

Notre Dame Case Book



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Notre Dame Consulting Consortium

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* Written by a Notre Dame student

Introduction

Welcome to the Notre Dame Consulting Case Book! This first page is designed to walk you through the process of running a case. What follows is a mix of compiled cases from other sources and original content from Notre Dame students. We hope this Case Book is helpful to your preparation for case interviews in the consulting and private equity industries.

The best way to improve at cases is through **effective practice**. Effective practice happens best in a 1-on-1 environment, and means receiving and responding to feedback.

We hope you enjoy watching yourself improve at cases. Shredding apart a problem is a valuable life skill, even if you choose not to pursue consulting. Practicing cases is a great way to discern whether consulting is a suitable career match for you.

We recommend starting off with cases where the **interviewer** leads and guides the interviewee, and the interviewee is just responsible with coming up with ideas and insights throughout the case. You can then work up to the Bain/BCG style where the **interviewee** drives discussion.

If you are entirely new to cases, we highly recommend starting with the Supplements on page 82. Otherwise, let's jump in with interviewer-led cases!

Acknowledgements

Putting this case book together required both writing new content and compiling quality content from outside sources. The writing process was particularly special, because the people I gave new cases to offered fresh ideas and constructive feedback. Two cases – health insurance (case 5) and data storage (case 7) – were used in Notre Dame's Inaugural Case Interview Competition. There are dozens of case books out there, each with their own approach, so the real challenge was compiling content that would prove most relevant and helpful to the current recruiting process. Naturally, I am responsible for any remaining errors and typos.

A huge thank you goes to Jack Cobain (Class of 2017, Bain & Co.), who personally read and approved every case I wrote.

Another huge thank you goes to Miles Wood (Class of 2020), who collected all of my content and managed the graphic design process.

Ultimately, this book is designed to help everyone engaged in the recruiting process for consulting – from those merely interested in consulting to seniors actively preparing to interview.

Yours in Notre Dame,
Scott Moore '17, McKinsey & Co.

Interviewer Led Cases

The process of running an interviewer-style case is relatively straightforward.

1. The "interviewer" takes a few minutes to digest the case, and then reads the prompt.
2. The "interviewee" summarizes the prompt, focusing on the important question at hand and the essential information relative to that question. By narrowing in on **just** the key information, you demonstrate an ability to filter information by importance.
3. The "interviewer" confirms that both people are at the same page! The interviewer then asks Question 1.
4. The "interviewee" asks for a few minutes to organize their thoughts (it feels awkward but you do it), and then develops a framework. Then the interviewee pitches it.
5. The interviewer may ask follow-up questions. Otherwise, the interviewer continues through the case by asking questions, working to steer the conversation in the right direction, and sometimes prompts the interviewee to come up with more ideas, clarify points, or be more specific.
6. Conversation/Questions continue. The interviewee at some point comes up with a recommendation and pitches it. If time is running out, the interviewer prompts it.
7. The case is over, and both people can step out of character. Feedback is shared about what went awesome and what areas can be improved for next time.

Firms that use the interviewer-led style:

McKinsey
Deloitte
Accenture
Strategy&
Oliver Wyman

Case 1: Hot Air Balloons

Prompt: Your client is TakeFlight, a company that sells hot air balloon rides out West. Purchasing a hot air balloon ride is all-inclusive, meaning participants pay for the following:

1. Watching the hot air balloon inflate
2. Up to 15 passengers can ride in the balloon for approximately 1 hour
3. Car ride back from the landing zone to the starting point

The entire process takes 3 hours. In recent years, the business has expanded to offer two rides, twice per day, rather than one ride, twice per day. However, TakeFlight has not experienced the economies of scale it expected.

(If asked, economies of scale mean profit margins rise as a company sells more products. In this case, doubling sales has not reduced margins at all.)

You have been hired to target strategies to grow TakeFlight's profit margins to support future growth.

Question 1: What are the factors you would investigate to determine opportunities for margin expansion?

Sample Framework (margins are essentially a spread between price and cost):

1. Raising Prices
 - a. Do we have a monopoly or other market power?
 - b. Do we have a differentiated experience warranting a price premium?
 - c. What is the willingness to pay of our customers?
 - d. Are we pricing per-person, rather than per-ride? Is capacity maximized? If asked say that the balloon ride costs the same for customers, even if only 2 people ride.
 - e. Can we separate our "all-inclusive" package into pieces?
 - f. Do we sell anything besides rides that could justify a higher price?
2. Cutting Costs
 - a. Fixed cost cutting
 - i. Investing in the second hot air balloon
 - ii. Storage facilities
 - iii. If asked, no fixed expenditures other than balloons\
 - b. Variable cost cutting
 - i. Does TakeFlight have enough inflation devices?
 - ii. Rising gas/fuel prices? Could we buy fuel for cars/balloons in bulk?
 - iii. Labor costs are too high?
 - iv. Flying the balloon? Can we tie the balloons together for one pilot?
 - v. How do we drive people back from the landing zone?
3. Market
 - a. Margins no longer justified due to drones and low customer loyalty.

A very good answer would hypothesize regarding the root cause of declining profitability, e.g. “Since the number of flights has doubled, I must assume revenues are up, but its costs have likely doubled as well.”

Question 2: TakeFlight has determined its pricing is optimal, so it cannot improve margins by growing revenues. Can you determine opportunities for reducing costs?

Note that this question should involve some back-and-forth, and top candidates will have great ideas. Quickly dismiss non-starter ideas, but score a candidate higher if they develop several wrong ideas and keep composure.

Potential Interviewee Questions and Interviewer Responses:

1. Do we own too many hot air balloons?
 - a. No, we only own three, allowing us one back-up.
2. How many inflation devices do we have?
 - a. 2, because we launch two balloons simultaneously.
3. Follow Up: Couldn't this be 1, and just space out the launch?
 - a. Doesn't work due to both weather variability and our ability to host larger groups. With groups of 25-30, they can see each other in the air.
4. What about driving people back from the landing zone?
 - a. Good idea. The balloon lands wherever the wind takes it, and we employ several “chase vehicles” to pick up passengers.
5. Follow Up: How many vehicles?
 - a. Back when we only had one flight, we would use two 9-passenger vans. Now we use four vans per flight.
6. Have gas/fuel prices risen? Have salaries risen?
 - a. Not recently, and even wild fluctuations wouldn't hurt our costs too much. Salaries are in line with historical levels and we can't lower them.
7. Any other question not relating to driving back...
 - a. Nope, that's not an option.

If candidate asks 4, feel free to move to Question 3. Top candidates will push the opportunity forcefully, leading you to move to Question 3.

A very good candidate is extremely systematic in targeting where costs can be cut (fixed vs. variable OR chronological order of flight both possible).

Question 3: How would you go about cutting costs for the return trip after landing the balloon? What cost savings would TakeFlight experience?

How to cut costs:

1. Vehicle Consolidation
 - a. Get 2 large vans, because it can be two different groups after all. Also what if the balloons land in different places?
 - b. Get 1 huge van.
 - c. School bus – beautiful answer.
 - d. Limo – expensive but good idea.
 - e. Pick-up truck with room in the back – edgy answer, but these people literally just rode in a basket. Could be legally problematic though!
 - f. Other return options (highly creative)
 - i. Bicycles, nature walk, ATVs, camel rides (#neverforget in the interview)

The best candidates have multiple ideas but are weighing the pros and cons of each. Okay, let's move to cost savings. Say we have a school bus. What are the anticipated cost savings?

Cost Savings (top candidate will nail at least the first two):

1. Labor costs of 4 drivers could be reduced
2. Gas costs
3. Inventory cost reductions possible from having fewer vehicles
4. Maintenance costs

Question 4: TakeFlight management decides that the best option is to invest in a school bus. Similar wind conditions means there is really only need for one vehicle, because the balloons will land in roughly the same place. Show Exhibit A. So I have two questions for you:

- A. Could you calculate TakeFlight's new margin after implementing the school bus?
 - i. Info available on request: margins are currently \$500 and 10%.
2. If the school bus costs \$50,000, how many flight days does it take for the school bus to pay itself off?

Answer to A: The new margin is \$250 more than the old margin, so the new margin is \$750 and 15% (based on proportions).

How do we get this \$250?

\$225 comes from the reduction of 3 drivers at \$75 each.

\$5 comes from maintenance for 4 vans (\$20) vs. maintenance for 1 bus (\$15)

\$20 comes from gas for 4 vans (\$60) vs. gas for 1 bus (\$40)

Top candidates react immediately to the answers they derive. If you have to prompt, there's a problem. A good reaction here is, "this looks like a significant benefit to the business!" A top reaction is "10% to 15% is a 50% growth in margin, which is worth pursuing. Knowing the cost of a school bus would help contextualize whether an investment is worthwhile."

