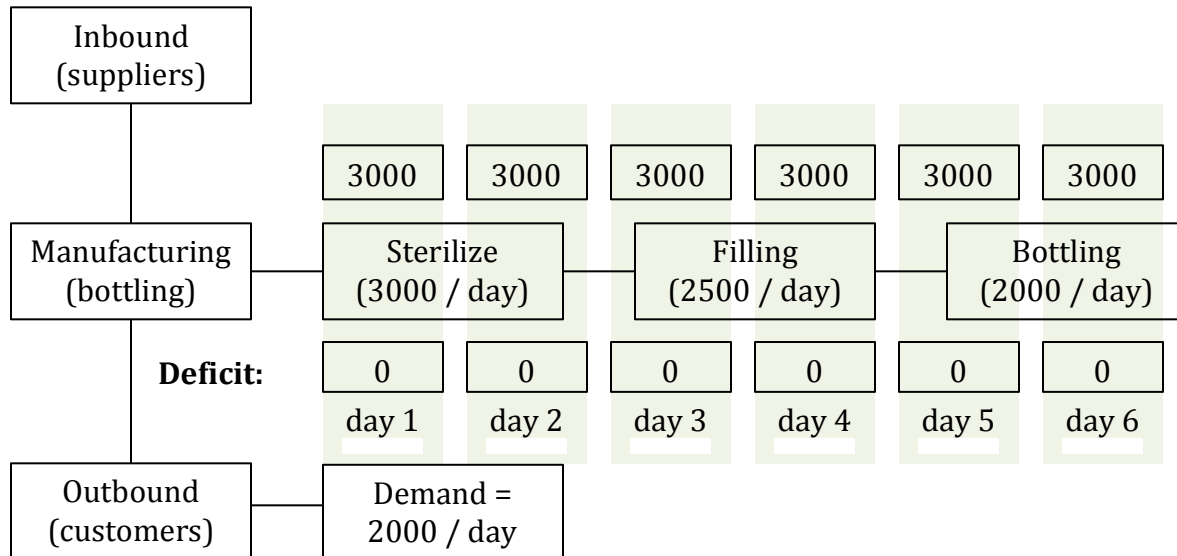
a) We identified the root cause of the problem. As demand exceeds supply due to capacity constraints, bottlenecks create deficit build-up and manufacturing short-fall.

b) We identified short and long term solutions. I recommend adding more shifts, which will notably allow our client to easily get back to prior production levels if needed.

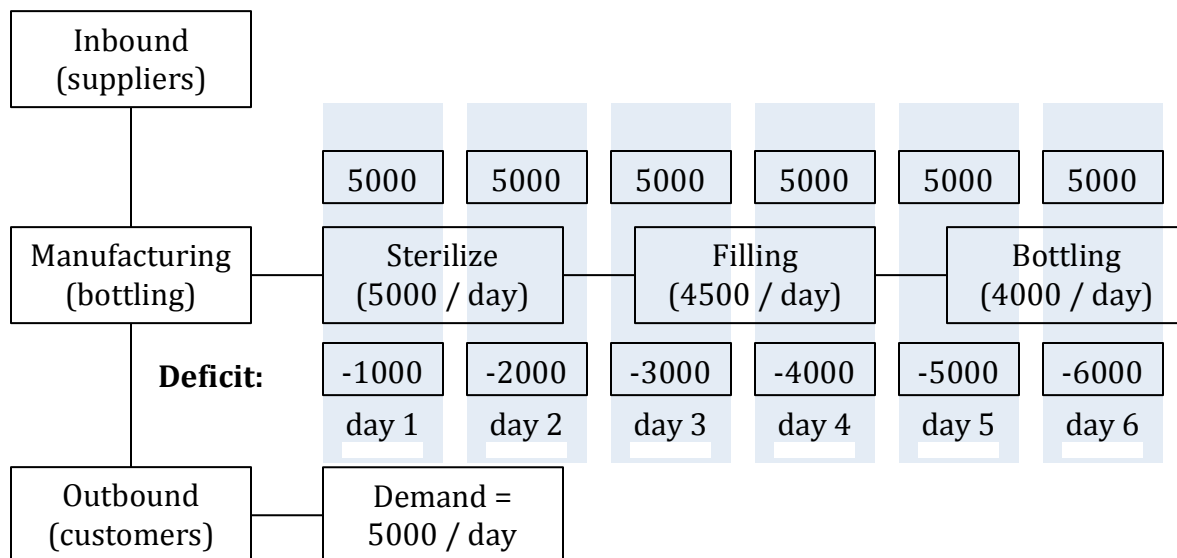
c) Finally I recommend optimizing production by adding a Q&A before the sterilizing phase, and optimizing inventories by ordering 60,000 screw caps every 12 days.