If the interviewee is confused, feel free to ask guiding questions, like "which numbers here matter, and which don't?"

Answer to B: $\$50,000 / \$250 = 200$ rides, and there are two rides per flight day, so the answer is 100 flight days. **Good reaction:** This investment sounds crazy good, because even if 1 in 3 days is a flight day, we would see a return within one year!

If there is time, ask: So should we sell off the vans?

- Yes is convincing, that's quick cash we can use to finance the bus.
- No is convincing, we may have honeymooners who want their own vehicle for a more high-end experience. Also, for two small groups, the van would still be cheaper.

Also, you might ask: What size bus should we purchase?

- Good candidates take the max. size of 2 groups + 1 driver + 2 pilots = 33 seats
- Top candidates note that if TakeFlight grows in the future, more seats may be justifiable.

If there is extra time, ask the candidate to summarize for the client. A very good answer outlines (a) what went wrong, (b) what should be done/impact, and (c) the next steps worth pursuing.

Sample Summary:

We were tasked with identifying strategies to grow the margins for TakeFlight, a company that offers hot air balloon rides. So far, the best option for raising margins from 10% to 15% involves using a bus to consolidate vehicles for return transportation from the landing zone.

The bus pays itself off in a year, but that's quicker if we sell a few of our vans. In addition, we might consider a larger bus for future growth. On the topic of future growth, there are a few options for TakeFlight. First, they could add post-flight refreshments or other add-ons (such as flight certificates). Second, TakeFlight might consider unbundling its package so it can operate more flights per day. Third, TakeFlight could expand regionally to other geographical areas where hot air balloon flights would be popular.

Exhibit A: Input Costs for TakeFlight

Item	Cost
Hot Air Balloon	\$50,000
Inflation Costs	\$5 per use
Maintenance, Van	\$5 per use
Maintenance, Bus	\$15 per use
Gas, Van	\$15 per use
Gas, Bus	\$40 per use
Labor – Pilot	\$200
Labor – Driver	\$75

Case 2: Autoparts

Prompt: Your client is CarCo, a mechanics and auto parts company in the Midwest. CarCo provides automotive services to customers – these include tires, oil changes, engine repair, etc. The business is family-owned and operated, and has historically generated \$25 million in profits annually. Recently, the business has experienced far lower profits than usual, namely \$10 million. While the business is still a profitable enterprise, a similar drop in profits would lead to collapse, and the mechanic does not really know what went wrong.

You have been hired to assess the root cause of decreased profits and suggest strategies for restoring profits to previous levels.

Question 1: What are the factors you would investigate to determine why profits have declined?

Sample Framework:

1. Revenue Decline
 - a. Prices have fallen
 - i. Price war with competitors
 - ii. Willingness to pay has fallen
 - iii. Economic hardship
 - b. Quantity sold has dropped
 - i. People fix cars themselves more
 - ii. Cars are better made and require less maintenance
 - iii. A competitor has stolen market share
 - iv. Fewer cars in the Midwest
2. Cost Increase
 - a. Fixed costs have increased
 - i. Garage rental, utilities, equipment
 - ii. Inventory costs
 - b. Variable costs have increased
 - i. Particular car parts cost more (more software in cars?), or have been bought and are not used
 - ii. Labor costs have risen due to more complicated services being performed
 - iii. Timing costs due to lengthier repairs
3. Market
 - a. Overall market for mechanic services is declining due to shifted focus to renewable energy and fewer vehicles in the market
 - b. Number of cars left unchanged, but cars need fewer repairs than they used to, thereby shrinking market

A very good answer would hypothesize regarding the root cause of declining profitability, e.g. “I doubt a mechanic’s costs would be in the \$15 million range, thus we should focus more on revenue and/or market factors.”

A very good answer leverages personal experience regarding what is happening in the world when commenting on the automotive industry.

Question 2: The company’s cost structure has held constant at 50%, and there are no external market factors that are relevant here. What are the revenue streams you would expect this mechanic to have?

The candidate should reiterate that the root cause of declining profitability is now a revenue story. A very good answer does not simply enumerate a list of revenue sources, but structures these revenue streams. And a phenomenal answer sets up further structure within each larger heading.

Sample Structure:

- 1. Products
 - a. Hardware – Tires, Engine, Brakes, Alternators
 - b. Software – Speakers, radios, touchscreens, chargers
 - c. Miscellaneous – Oil, Coolant
- 2. Services
 - a. Yearly inspections
 - b. Winterizing, Oil Change
 - c. Post-Accident repair
 - d. Scrapping the car
- 3. Potential Passive Income?
 - a. Investments
 - b. Property

Question 3: The mechanic does sell a mix of products and services to customers. Historically, the total quantity of products/services sold has remained constant at 1 million. In addition, the prices of these offerings have not changed at all. Can you explain what has happened, and how you would suggest the client increase profits?

Product	Price
Regular Tire	\$10
Oil Change	\$30
Engine Overhaul	\$200

What has happened is that despite a constant total number of products sold, customers have purchased proportionally more tires and oil changes and proportionally fewer engine overhauls. Thus, the declining profitability is due to a switching from higher-margin items to lower-margin items. Because none of these products are substitutes, there are several suggestions one could make:

1. Increase customer base or expand number of shops – may be tough if population is roughly constant.
2. Increase product offering to incentivize customers to buy more.
3. Reduce the price of engines, as current profits are \$100 and our competitors may have undercut us.
4. Candidate may notice that the engine overhaul has both a product and service component. If the market is moving more towards “do it yourself,” the mechanic could sell engines without the service component, or could shift away to services and more towards products.
5. Marketing campaign in the community, or other promotion.

If candidate is struggling, the first hint is by creating a row at the bottom. In the righthand cell, describe how 1 million would be a summation of the quantity sold of each product. In the lefthand cell, describe that the number would have fallen.

The second hint would be encouraging the candidate to work through the profits per product. The cost structure is 50% for all products, meaning an engine generates \$100 profit while a tire generates \$5.

A very good answer can crisply describe what has led to declining profits, and exhibits quantitative literacy while doing so. For example, “one way to get 10 million in profits is selling 500k of tires and 500k of engine overhauls.” For example, “for every 1 less engine we sell, we need to sell 20 tires or nearly 7 to make the same profits.” For example, “in order to get back to \$25 million in profits, the mechanic would need to sell 150,000 more engine overhauls per year (if the quantity of other products were left unchanged).

A good answer says, “people are buying fewer engines than they used to,” while a great answer says, “people are buying fewer engines, and that could be because our prices are now too high, or car engines don’t need to be repaired as often.” Answers that are actionable and pursue further explanation or data are preferable.

Question 4: Your client approaches you, and is convinced the right strategy moving forward is adding Star Tires to its product line. These tires would sell for \$25 with a profit margin of 60%. What are the risks of selling star tires?

1. Cannibalization – people who buy star tires will buy them instead of regular tires.
2. Customers – will our customers want to buy more expensive tires? They are already shying away from our more expensive products. Are star tire shoppers are current customers or new customers?
3. Brand – As a family-owned business, would selling star tires force us to increase the service quality and become a more premium brand? Would we lose business this way?
4. Permanence – Are star tires a fad? Also, if they last more than three times as long as regular tires, will they need to be replaced less often?
5. Execution – Do we have a stable supplier, and do we have the inventory to support this? Can our mechanics change these tires?

If the candidate refers to cannibalization, push the candidate. Wouldn't a total shift from regular tires to star tires triple profits in the tire segment? How could that be a bad thing?

- A good candidate will concede that profits for tires would rise, and not offer any pushback. If so, push for potential risks in the case that regular tires are 100% cannibalized.
- A very good answer would come up risks even if cannibalization increased profitability, namely, contract risk (we still receive a 5 year supply of regular tires and have no room in inventory), pricing risk (our customers will pay \$40 for both tires and an oil change, but not \$55 for both star tires and an oil change), branding risk as before.

If there is extra time, ask the candidate to summarize for the client. A very good answer has this rough outline:

1. Root cause of problem
2. Recommendation
 - a. Data Point, Data Point (may be less pressing here)
3. Next Steps

Sample Summary:

We discovered profits have fallen 60% due to a drop of engine repairs being sold. While our other products have sold better, the increase has been insufficient to compensate the losses from engines. There are two ideas that could help. First, the mechanic could change the pricing of engine overhauls to better compete – we would want to see what other mechanics charge. In addition, star tires are a good idea, and we need to explore X risks.

Exhibit A: CarCo's Pricing Scheme

Product / Service	Price
Regular Tire	\$10
Oil Change	\$30
Engine Overhaul	\$200

Margins are 50% across all product/service lines.

Total products/services sold has held constant at 1 million for decades.

Exhibit B: CarCo's Proposed Pricing Scheme

Product / Service	Price	Profit Margin
Regular Tire	\$10	\$5
<u>NEW: Star Tires</u>	<u>\$25</u>	
Oil Change	\$30	\$15
Engine Overhaul	\$200	\$100

Case 3: Health Insurance

Prompt: Your client is FitCo, a health insurance company that has grown rapidly in the past five years. In the recent regulatory environment, FitCo has been subsidized to expand into new markets, and has done so quite successfully. However, in the last three years, its profitability has dropped sharply.

FitCo's CEO has brought you on to determine the root cause of declining profitability and suggest strategies for restoring profits to prior levels.

Question 1: What are the factors you would investigate to determine why profits have declined?

Sample Framework:

1. Revenue Decline
 - a. Prices have fallen
 - i. New markets include customers who pay less for healthcare
 - ii. FitCo has undercut competitors to win in new markets
 - iii. Regulation stipulates that larger companies charge less
 - b. Quantity sold has dropped
 - i. Unlikely because FitCo has expanded into new markets
 - ii. Potential for lower-margin products to dominate in new markets while higher-margin products suffer
2. Cost Increase
 - a. Fixed costs have increased
 - i. Government subsidies were a temporary thing
 - ii. FitCo has invested in marketing, customer service, etc. in new markets
 - b. Variable costs have increased
 - i. Customers in new markets are tougher to acquire
 - ii. Customers in new markets are tougher to maintain
 - iii. Customers in new markets are sicker (and more costly)
3. Market
 - a. FitCo's business model is no longer effective, or won't scale well
 - b. Regulatory uncertainty has incentivized overexpansion, naturally reducing profits for the time being. This is temporary and not worrisome
 - c. FitCo insures a particular type of healthcare, but consumers are seeking out a different kind of healthcare

A very good answer would hypothesize regarding the root cause of declining profitability, e.g. "I doubt scaling the business would reduce revenues, but it could certainly bloat costs. I'd like to look into costs."

Question 2: Revenues have held constant, and rapid market fluctuations have become the new normal for the healthcare industry. FitCo measures its success using two data points: (1) average revenue per person insured, and (2) average healthcare costs per person insured. Five years ago, average revenue per person insured was \$5,000, and this number has held constant. However, average healthcare costs per person insured have risen from \$3,500 five years ago to \$4,500 now.

- A. Assuming FitCo insures 2 million people now, and this number has doubled from five years ago, what is the difference in profitability?
- B. Holding revenue fixed, by how much do we have to lower average cost per person to achieve the same absolute profits as before?

Answer to A: \$500 million (or half a billion dollars). Five years prior, FitCo had a \$1500 profit margin and 1 million customers, for total profits of \$1.5 billion. Now, FitCo has \$500 profit margin on average for 2 million customers, for total profits of \$1 billion. $\$1.5 \text{ billion} - \$1 \text{ billion} = .5 \text{ billion}$

Answer to B: \$250. One way to go about is to look at the factor you want multiply by to restore prior profitability, 1.5. That means your margin needs to be $\$500 * 1.5 = \750 , or \$250 more than it is now. The other way is to take \$1.5 billion and divide it by 2 million, which yields \$750. This \$750 as before is a \$250 increase from current levels.

A good candidate works through both parts, noting that the \$250 decrease in costs is surely achievable, given that costs used to be \$1,000 less.

A very good candidate additionally adds that this \$250 is essentially a margin, and could also be achieved by increasing average revenues, too. If customers in new markets cost more to service, we may have simply priced too low in these new markets. This sort of hypothesizing is welcomed!

Question 3: We have learned that FitCo's margins in new markets have reduced profitability, what strategies would you pursue to grow margins? What would help you determine whether to stay in these markets?

The following would be worth bringing up:

1. **Market Segmentation and Breakdown:** If half of our customers are coming from new markets, and the average moved by \$1,000, wouldn't the average of the new markets be operating at a loss? ***Top candidates will have this insight.*** We ought to segment this average to unpack which markets are working and which are not.
 - a. **Leave New Markets with long-term unprofitability**
2. **Growing Revenues**
 - a. **Government Subsidies:** Did these artificially increase margins? Are these included in our current margins?

- b. **Charging More:** How many customers do we lose if we raise prices in costlier markets? Is it even bad to lose customers if our margins are negative?
3. **Cutting Costs**
- a. What actually goes into these costs?
 - b. Patients are sicker, or require more care. Can we incentivize healthier behaviors? Is there another way to reduce the amount we spend on care?
 - c. Maybe the assumption that patients are sicker is wrong. Instead, our start-up costs for new markets are high, or adhering to local regulation in new markets is costly.

Good candidates recognize the flaws in an average, and come up with creative ideas to grow margins. Very good candidates do not limit themselves to either cost cutting or revenue growth, but provide multiple solution directions for FitCo to pursue.

Question 4: FitCo has learned that its rapid growth in new markets is due to pricing its insurance too low, given its costs are \$5,500. FitCo now finds half its customers in these new markets. For every 20% price increase, FitCo will lose 20% of its customers (e.g. price 40% higher, lose 40% of customers; price 60%, lose 60%, etc.). How high should FitCo price? What other factors besides profits would you take into account here?

Encourage the candidate to reiterate the important numbers. We are narrowing in on new markets, with 1 million customers here. Revenues are \$5,000 and costs are \$5,500, meaning FitCo is operating at a loss. A top candidate will lay out the pricing scenarios with clarity.

	Current	20% Increase	40% Increase	60% Increase
Customers	1 MM	800,000	600,000	400,000
Avg. Revenue	\$5,000	\$6,000	\$7,000	\$8,000
Avg. Cost	\$5,500	\$5,500	\$5,500	\$5,500
Avg. Profit	(\$500)	\$500	\$1,500	\$2,500
Total Profit	(\$500MM)	\$400MM	\$900MM	\$1BN

The “# of Customers” row is found by taking 1 million * (1 - % increase).

The “Avg. Cost” row is a fixed \$5,500.

The “Avg. Rev.” row is found by taking \$5,000 * (1 + % increase).

The “Avg. Profit” row is found by subtracting costs from revenues.

The Total Profit row is found by multiplying the “# of customers” row by the “Avg. Profit” row.

If the candidate continues with an 80% increase, jump in and ask, “Do we really want to lose 80% of our customers just like that?”

A good candidate will note that the 40% and 60% increase yield similar profits, and the risks of price increases rise the higher FitCo prices.

Beyond-Profit Factors:

- (a) Government may regulate how much prices can change year to year.
- (b) Brand image suffers when we jack up prices. Or are we “high-end?”
- (c) We may be left with an unhealthier/costlier pool of customers.
- (d) Do we have to grandfather in our current customers?

Sample Summary:

We discovered FitCo’s profits fell by a third due to pricing too low in new markets. In order to grow profits proportionally with customers, FitCo will need to raise prices. So far, I would recommend a 40% price increase – 40% allows us to capture the same \$1,500 margin in new markets that we currently achieve in our original markets. However, this strategy will also involve losing 40% of our customers.

Moving forward, I want to look at our competitors’ prices in new markets to see if a 40% increase is reasonable, as it could also affect our brand image. I would also want to segment the new markets further to see if FitCo can differentiate its pricing further within its new markets.

Case 4: Gold Mine

Prompt: Your client is MyBank, a major financial institution. MyBank manages a portfolio with annual returns of 10%. They have learned of an untapped gold mine in Peru that is for sale. A decade ago, upon learning the mine was mineral-rich, the Peruvian government seized the land. Now, the Peruvian government is cash-strapped and wants to sell it to MyBank for USD\$250 million.

Is this an investment MyBank should add to its portfolio? MyBank's portfolio manager wants you to analyze the investment and offer a recommendation.

Question 1: What are the factors you would consider in determining the worthiness of the investment?

Sample Framework:

1. Financial Considerations – must be profitable at 10%+ year over year
 - a. Costs
 - i. Initial investment in the mine
 - ii. Set-up costs for developing the capabilities of the mine
 - iii. Variable costs of harvesting gold
 - b. Revenues – top candidates outline how they derive this, e.g. revenues = expected quantity of gold * market price of gold
 - i. Market price for gold – does this fluctuate?
 - ii. How much gold can the mine produce annually?
 - iii. Is annual production expected to grow?
 - iv. How long before the mine runs out of gold?
 2. Market Considerations
 - a. Commodity Market
 - i. Would we be investing in gold anyway?
 - ii. Are there any other minerals in the mine?
 - b. Alternatives
 - i. Is it better to be in another industry instead?
 - ii. Does our portfolio normally take on this level of risk? Do we have precedent for such investments?
 3. Logistical Considerations
 - a. Will we be expected to do anything unethical in the Peruvian market?
 - b. Are we outsourcing the mine's operations?
 - c. Where are export markets, and do we have a way to get gold to these markets from Peru?
-

Question 2: The mine is centrally located, and could be developed within a year for a mere \$50 million. Once developed, the mine would produce 150,000 ounces of gold each year. Fixed costs are \$25 million per year. Each ounce of gold costs \$200 to mine.