7) Exhibits

Before the episode of How I Met Your Mother aired on TV:



After the episode of How I Met Your Mother aired on TV:





1) Presentation

Our client is a defense technology firm that designs and manufactures classified advanced systems, and is headquartered in Boston, with locations throughout the US. due to economic pressure and competitive threats, profits are declining and the firm is looking for ways to reduce spending. The primary area of interest is evaluating their options for transporting executives from headquarters to their various offices throughout the US. The firm has hired you to outline their business travel options.

2) Type of Case and Expectations

Operations, Profitability, Partnership

3) Suggested Framework

- Utilization: # trips, offices, # passengers, etc.
- Transportation Options: Commercial, partnership, lease, buy
- Cost of Options: Airfare, lease, fuel, maintenance, crew, hangar/garage, insurance
- Other Factors: Productivity, confidentiality, scheduling conflicts

4) Recommended Strategy for Interviewee

(Q: Question, M: Math, C: Creativity)

Q: What do you need to know about the firm's transportation utilization?

Q: What are options for transportation to meetings?

M: Calculate the cost of each option.

Q: Of the leasing options, which size plane would you choose?

C: What other type of costs are associated with the leasing and buying options?

M: What is the new total cost of the leasing and buying options?

Q: What do you recommend: commercial, leasing, or buying?

Q: Given the partnership savings, would you make the same recommendation?

5) Data

Utilization Data

City	Meetings/Week	One-Way Distance (mi)
New York	2	250
Chicago	2	1000
San Francisco	1	2500

Note: Assume 50 weeks/year

Transportation Options and Costs

1. Commercial Airline

Airport	Flights/Year	Passengers/Flight	# Tickets	RT Ticket	Cost
JFK	100	10	1000	\$600	\$600K
ORD	100	12	1200	\$1000	\$1200K
SFO	50	10	500	\$1400	\$700K

Total Cost: \$2500K/year

2. Partnership with Airline

Savings: 20%

Total Cost: $\$2500K \times 0.80 = \$2000K/\text{year}$

3. Lease Private Plane

Plane Size	Range (mi)	Capacity	Speed	Cost/Hour
Small	2000	10	400mi/hr	\$1.0K
Medium	3000	12	500mi/hr	\$2.0K
Large	4000	14	600mi/hr	\$2.4K

Small jet range will not make it to SFO. Small jet capacity is not enough for ORD.

Cost = \$4/mi for both medium and large plane size

Total miles = $100(2 \times 250) + 100(2 \times 1000) + 50(2 \times 2500) = 500K$ miles

Lease Cost = $\$4/\text{mi} \times 500K \text{ mi} = \$2000K$ for both medium and large plane size

Other Costs: Fuel, maintenance, crew

Lease Cost = 80% Total Cost

Total Cost: $\$2000/0.80 = \$2500K/\text{year}$

4. Buy Private Plane

Plane Cost: \$20M for 10 year utilization period

Other Costs: Fuel, maintenance, crew, hangar/garage, insurance

Plane Cost = 66.67% Total Cost

Total Cost: \$3M/year

6) Proposed Conclusion

a) Commercial vs Leasing vs Buying

Buying is 20% more costly than commercial airline or leasing (Risk: Only one plane). Commercial airline and leasing have the same cost of \$2.5M/year, but leasing is better than commercial airline because of:

- Productivity
- Privacy
- Flexibility
- No risk of commercial airline delays

b) Lease Plane Size

Small size plane does not meet range and capacity demands.