If asked for, volunteer that the market price for an ounce of gold fluctuates between \$1200 and \$1800. Candidate should use the conservative figure for calculations (good candidates won't need prompting here).

Suggested answer: To approach this problem, I need to compare the expected costs of the mine with the mine's expected revenues.

Expected costs: 250mm + 50 mm (fixed) = **300 mm**

Expected margin: ($\$1200 - \200) = \$1000 per ounce of gold

Expected annual profits: (150,000 ounces * \$1,000 per ounce) - \$25 million in fixed costs = **\$125 million annual profits**

Thus, starting in year 2, we make \$125 million in annual profits, and by the third year of operation (year 4), we recoup our investment. Over five years, we pay in \$300 million and reap \$500 million, well over the \$450-480 million we would receive at the usual 10% annual return over five years.

Candidate may ask about other costs, like taxes. If so, tell them we can assume that all costs are factored in. Thus, from a financial perspective, this mine is a good investment for MyBank's portfolio.

A very good candidate will note that we used the conservative market price for gold, and profits could well be far higher. A very good candidate would suggest turning to the market/logistical factors to ensure that this investment will really work out in MyBank's favor.

Question 3: Can you think of any risks of this investment?

1. Political / Regulatory Risk – Peru seized this mine before. Might they do it again? What are the policies on exports?
2. Brand Risk – Is MyBank exploiting the weaknesses of a foreign government in a way that could come under criticism?
3. Market price for gold – If the price of gold falls by, say, half, MyBank's investment is no longer profitable.
4. Natural Disaster – El Niño may wreck your mine?
5. Local Labor – Do we have a qualified talent pipeline to meet annual production goals? How do we recruit these people?
6. Infrastructure / Location – Are we sure we can get the gold out of Peru and to the right markets?

A very good answer uses questions to build rapport with the client. As the mock interviewer, you may not be able to answer specific questions about local conditions, but you can discern whether the questions are good.

Question 4: MyBank decides to move forward with the investment, and things move smoothly for the year of development and the first two years of mining. However, Peru's recently elected president has bashed exploitative foreign companies, and you estimate there is a 50% chance the mine will be seized. MyBank has looked at two options. The first involves permanently raising its fixed costs \$25 million to pay extremely high wages to its employees – such a move could reduce the chance of seizure to 30% (from 50%). The second option involves selling a 40% stake to local investors for \$100 million – such a move could reduce the chance of seizure to 10%.

Peruvian presidents are elected to five-year terms, so let's look at the five-year horizon.

Suggested answer: A good candidate acknowledges that this is an expected value problem, and structures the multiple scenarios well. A good candidate verifies that expected profits after seizure would be 0. The numbers below use the 5 year horizon, but the 1-year works too.

Base case: 5 years of profit * 50% = $(\$125\text{mm} * 5) * 0.5 = \mathbf{\$312.5\text{mm}}$

Option 1: 5 years of (profit – 25mm) = $5 * (125 - 25) = 500\text{mm}$

Then there is a 30% chance of seizure, so the chance of receiving those 500mm in profits is $0.7 * 500\text{mm} = \mathbf{350\text{mm}}$

Option 1 has a higher expected value than the base case.

Option 2: 5 years of profit * 60% stake = $\$375\text{mm}$

Then there is a 10% of seizure, so the chance of receiving those 375mm in profits is $0.9 * 375 = 337.5\text{mm}$

However, we get \$100mm for selling our stake, so our final expected value is $\mathbf{\$437.5\text{mm}}$.

Option 2 has an expected value far above the base case.

A good candidate crisply lays out the math, allowing extra time to be spent on the “qualitative” aspects of the decision. I put qualitative in quotes because these concerns will certainly impact the profits of the mine. Option 2 looks best over a 5-year horizon, but do we want to give up nearly half the mine over the longer term?

Other considerations:

- Other options – negotiations: phenomenal candidates have other creative ideas to maximize expected value
- Other options – liquidation: sell the whole mine and make \$500mm
- Short-term vs. Long-term: is the five-year window the best view?

- Government relationships: given the \$100 mm stake may be undervalued, does this amount to bribery?
- Labor Costs: if we overpay, do our workers get complacent? How does that impact our talent pipeline?

Sample Summary:

MyBank has a real opportunity with this Peruvian gold mine, as its return is expected to far exceed the 10% portfolio average. Once operational, the mine could make half a billion in profits every 4 years. However, cultivating relationships with the Peruvian government will be critical to ensuring the mine does not get seized in the near future.

Case 5: Data Storage

Prompt: Your client is DataCo, a data storage company that sells most of its products to other businesses. DataCo has two main revenue streams: products and services. DataCo's products include high-capacity storage devices and data servers. DataCo's services include data back-up tools and cloud storage. In recent decades, DataCo has been an innovation leader, making significant investments in new products as needed. Through the rise and fall of floppy disks, hard drives, CDs, and USBs, DataCo has commanded the market. Lately, however, DataCo has seen declining profitability.

You have been hired to assess the root cause of decreased profits and suggest strategies for restoring profits to previous levels.

Question 1: What are the factors you would investigate to determine why profits have declined?

Sample Framework:

1. Revenue Decline
 - a. Prices have fallen
 - i. Price war with competitors
 - ii. Willingness to pay has fallen
 - iii. Economic hardship
 - b. Quantity sold has dropped
 - i. Larger storage means people buy fewer units
 - ii. Companies manage their data with fewer products
 - iii. Companies switch from products to services
 - iv. Fewer companies buying data solutions
2. Cost Increase
 - a. Fixed costs have increased
 - i. Manufacturing facilities are more complex
 - ii. R&D expenditures too high or misdirected
 - b. Variable costs have increased
 - i. Packaging more expensive for larger products
 - ii. Digital platform more heavily trafficked and expensive to manage
 - iii. Support staff for service solutions is expensive
3. Market
 - a. People don't buy data products anymore, because they purchase data services (or outsource data management)
 - b. Data solutions are often developed in-house at companies
 - c. DataCo's service solutions are often sold to end users as well, but DataCo still maintains a business-to-business sales focus

A very good answer would hypothesize regarding the root cause of declining profitability, e.g. “I doubt this company has trouble managing market fluctuations, but it could struggle with its costs.”

A very good answer leverages personal experience regarding real world affairs when commenting on the data management industry. Most people know of Box, Google Drive, Amazon AWS, etc.

Question 2: The company has seen cost increases across most areas of the business. Show Exhibit A. Management is worried that costs are increasing at a faster rate than revenue. Is this an avoidable problem? *Note that this question should involve some back-and-forth.*

Key insights: (1) The data services market is growing faster than the data products market by leaps and bounds. (2) R&D is divided equally between segments, and does not reflect the trends in each segment. (3) Margins in data products have shrunk, and SG&A costs in data products are up. (4) SG&A costs in data services have tripled.

If candidate notes (1) and asks for more projections of the market, show Exhibit B. Candidate should immediately note that the data services market is where the future is...why are we decreasing investment there?

If candidate notes (2) and asks why, note that in the company's early history, multiple storage devices competed against one another for R&D spend (half of Revenue-COGS-SG&A, so management set a policy to distribute spend equally between departments). Candidate should respond that the policy should be reassessed for the current market environment. If candidate specifically asks what R&D costs go toward, tell them they are on the right track, but let's close out the general discussion (the next question will narrow in on R&D).

If candidate notes (3) and asks why, mention that the data products has invested in higher and higher memory products, which have higher fixed costs. Many of these higher-end products have not sold well, and increased SG&A represents confusion regarding this newer but more complicated product. Candidate should get the hint that DataCo has over-invested in products.

If candidate notes (4) and asks why, mention that our cloud services do not have much of the functionality of our competitors, so the customer service team has ballooned to handle the complaints and try to keep our clients happy. Again, you are steering the candidate that investment in data services has been insufficient.

A very good candidate nails at least 3 of these insights, and confidently asserts that DataCo will need to adjust its R&D spend to favor services. The window is closing for DataCo to grab a chunk of the growing services market.