Medium size and large size plane have the same cost, but large size plane is better than medium size plane because:

- Faster plane = time savings
- Additional capacity

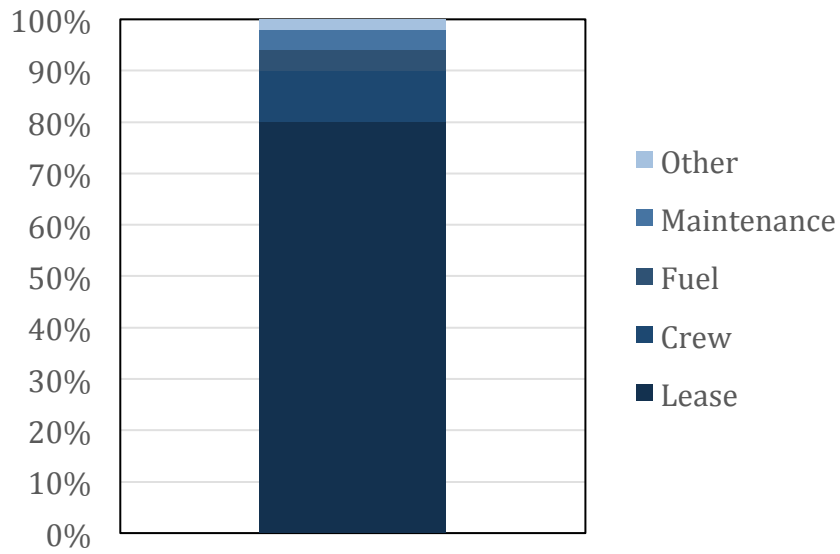
c) Partnership Considerations

Airline partnership is \$2M/year so it is a 20% savings over leasing private plane. However, the same advantages of leasing over commercial in part (a) apply. More research is needed to understand the firm's preferences.

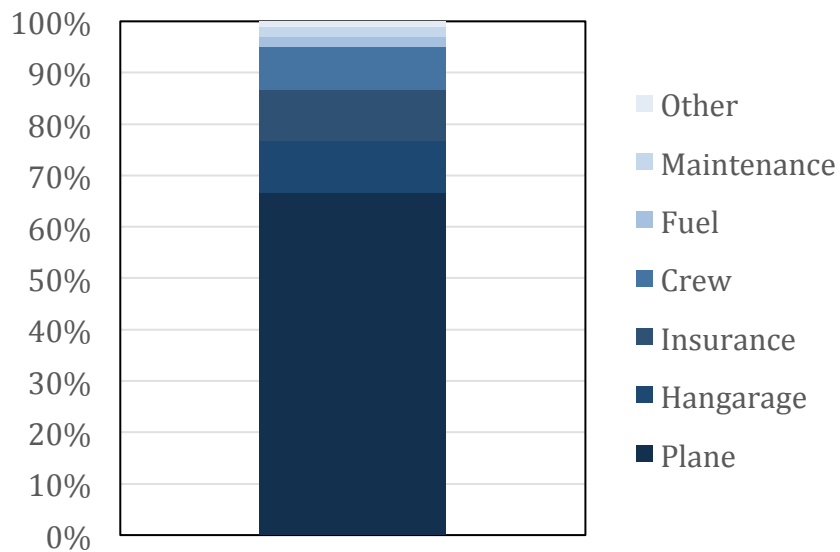
7) Exhibits

Annual costs of leasing and buying jet

Leased Jet Cost Breakdown



Private Plane Cost Breakdown



Pharma+

Consulting Club at MIT
Category: Pharmaceutical
Difficulty: Medium



Case written by Jeremy Curuksu, PhD

1) Presentation

Pharma+ has developed an ultra fast treatment for dyspepsia (heartburns/other mild abdominal pains). Take the pill and symptoms disappear within the hour. Pharma+'s CEO believes the new molecule is revolutionary. He wants your help to fix the price.

2) Type of Case and Expectations

- New product and pricing strategies
- Creative thinking for non industry experts: side effects, coverage by insurance, ...
- Think about who really are the customers: patients, physicians, hospitals, ...
- Creative thinking about value proposition (e.g.: benchmark price of commodities)

3) Suggested Framework

- Product characteristics and target market
- Market sizing
- Competitor benchmarking
- Economic value to the consumer

4) Recommended Strategy for Interviewee

(Q: Question, M: Math, C: Creativity)

Q: Are there side effects, can both male and female use the pill, OTC or prescription?

M: Define and size the market (adult males and females)

Q: How much more efficient is it compared to similar products?

Q: Disadvantages compared to other products? Spectrum of substitutions.

C: Based on all costs including R&D/manufacturing/marketing, propose a price for a significant markup, targeting the high end of competitors' price range.

C: Extend beyond the standard model, draw a price line, consider what the market is willing to pay for similar value propositions (e.g. wellness, healthy diets)

5) Data

Product characteristics

- Clinical trials showed side effects limited to frequent migraine (i.e. not to be advised for children), with similar results for males and females
- During clinical trials 75% of patients stopped reporting symptoms using 2 pills/day
- Can be sold OTC => patient is the real customer

Competition

- Treatments (antacids, prokinetics, H2-RA and PPI agents) are all popular for their frustratingly low efficacy: in >50% of patients, herbal products such as ginger or peppermint generally have as much anti-dyspeptic effect as best-in-class medications
- Prices range from \$15 to \$50 for a month supply with posology from 2 to 3 pills/day

Market Sizing

Age	#	Affected	#	Treated	#	Total ~40m
0-20	0	-	-	-	0	
20-40	80m	40%	32m	50%	16m	
40-60	80m	20%	16m	50%	8m	
60-80	80m	20%	16m	100%	16m	

- US population ~320m, consider only 20-80 year-olds
- Assume biases, for instance an higher prevalence in young professionals (stress-induced) and an higher willingness in elderlies (who generally take pills every day)

Costs

- R&D = \$10m
- Manufacturing (marginal cost) = \$.50
- Marketing and sales (effective cost per pill) = \$.50

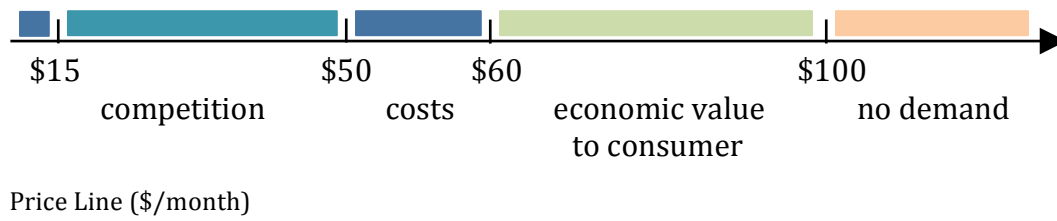
6) Proposed Conclusion

a) I recommend advertising lab results & targeting the high end of competitive prices.

b) 1-month supply of competitors' pill amounts to \$50 and since in the US people tend to spend a few extra bucks every day for a healthy diet, I believe that we can target up to \$100 for 1-month supply. This means \$2/pill, 100% markup.

c) With this \$1-profit margin, breakeven is 10m pills or 20000 customers per year. This represents less than 0.1% share. If we tap 1% of the US market we're looking at 200 millions earning per year. Our CEO was right! --this is a billion dollar molecule.

7) Exhibits



Video Interpreter

Consulting Club at MIT

Category: Technology, Strategy

Difficulty: Medium



Business Cases

Case written by Jingnan Lu, PhD

1) Introduction

Your client provides an on-demand video communication service that uses devices such as web cams or videophones to provide sign language or foreign language interpreting services. For the past decade, the client has had great success in the airline industry. Your client wants to grow his business even further and wants your advice on how.

2) Type of Case and Expectations

Market evaluation (realize that the client already dominated the airline industry and the industry is not growing)
New market entry (creatively come up with other uses of this technology in other industries, such as in healthcare)
New product marketing and evaluate pricing strategy

3) Suggested Framework

- Current industry analysis (growth, market share, competitive landscape etc)
- Entering a new market (competition, barrier to entry, comparative services etc)
- New service evaluation (pros and cons, replacing existing service etc)
- Marketing and pricing strategy (value-added service, competitive pricing etc)

4) Recommended Strategy for Interviewee

(Q: Question, M: Math, C: Creativity)

- Q: Is there a growing need for interpreters in the airline industry?
Q: What is the client's current market share in this industry?
C: Can the client's technology be modified and applied to other industries?
Q: What is(are) the existing interpreter service(s) in the healthcare industry?