A very good candidate is already speculating about where the investment in services should be made (cloud functionality, back-up).

Question 3: DataCo's management agrees with you, and offers \$35 million towards an investment in services, but it could go in two different directions. (1) Add functionality to cloud software, upping the quality of their most popular product. (2) Expand DataCo's reach to new clients by tapping into customers who buy ONLY products. How would you approach the decision?

The model answer is "we want to get the biggest ROI for our investment, so we need more information to learn which investment is most profitable."

Information you should give (bonus if requested):

Option #1 – Functionality

- Expected sales growth would be 7.5%
- COGS would remain at 80% (scaling is a future initiative)
- Cut Services SG&A by half from fewer customer complaints

Change in profits is \$55MM. Sales growth is \$75MM * 20% margin = \$15MM. SG&A costs of \$150MM cut \$75MM. $75 + 15 - 35 = 55$.

Option #2 – Market Share

- Expected sales growth would be 10%
- COGS would remain at 80% (scaling is a future initiative)
- Integrating our marketing efforts between products and services would allow us to cut \$50MM in SG&A costs across both segments (total, not from each segment).

Change in profits is \$70MM. Sales growth is \$100MM * 20% margin = \$20MM. SG&A costs cut \$50MM. $50 + 20 - 35 = 35$.

A good candidate makes quick work of the math and makes a judgment call favoring option 1 without prompting.

A very good candidate does the above, but introduces some qualitative factors into discussion:

- How long can customers go without certain functionality? Are we losing customers?
- In option 2, are we reaching out to clients who are behind the digital curve, and will still be around to snatch up next year?
- Is the dominance of a competitor making market share critical for our long-term success?
- Can't we integrate marketing between products and services regardless? DataCo should have thought to do this by now!

Question 4: DataCo management agrees with you that expanding Cloud functionality will be critical to the future success of the business. In the process, management has also learned that many of its *product* buyers are technologically behind. These customers are not interested in more advanced data storage products, and will be unwilling to pay more, even if products improve substantially.

With these considerations in mind, DataCo's CEO would like to approach clients in the products space, and suggest they purchase services as well. The CEO would like you to address some opportunities and risks of attempting to maximize value from its clients in this way.

Opportunities

1. Product users seem loyal to us so likely to work with us here.
2. Our customer service can help get these clients up to speed.
3. We may be able to provide packages across products and services, which simplifies our business model.
4. We probably already have a bit of overlap, so we can use these clients as a "pilot" (or analytics) for approaching other clients.

Risks

1. Cannibalization – our margins are still higher in products. ***Top candidate notes that this is changing and may reverse.
2. Marketing can be annoying, especially with the recent changes.
3. Clients may not be able to pull off using data services. Do we want to be an outsourcing tool for data-unsavvy businesses?
4. Are we prepared to support fast growth, which has hiccups?

Sample Summary:

We discovered profits are down due to bloated costs. We have over-invested in complicated products while missing the opportunity to invest in fast-growing services. In products, we need to focus on selling simple products clients want to buy. In services, we need to claim market leadership with top functionality. Across both, we need to integrate our marketing/sales efforts.

Exhibit A: DataCo - Revenue Breakdown by Revenue Stream

2010 (\$MM)	Data Products	Data Services
Revenue	\$800	\$600
COGS	\$500	\$500
SG&A	\$150	\$50
R&D	\$50	\$50
Net Profits	\$100	\$-

2015 (\$MM)	Data Products	Data Services
Revenue	\$900	\$1,000
COGS	\$650	\$800
SG&A	\$200	\$150
R&D	\$25	\$25
Net Profits	\$25	\$25

Exhibit B: Market Trends in the Data Sector

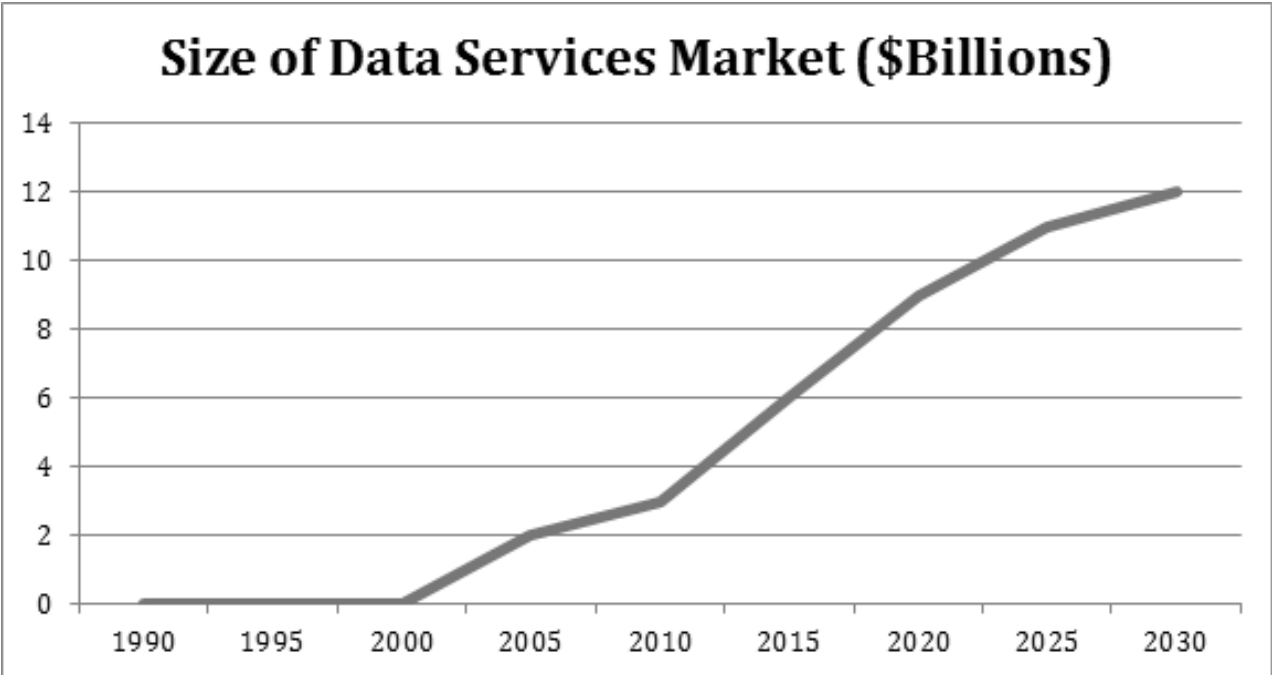
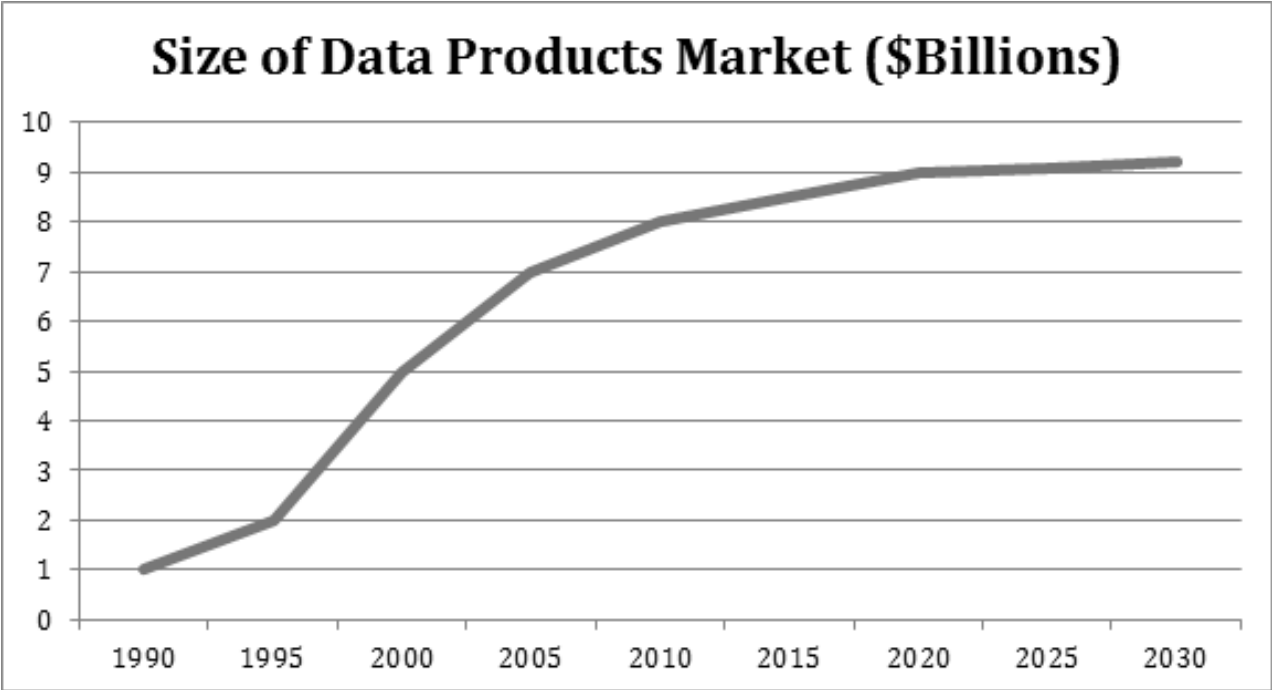


Exhibit C: Investment Options

Option #1 – Functionality

Description of Investment: Improve the functionality of DataCo's most popular cloud service. DataCo would offer a higher quality service.