Q: How is the client's service compare to these existing services?
M: How much does(do) these existing service(s) charge?
Q: Will insurance company cover these services?

5) Data

Interpreter needs in the airline industry:

No growth in the past 5 years

Market share:

Remote video interpreter service dominates the market at 80%. The client has 60% market share in the remote video interpreter business and the rest of the market is very fragmented.

New industries brainstorm:

Retail

Hospitality and travel

Government

Healthcare (*client chooses to focus on the healthcare industry*)

Legal

Insurance

Utilities

Banking and finance

Real estate

Healthcare market:

Demand: 1 in 7 patient needs an interpreter

Existing service: in-person interpreter

Price: \$30/hr + \$50 travel cost

Average time needed: 2 hrs

of patients per year in the US: 35M

of hospitals in the US: 5,000

$35M / 5,000 = 7M$; $7M / 7 = 1M$ (in need of interpreter services)

$1M * \$110 = \$110 M$ (total cost)

Client's video interpreter service:

Entry: no R&D needed, existing technology can be directly used in the healthcare industry

Comparative services: in-person interpreter

Competition: no video interpreter service

Who still requires an in-person interpreter: patients with severe or terminal illness, dementia, or suffering from emotional disorder (10% patient population)

Current \$/yr in each airport: \$0.2M training and service charge + \$0.02 per-minute fee

$\$1M + \$0.02 * 120 * 0.9M = \$3.16 M$ (video interpreter service cost)

$7M * 10\% = 0.7M$; $0.7M / 7 = 0.1 M$ (need in-person interpreter services)

$0.1M * (\$30*2+\$50) = \$11 M$ (cost for in-person required patients)

$\$3.16 + \$11M = \$14.16M$ (cost to provide interpreter service to all patients)

6) Proposed Conclusion

a) The client should expand its video interpreter service in another industry, since there is no growth potential in the airline industry.

b) The healthcare industry is very promising, because it is very costly and time-consuming for hospitals to provide in-person interpreter services.

c) If the client uses the same pricing point from the airline industry, it is able to save each hospital more than 85% each year.

d) Client's selling point: competitive price, value-added service, on-site service 24/7 etc. Barriers to entry/risks: new technology implementation etc

Railways Electric

Consulting Club at MIT
Category: PE, Acquisition
Difficulty: Medium



Case written by Anirudh Rajashekar, MS

1) Presentation

A large private equity company, Venture Southeast Asia (VSA), is looking to acquire a small company that offers unique track electrification technology, R3R, in order to expand its rail infrastructure portfolio. R3R is a small company based in Thailand but has clients around southeast Asia, south Asia and the middle east (5 countries in total). The CEO of VSA is interested in knowing whether R3R is a good company to purchase and approximately how much they should pay for the acquisition.

2) Type of Case and Expectations

- Due diligence, projected growth/ performance
- Valuation where company culture, management and organizational design might be more important in determining future profitability than market size and growth

3) Suggested Framework

- Current and projected P&L
- Market size and growth
- Discounted Cash Flow + asset valuation
- Organizational structure and negative aspects of company
- Risks to consider

4) Recommended Strategy for Interviewee

(Q: Question, M: Math, C: Creativity)

- Q: Understanding the target company's product and profit per unit
- M: Number of units required per railway line and number of lines in operation in each country (on average)
- Q: Current and projected market share
- Q: Market growth in each country and future expansion

Q: Threats to the target company from competition, substitutes, and new entrants
C: Current issues the company faces such as internal culture, capacity of employees and entrepreneur
Q, M, C: Appropriate discount rate and estimated discounted cash flow
Q, C: What are alternate investments the PE firm could invest in?
M: Candidate should look to quantitatively determine current and future profits
C: Make valuation of the company based on both pieces of information. Bonus points for expressing the information in terms of IRR
C: Look at the role of leadership and organizational management in determining the success and future growth prospects of the company