- Size of Investment: \$35 million
- Expected sales growth would be 7.5%
- COGS would remain at 80% (scaling is a future initiative)
- Cut Services SG&A by half from fewer customer complaints

Option #2 – Market Share

Description of Investment: Market aggressively to DataCo's existing product customers who have not yet purchased services.

- Size of Investment: \$35 million
- Expected sales growth would be 10%
- COGS would remain at 80% (scaling is a future initiative)
- Integrating our marketing efforts between products and services would allow us to cut \$50MM in SG&A costs across both segments (total, not from each segment).

DataCo is looking for a return in the same year as its investment.

Case 6: Pipelines

Prompt: Your client is GasCo, an integrated natural gas supplier. Their functions range from exploration, extraction, production, and transport via pipeline operator. In the current market environment, natural gas is quickly gaining prominence as a clean and safe energy source.

PipeCo is a pipeline operator interested in a potential joint venture with GasCo. GasCo has come to you to assess the desirability of the venture. In the terms of the agreement, GasCo would contribute the majority of the funds to build a pipeline from Pennsylvania to Louisiana. Upon completion, GasCo would be the legal owner of the pipeline, which PipeCo would operate. GasCo would then retain a majority of the natural gas profits flowing through that pipeline.

Question 1: What are the factors you would investigate to determine whether the joint venture is worthwhile?

Sample Framework:

1. Quantitative – Investment Costs
 - i. Pipeline construction costs
 - ii. Miscellaneous costs – legal, regulatory, meetings
 - iii. Variable costs upon pipeline completion of ownership
 - iv. Opportunity costs of investing elsewhere
2. Quantitative – Profits to Recoup Investment
 - i. Terms of agreement regarding profits
 - ii. Expected profits from gas upon completion
 - iii. Time to payoff, potential delays
 - iv. Synergies across other pipelines
3. Qualitative
 - a. Relationship with PipeCo
 - i. Is PipeCo trustworthy?
 - ii. PipeCo's history as a pipeline operator
 - b. Company Position
 - i. Is GasCo normally an owner? Should it take on less risk/profits or potentially more risk/profits?
 - ii. Is the pipeline in line with GasCo's strategy?

A very good answer nails down right away that this is an investment decision. The candidate does not get bogged down in the complexities of joint venture contracts.

Question 2: Your client wants you to identify potential synergies of having a Pennsylvania to Louisiana pipeline.



Regions	Synergies
2	\$2 million
3	\$5 million
4-5	\$10 million

States	Synergies
2-4	\$3 million
5-9	\$10 million
10-15	\$15 million
16-25	\$25 million

Currently, GasCo exists in all 5 states in the Southwest. Adding the PALA (Pennsylvania – Louisiana) pipeline would expand coverage to three regions, rather than one, and expand coverage to six additional states.

While these synergies would accrue on an annual basis, there would also be an estimated \$5 million in annual legal and regulatory expenses associated with the expansion.

- A. What are the expected net synergies if the pipeline will be operated for 10 years?
- B. GasCo is interested in your take regarding their longer-term strategic objectives. Assuming the PALA pipeline goes through, GasCo expects to make additional investments across the U.S. Assuming equivalent legal and regulatory costs, in the next fifteen years, is it preferable to expand into two more regions and four more states, or

zero more regions and six more states? To be clear, these scenarios are **post-PALA pipeline**.

A very good answer explicitly examines the investment decision on the margin. Currently, GasCo is in 1 region (\$0 million) and 5 states (\$10 million). With the PALA pipeline, GasCo will exist in 3 regions (\$5 million) and 11 states (\$15 million). This creates an additional \$10 million in synergies, which is offset by \$5 million in expenses. The net yearly benefit is $10 - 5 = \$5$ million.

Regarding (B), an additional 2 regions and four states would expand synergies by \$5 million each year (minus expenses), while an additional six states would expand synergies by \$10 million (minus the same expenses). The latter option is preferable by far.

Question 3: In addition to synergies, there is a second benefit of the PALA pipeline, namely profits from gas that passes through the pipeline. Please advise GasCo on whether the PALA pipeline is a financially sound investment.

1. The investment is \$500 million, and GasCo must contribute 60%, while PipeCo will contribute the remaining 40%. GasCo also retains a 70% majority of the profits.
2. After investment, the pipeline will take two years to become operational.
3. Once the pipeline is operational, it is anticipated to pass 200 Bcf of gas throughput per year. Natural gas is forecast to sell for \$4.00/MMBtu.
4. In the oil and gas industry, owners will only make an investment if the payoff is within eight years, and operators will only do so if the payoff is within ten years.

Information available upon request:

1 Bcf = 1,000,000 MMBtu

The profit margin is 12.5%, and profits are split 70%-30% between GasCo and PipeCo.

Top candidates set up the problem systematically and reach a definitive yes conclusion. The calculations below are underestimates that do not factor in synergies, though candidates can.

GasCo: Contribution \$300MM (investment cost)

Expected Revenues = 200 million * \$4 = \$800 million gross revenues

Profit margin = 12.5% * \$800 million = \$100 million

% of profits GasCo gets: \$100mm * 70% = \$70 million

Years to payoff = $2 + 300/70 = 6.25$ or so (faster if you include synergies of 5mm per year)

PipeCo: Contribution \$200MM (investment cost)

Expected Revenues = 800 million gross revenues

Profit margin = 12.5% * \$800 million = \$100 million

% of profits PipeCo gets: \$100mm * 30% = \$30 million

Years to payoff = $2 + 200/30 = 8.67$ or so

The investment is \$500 million, and GasCo must contribute 60%, while PipeCo will contribute the remaining 40%.

Question 4: Management at GasCo very much appreciates that PipeCo approached them with this joint venture. GasCo is also interested in rapidly expanding its presence in the U.S. natural gas market. Thus, GasCo has approached you to discuss the feasibility and desirability of acquiring PipeCo. How would you assess the feasibility and desirability of acquiring PipeCo?

This question is structured for you, and this so often happens in cases. While you do not need to understand the natural gas market to answer your question, you can utilize prior information in the case to formulate your response.

1. Feasibility
 - a. Is it allowed under regulatory standards to make the acquisition?
 - b. What are the legal costs of the acquisition?
 - c. Are both companies able to work in all states and regions as before?
 - d. How does the acquisition impact outstanding contracts like the PALA pipeline?
 - e. What conflicts of interest might either party be involved in, and how would these be resolved?
2. Desirability
 - a. Advantages
 - i. Cost savings from management
 - ii. Synergies from both owning and operating a pipeline
 - iii. Building an integrated, end-to-end brand
 - iv. Quicker expansion may be a priority
 - b. Disadvantages
 - i. Risk accumulates under one umbrella, rather than spreading between two firms
 - ii. Cost of the acquisition – how would it be paid for?
 - iii. Are there switching costs from joint venture projects?

Sample Summary:

GasCo should move forward with the PALA pipeline, which will require two years of construction to become operational and then pay off four years thereafter. This is two years less than the industry standard for owners. Moreover, the pipeline will allow GasCo to expand its industry presence in the U.S.

There are two next steps we should take regarding expansion as a firm. First, we ought to explore the potential strategy of acquiring PipeCo. Second, we can explore which regions of the U.S. are most favorable regarding future expansion into six other states.

Exhibit A: Regions of Operation



Regions	Synergies	States	Synergies
2	\$2 million	2-4	\$3 million
3	\$5 million	5-9	\$10 million
4-5	\$10 million	10-15	\$15 million
		16-25	\$25 million

Exhibit B: Proposed Joint Venture

	GasCo	PipeCo
Role	Owner	Operator
Investment	60%	40%
Profit	70%	30%
Desired ROI Period	8 Years	10 Years

Proposed PALA Pipeline

Annual Throughput: 200 Bcf (billion cubic feet)
Market Price of Natural Gas: \$4.00 MMBTU (Million British thermal units)

Case 7: Business Class Airline

Prompt: Our client is FlyCheap, a budget airline considering entering a new market for business class flights. Think of a very cheap but low-quality airline. They are considering running an all business-class service within Europe. They want your advice on whether this is a good idea, and if so, how they should do it.

Question 1: What factors should FlyCheap consider when deciding about launching an all-business service within Europe?

Sample Framework:

1. Customers
 - a. Business Travelers
 - b. Luxury Tourists
 - c. Diplomats
 - d. How price sensitive are these groups, and what niche would offer them value?
 2. Competition
 - a. How will incumbent airlines react to this?
 - b. Are alternatives such as train travel serious competition?
 - c. Can they position themselves as competition to other airlines' economy offerings?
 3. Capabilities
 - a. Will their budget brand be a limitation or an asset?
 - b. What capabilities do they have as a budget airline that are particularly useful? Do they have access to landing slots?
 - c. What do they not currently do that they will need to be good at?
 - d. New staff and luxury aircraft?
 4. Entry Mode
 - a. Can this simply be launched as another route with a different service?
 - b. Whom could they partner with? Is an acquisition or partnership a viable option?
 - c. Should they consider setting up a new company (with a new brand)?
-

Question 2: FlyCheap has determined that it cannot simply offer another version of the current service offerings in the market. The company is looking to carve out an innovative niche for itself by serving high-class customers in a different way. What ideas do you have for FlyCheap?

Basic Ideas

1. Fly a scheduled service to high-end holiday resorts
2. Partner with luxury hotel chains and travel companies to offer packages
3. Fly from regional airports and include a chauffeur to get passengers there
4. Set up a scheduled service for government officials

More Innovative Ideas

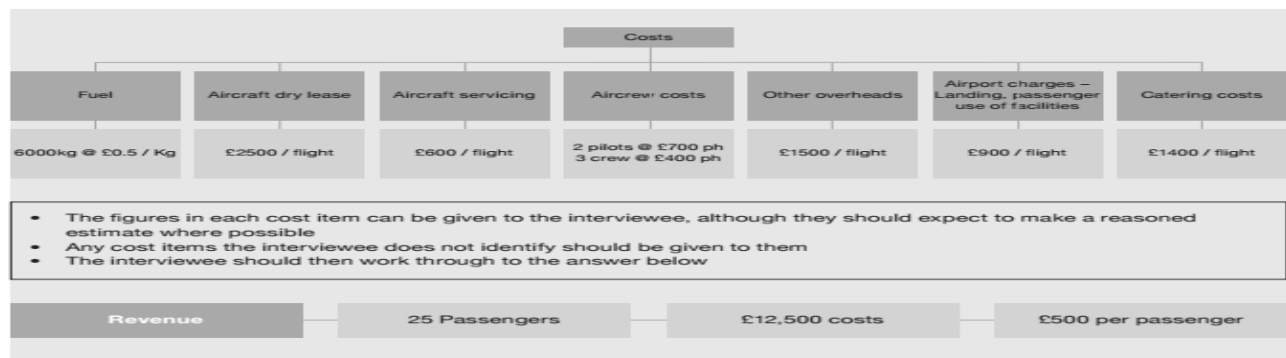
1. Charter to luxury cruise lines to offer passengers flights to the ship
2. Do not fly scheduled flights, but focus on one off flights to key European social events – Monaco Grand Prix, Paris Fashion Week
3. Offer packages including entry to these events
4. Run on board events, such as wine tastings

5. Offer 'experience flights' e.g. over the North Pole
6. Use a subscription model for unlimited flights in a given period
7. Partner with corporations and governments who want the use of a private jet but don't want to buy one

Question 3: FlyCheap is looking at Vienna for its first destination. Before we jump into the calculation, what are the main costs you anticipate FlyCheap faces?

1. Getting customers on the flight
 - a. Aircraft or Leasing the aircraft
 - b. Fuel
 - c. Marketing and other overhead
 - d. Slotting fees for the gates and use of airport
2. Caring for customers onboard
 - a. Labor - pilots, stewards, crew
 - b. Servicing, Cleaning the aircraft
 - c. Onboard refreshments and services

Verbally provide the following costs (you can state them in dollars). How much does FlyCheap need to charge per passenger to break even on this flight if 25/32 seats are filled?



You can also omit the price of fuel if you want to provide an added challenge. A top candidate will get to the answer of \$500 and note that business class seats could be far more expensive than that. Thus, FlyCheap has a great profit opportunity here.

Question 4: Now that we have talked through FlyCheap's options, would you recommend launching an all-business class service? What are the important things to keep in mind?

This question is asking for an initial judgment call and a summary.

Top candidates do not need to have gone through everything to be decisive. They note that:

- Yes, an all business-class service looks profitable so this is worth pursuing.
- In order to do it right, there are some important factors:
 - Brand: launch a new brand or partner.
 - Niche: come up with something new that our customers would pay for.
 - Capabilities: make sure we are trained in luxury customer service.
- Hits home that this is possible and should be pursued.

Case 8: H Health

Prompt: H Health is a major health care provider in the United States. H Health's business model is simple: It signs contracts with patients and provides medical services via one of its 300 contracted physicians. The company's key revenues then come from commissions. In the scenario that H Health's contracted physicians cannot provide the necessary medical treatment, H Health gives the patient a "referral" to other providers.

Last year, H Health suffered a profit decline. You have been hired to solve this problem.

Question 1: How would you approach this problem?

Sample Framework:

1. Revenue Declined
 - a. number of patients dropped
 - b. unit price dropped
 - c. competition grew their market share
 2. Costs Increased
 - a. VC: number of visits increased (e.g. major flu), per person cost increased (e.g. cost of the medicine), referral cost increased
 - b. FC: physician's salary increased, facilities costs increased
 3. Market Factors
 - a. Nobody pays for healthcare anymore via contract
 - b. People are healthier than before
-

Question 2: Competitor analysis – why is our referral cost higher than the competitor?

	H Health	Sunshine
Number of Patients	300,000	500,000
Monthly Referral Cost	\$20 per member	\$15 per member

Basic Ideas:

1. Economies of scale
2. Lower administration costs
3. More contracted physicians

Creative Ideas:

1. Sunshine offers a broader suite of services
 2. Consolidated referral system from the back-end
 3. Sunshine has a partnership in the market
-

Question 3: Assuming none of the contracted physicians have the specialty of cardiology, estimate the number of referrals per year for cardiology based on the following information:

- Number of patients: 300,000
- 20% of the total population is > 65 years old, and 30% of them need treatment
- For the rest of the population, there's a 10% chance for them to require the treatment
- The treatment usually requires 5 visits to the doctor per year.

Answer:

$$>65 \text{ years} = 300,000 * 0.2 * 0.3 = 18,000$$

$$<65 \text{ years} = 300,000 * 0.8 * 0.1 = 24,000$$

$$42,000 * 5 \text{ times/year} = 210,000 \text{ (times/year)}$$

Question 4: The actual number of referrals is 300,000. Why is it higher than the estimate?

Possible Answers:

- H Health's clients are not representative of the overall population
 - They underestimated the number of visits per year
 - More demanding patients ask to be referred even if they don't have such issues
 - Physicians refer non-cardiology patients because they don't want to take the risk and are not motivated to provide services even if they are capable
-

Question 5: How much does the number of referrals have to decrease in order to justify following incentive plan to encourage contracted physicians to be more responsible?

Incentive plan:

Bonus: \$100,000 / year to top 10 physicians with the lowest referral rate

Training: \$1,000,000

Referral cost: \$200 per referral

Current no. of referral: 300,000

Answer:

$$\text{Total cost} = 2,000,000$$

$$2,000,000 / 200 = 10,000$$

Question 6: If the incentive plan can reduce the number of referrals by 5% for year one and 2% for year two, what is the total saving?

Answer:

$$Y1 = 300,000 * 5\% = 15,000 \text{ referrals}$$

$$Y2 = (300,000 - 15,000) * 2\% = 5,700 \text{ referrals}$$

$$\text{Total saving} = (15,000 + 5,700) * \$200 - \$2,000,000 * 2 = \$140,000$$

Question 7: Apart from Cardiology, how can H Health reduce its referrals in general?

Possible Answers:

- Increase training to improve physician's capability
 - Extend the incentive program to other departments
 - Improve the quality of relationship with the patients and build up the trust
 - Improve/remove physicians who are outliers with extremely high referral rate
 - Increase the no. of contracted physicians
 - Partner with other health care provider to lower referral cost
-

Sample Summary:

We have determined that H Health's profitability can be improved by lowering its referral costs in the cardiology business. There are two ways to approach this:

1. Reduce the number of referrals, and/or
2. Reduce the cost per referral

Across its business, H Health should ensure it offers the ideal product offering to patients.