5) Data

Profit per electrification Unit:

USD 5,000

Number of electrification Units per track:

~ 2 per km

Average amount of track in each operating country:

3000 km

Expected growth in rail market over 10 years:

10% per year

Current Market Share:

80%; decrease by 10% annually

Other competitors:

Company 1: currently 5% of market but growing at 2% annually

Company 2: currently 15% of market but growing at 8% annually

Appropriate Discount rate (to adjust for risk):

30-60%

Average holding time:

5 years

Suggested Calculations:

Estimate Market

3000*2 = 6000 units per country
6000*5 = 30,000 units total
30,000*5,000 = 150,000,000 million current market
R3R current profits: 0.8*150,000,00 = 120,000,000

Growth in market over 5 years:

165,000,000
182,000,000
200,000,000
220,000,000
240,000,000

R3R profits over 5 years:

115,500,000
110,000,000
100,000,000
88,000,000
72,000,000

$$= 120000000 + \frac{115,500,000}{(1.5)} + \frac{110,000,000}{1.5^2} + \frac{100,000,000}{1.5^3} + \frac{88,000,000}{1.5^4}$$

$$= 120,000,000 + 77,000,000 + 49,000,000 + 30,000,000 + 18,000,000$$

~ \$294,000,000 + physical assets

6) Proposed Conclusion

- a)** Given that R3R is projected to have declining profitability over the next 5 years, despite growth in the overall market for rail electrification, I recommend that Venture Southeast Asia **does not** purchase the company.
- b)** The reasons for the decline in profitability ought to be explored, although my conjecture is that the company is being managed like a startup, and does not have the management capacity to capitalize on the growing demand for rail electrification.
- c)** I recommend looking at Company 1 & 2. These might allow VSA to increase their rail portfolio without investing in a company that has negative future prospects.
- d)** Alternatively the client ought to explore another aspect of rail technology and outline potentially better investments.

Ripening Chemical

Consulting Club at MIT

Category: Chemicals, New Product

Difficulty: Medium



Business Cases

Case written by Hasan Celiker, PhD

1) Presentation

A Korean company has acquired a Boston biotech company, which has developed a chemical that helps control ripening of perishables. Testing confirmed that this chemical works best with apples, and enables earlier harvest and improves quality. CEO of the Korean company asked us if they should go about commercializing this product. How would you think about this problem?

2) Type of Case and Expectations

New product and market entry

3) Suggested Framework

- Market opportunity (Size, growth, competition, ROI)
- Pricing
- Risks (Regulation, patent issues, FDA, poisoning, crop cross effects)
- Opportunity cost

4) Recommended Strategy for Interviewee

(Q: Question, M: Math, C: Creativity)

C: Approach the problem by considering a pilot test (redirect toward Maine!)

Q: What is the size of the initial pilot (Maine) market?

Q: How does the harvesting business work? How is it growing?

M: Compute ROI

Q: What might be the benefit to the farmers?

Q: What are the incremental revenues from yield increase?

Q: What are cost savings due to earlier harvest?

C: Price product based on exceptional economic value to farmers.

5) Data

No competition

Maine local test market:

200 orchards

Average revenue: \$30K/acre

On average 100 acres per orchard

1 apple harvest per year

Assume GDP growth

Revenue breakdown for farmers

25% from apples

75% from apple juice

Benefit to the farmers

10% yield increase in apples

5% yield increase in apple juice

10 day earlier harvest

Cost of product

\$100K for 200 acre farm

Cost to keep the farm running

1.5K/night/orchard

Solutions:

Maine market size: \$600M per annum

Incremental revenue for farmers: \$2K/acre

Cost savings for farmers: $\$1.5K/100\text{acre} \times 10\text{days} = \$150/\text{acre}$

Price range: Between $(\$2K + \$150)$ and \$500 (product cost per acre)

6) Proposed Conclusion

a) Enter market given its size and ROI potential

b) Can price the product with a significant margin based on huge benefit to farmers

c) But there are risks associated with commercialization: USDA/FDA regulation, IP protection, test market not representative of overall US market, chemical might be harmful to other crops.

Foodland Turnaround

Consulting Club at MIT
Category: Retail, Profitability
Difficulty: Easy



Business Cases

Case written by Ayla Ergun, PhD

1) Presentation

FoodLand is a major Canadian supermarket that has been the industry leader for 20 years and currently has 25% market share. 5 years ago they experienced growth stall, followed by revenue and profit decline in the last 2 years. Drop in profitability percentage has been higher than the drop in revenue. What is happening and how can they turn around the situation?

2) Type of Case and Expectations

- Industry Analysis,
- Profitability Analysis
- Turnaround Strategy

3) Suggested Framework

- Industry Trends
- Customer Segmentation/Needs
- Competition

4) Recommended Strategy for Interviewee

(Q: Question, M: Math, C: Creativity)

Q: Has the overall industry been declining, are other competitors facing similar problems?

Q: What is the competitive landscape? Have there been new entrants into the market that could explain the reduction in revenue?

Q: Who are our client's customers? Are they price-sensitive?

C: Ways to cut down costs (Hint: Main competitors have been taking advantage of Internet as a new high margin distribution channel while our client hasn't been doing that. Internet delivery will cut down on the labor/rent/ maintenance costs).

5) Data

Industry Landscape: New Competitors offering cheaper products

- The overall supermarket industry is growing steadily. Other competitors are not experiencing similar problems.
- There are a few new players who offer unbeatable low-end offers that have been gaining market share. Second player has 23% MS.

Customers:

- Client's customers are mid-to-upper middle income market.
- Some of the customers might be price sensitive and hence prefer the cheaper products and switch to the cheaper competition.

Price:

Our client sells better products and could keep doing so to retain and sharpen the focus on upper-middle class customers.

- Suppose they increase the average product price from 10\$ to 11\$. As a consequence the purchasing costs increase by 5%.
- Price elasticity = -0.5 (for 10% increase in price demand of product units decreases by 5%).

Is the client going to be profitable with this change in product strategy?

Last year revenues were 110\$ per customer per week. The client had 1M customers last year. The number of clients has remained constant but the average spent has declined.

Last year:

- Revenue= $110\$/\text{week} \times 52\text{weeks} = 5720\$/\text{year} \times 1\text{M} = \$5.720\text{B}/\text{year}$
- Cost= 6B/year (purchasing costs=60%=3.6B)
- Profitability=5.72-6=-0.28B

Estimates:

- Revenue: Average price of 10\$ and weekly expenditure of 110\$/week implies customers bought 11 units per week. After price increase, customers will buy 10.45 units leading to 114.95\$ ~ 115\$.
- $115\$/\text{week} \times 52\text{weeks} = 5980\$/\text{year} \times 1\text{M} = \$5.980\text{B}/\text{year}$
- Costs: Purchasing costs will increase 5% (3.78B), total costs=3.78+2.4=6.18B
- Profitability:5.98-6.1=-0.2B

So overall the profitability would still be negative --but the loss would be less!

6) Proposed Conclusion

The client company has not adapted to two industry trends: (1) Hard-discounters entering the market, and (2) Internet delivery as a distribution channel.

- a)** I recommend restructuring our offerings by going toward high-end products that have higher margins and match better the target market.
- b)** We should consider eliminating low-margin products.
- c)** We should start an internet delivery channel ASAP.

Sandy Coffee Shop

Consulting Club at MIT

Category: Retail, Diversification

Difficulty: Easy



Business Cases

Case written by Bangqi Yin, MS, MBA

1) Presentation

Our client “Sandy” owns a coffee shop located in a small town named White Plain. It is currently considering diversifying its business by selling bagels. What kind of advice you would give to her?

2) Type of Case and Expectations

- Market entry question
- Understand the market and competitive landscape
- P&L analysis
- Identify potential risks

3) Suggested Framework

- Market size
- Economics
- Barriers to entry
- Potential risks
- Entry strategies

4) Recommended Strategy for Interviewee

(Q: Question, M: Math, C: Creativity)

M: Estimate the market size by making reasonable hypothesis?

Q: How is the competition landscape, how much market can client expect to acquire?

M: Analyze profitability by segmenting and calculating the cost (P&L).

C: Brainstorm list of risks

5) Data

Competition = low (expect to acquire market share of 10%)

Market Sizing:

Data:

- Year-round population in White Plan is 10,000
- Tourist population amounting to an additional 30,000 people for 6 months of the year
- 25% of the year-round population are bagel buyers; they buy 4 bagels per week
- 50% of the tourist population are bagel buyers; they buy 2 bagels per week

Solution:

1. *Annual consumption of year-round population:*
 - 25% of year-round population: $10,000 * 0.25 = 2,500$ year-round bagel buyers
 - 2,500 year-round bagel buyers * 4 bagels per week = 10,000 bagels bought weekly
 - $10,000 * 50 = 500,000$ bagels per year
2. *Annual consumption of tourist population:*
 - 50% of tourist population: $30,000 * 0.5 = 15,000$ bagel buyers
 - 15,000 tourist bagel buyers * 2 bagels per week = 30,000 bagels bought weekly
 - $30,000 * 25$ (approximately 6 months) = 750,000 bagels per year
3. *Total bagel market*
 $500,000 + 750,000 = 1.25\text{M}$ bagels/year

Profitability Analysis:

Data:

2 Manufacturing Models:

1. In house built Model
 - 1) Monthly equipment cost of \$1,000
 - 2) All other cost amounts to \$0.5/bagel
2. Outsource Model
Cost of one bagel: \$0.7
 - Price to sell: \$1.25/bagel

Solution:

1. *In house model cost:*
 $1.25x - (1,000 + 0.5x)$, to be profitable, x must > 1334
2. *Outsource cost:*
 $1.25x - 0.75x$, always be profitable

When the two costs equals to each other, $x = 4,000$ bagels/month, 48,000 bagels/year
Since expected sales is 125,000 bagels/year, client should select the first model.

6) Proposed Conclusion

I recommend our client to enter this bagel market by developing in house manufacturing capability. Because:

- a) The market is attractive
- b) The competition is not intensive
- c) The business is more profitable by having in house manufacturing capability

As they continue to pursue this diversification, some potential risks are the potential drawbacks brought by different product mix (cannibalization effect), by using different marketing channels, etc.



1) Presentation

A rope is tied around the equator of the Moon drawing a circle centered at the center of the Moon. If you add 200 meters to the length of the rope, you get another circle, still centered at the center of the Moon but with an expanded radius. How high above the ground would the new rope sit?

2) Type of Case and Expectations

- Logic problem, often used as ice breaker on the moon or on the earth...
- Find a relevant starting point (here the formula for the perimeter of a circle), and make simplifying assumptions ($\pi = 3$, moon is spherical, etc)

3) Suggested Framework

- Assume the moon is perfectly spherical
- Circumference = $2\pi r$

4) Recommended Strategy for Interviewee

(Q: Question, M: Math, C: Creativity)

M: Length of the equator = circumference = $2\pi r$, r = radius of the moon

C: Approximate π to be equal to 3

M: If we increase the length by 200 meters, the new length will be $C=2\pi r+200$

M: $C = 2\pi R$, R is the new radius, $R-r$ is the height above the ground where the rope sits

M: Solve $2\pi R = 2\pi r+200$ for $R \Rightarrow R = r+200/(2\pi)$

M: $R-r$ is what we are looking for $\Rightarrow R-r = 200/(2\pi)=100/\pi$

5) Data

Perimeter of a circle (to give only if interviewee is lost):

$2 \cdot \pi \cdot r$ with r the radius of the circle

Reasoning:

Start with a circle of radius r . By adding 200 meters to the length of the rope, we get a new circle (with the same center) but with a new radius R . The difference $R-r$ gives the height above the equator where the extended rope will sit.

6) Proposed Conclusion

It is not necessary to know the initial radius of the moon to solve this problem.

By using the formula for the radius of a circle and the amount of rope added to what we had initially, we are able to compute $R-r$, i.e. the height above the ground where the extended rope sits.

The height above the ground is $R-r = 100/\pi \sim 100/3 \sim 35$ meters.



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