Case 9: Town Mayor

Prompt: The client has just been elected to be the Mayor of a town of 500,000 people in the United States. The town has experienced some hard economic times and there has been a slight decline in the population. The Mayor's election platform was centered on a message of economic revival with a plan to be launched in the first 100-days. The Mayor has hired you to help develop the plan.

Question 1: What information would you like to know about the city and what is your plan?

Sample Structure:

1. Location
 - a. What's the geography here?
 - b. What are the surrounding cities?
 2. Current Businesses and Environment
 - a. What industries? Expanding or Declining?
 - b. Who lives here, and what are their skills?
 3. Government Role
 - a. What role does the government typically play in the economy?
 - b. Are there tax incentives or infrastructure support?
 - c. How much time do we have before reelection?
-

Question 2: What could've caused the population/economic decrease?

Possible answers:

- Tax increases
 - Aging population
 - Deteriorating infrastructure
 - Surrounding cities are having poor times
 - Increasing crime rates
 - Major airlines cut numerous flights to and from the city
-

Question 3: Unemployment is currently 8% and the Mayor would like to increase the population by 5% and decrease unemployment to 5%. How many new companies will they need?

Information upon request:

60% of the population is in the labor force.
Each company provides 500 jobs on average.

Current state of the town:

Population 500,000
% Eligible to Work 60%
Possible Workers 300,000
Current Unemployment 8%

Current Goal:

Employed $276,000$ $299,250 = 300,000 * 1.05 * .95$

Unemployed 24,000 15,750 =300,000*1.05*.05
This requires creating 23,250 new jobs
At 500 jobs per company, this is ~50 new companies/plants

Question 4: What could be done to get the ~50 companies/plants?

Possible answers:

- Get current companies to expand locally
 - Offer to build roads to and from the plants
 - Tax Incentives
 - Lobby other governors of “at-capacity” cities to suggest your city (think L.A.)
 - Lobby federal government for more federal jobs
 - Active marketing of the city as a destination spot
-

Question 5: The state is looking to build a new university and is considering this city. Is that a good thing? Should the Mayor support this?

Possible Concerns:

- The town is older (retirement community) and not ready for this
 - No central location geographically to put a large university
 - How will the university be funded? What will the cities role be?
 - What is the time frame?
 - Will progress be able to be made before the next elections come up?
-

Sample Summary:

The town mayor has his work cut out for him to please the demands of his citizens. At the current goals of 5% population growth and 5% unemployment, 50 new companies will be needed. Perhaps the mayor could target unemployment first, which might prompt organic population growth. So far, we have looked at building a university, but I would like to explore further options as well.

Case 10: New York Taxi Driver

Prompt: You are a New York City taxi driver. You have just dropped off a passenger at LaGuardia Airport, 12 miles from downtown Manhattan. You are now faced with a choice of returning to Manhattan with an empty cab or waiting in a two-hour line to pick up a passenger at the airport.

Question 1: How would you decide between your options?

Sample Framework: Financial Comparison – Qualitative Factors

Question 2: Your cab collects \$2 for the first mile and \$1 for each additional mile. When you think about the additional costs and revenues of each option, which option is better financially?

This requires significant brainstorming. Help the candidate nail down all the numbers they need. Information available upon request:

LaGuardia fare data

- Average tip 10% of fare – rounded up to full dollar
- Cost of cab 50% of meter revenue
- Bridge toll \$3.50 (Paid by driver if cab is empty)
- Fuel / gallon \$3
- Cab's fuel efficiency 24 MPG

Manhattan fare data

- Average wait time to find a fare: 20 minutes
- Average distance to find a fare: 2 miles
- Average drive time of a fare: 10 minutes
- Average distance of a fare: 2 miles
- Average tip per fare: \$2

Solution Walkthrough

Staying at LaGuardia:

- Revenue
- Fare \$13
- Toll \$3.50
- Tip \$2
- Total: \$18.50

- Costs
- Gas \$1.50 (12 miles @ 24 MPG = ½ gallon * \$3/gal)
- Toll \$3.50
- Car \$6.50 (\$13 fare * 50%)
- Total: \$11.50

Profit \$7 (\$18.50 revenue - \$11.50 cost)

Leaving for Manhattan with an empty cab:

Revenue once in Manhattan

Fare \$3 (average of 2 miles = \$2 for first mile + \$1 for second mile)

Tip \$2 (average tip in Manhattan)

Total: \$5

Costs

Gas \$0.50 (4 miles @ 24 MPG = 1/6 gallon * \$3/gal)

Car \$1.50 (\$3 fare * 50%)

Total: \$2

Profit \$3 (\$4 revenue - \$2 cost)

Total Profit \$12 (it takes 20 minutes to find passenger +10 minutes per ride = 30 minutes) for the 4 taxi rides in Manhattan.

We must include the gas and toll costs to get from LaGuardia to Manhattan with an empty cab = \$3.50 for toll + \$1.50 for gas = \$5.00

Therefore, the total profit is \$12 - \$5.00 = \$7.00 = the same as staying at LaGuardia.

A top answer notes that this is a perfectly competitive market:

Cars in LaGuardia will wait until the expected value of profits exactly matches the profits of driving to Manhattan. Essentially the waiting time is at market equilibrium, making the amount of expected profit for the two alternatives equal.

Question 3: So how would you decide between staying at LaGuardia and driving to Manhattan?

Top answer:

- The decision comes down largely to non-financial factors.
- Hypotheses for non-financial factors that might affect a driver's decision?
 - **LaGuardia**
 - Sitting in the car listening to the radio for two hours
 - Calling important people in your life
 - Fewer customers
 - Day-trading or other revenue streams? (creative)
 - **Working in Manhattan**
 - More exciting, more customers
 - Etc.

Follow-up if there is time: Given what you would do, what does this mean for people who need taxis in Manhattan and at LaGuardia? What might you change?

There is not necessarily a need to summarize, unless the candidate went all over the place. The main reason a summary doesn't matter is that the candidate is essentially his/her own client here.

Interviewee Led Cases

Interviewee-led cases are tougher. There are a couple things to note before we jump in.

1. Your framework can be shorter. You're not trying to demonstrate you can think of every factor up-front. Your structuring skills will become evident in how you drive the case.
2. Do not go in circles.
3. When asking for information, talking in specifics is helpful. Example: "Do we have information on investment costs for this airline? I would expect them to need to purchase new aircraft, in-flight services, and landing slots at the airport."
4. If you hear, "no, we don't have that information," see point 2. Do not ask for the same information twice! You may want to get at that information in a different way, though, so you can broaden your ask from "costs of investment" to "any costs at all we would face."
5. State the hypothesis you wish to pursue, and drive at information that helps you confirm or reject your hypothesis. Once you have the info you need, explicitly state whether you were right or wrong.
6. Before you depart from one topic to another, restate the insight you've just uncovered, and how that leads you to want to pursue a different topic. Example: "We now know it costs \$10 to win one customer through marketing. This is worthwhile if the average customer we target provides more than \$10 in profits. To examine that, I'd like to look at information on purchasing behavior of our customers."

Keeping your composure after hearing "we don't have that info" millions of times will score you major points.

Firms that use the interviewee-led style:

Bain
BCG
LEK
PwC

Case 1: Coffee Shop

Prompt: My friend has a coffee shop in Vail, Colorado. He offered to sell the shop to me for \$100,000. Do you think I should do it?

Offer the following information if asked.

Products/Prices:

- Cup of coffee, \$4.00
- Bottled Water, \$2.00
- Pastries, \$3.00
- 60% of customers order coffee, 30% order pastry, and 10% order a bottle of water

Variable Cost:

All products have a 50% margin

Customers and Customer Flow:

The shop serves mostly locals, not tourists, so demand is consistent throughout the year

- Assume that the coffee shop gets 10 customers per hour in slow hour and 20 customers per hour in a busy hour.
- The first and last 2 hours of the day are busy hours. (To be calculated by the interviewee: The coffee shop gets $20 \times 4 + 10 \times 8 = 160$ customers/day.)
- On Saturdays, every hour is busy ($20 \times 12 = 240$ hours on Saturday).

Other Costs:

- Rent was \$500 per month
- Wages (for 2 employees) were \$8.00 per hour.
- The shop is open 12 hours a day, six days a week

Tell the candidate that he can assume that the coffee shop will bring in consistent profits.

Candidate should use the following:

Number of customers / week = $160 \times 5 + 240 \times 1 = 1040$

Number of customers / year = $1040 \times 50 = 50,200$

Assuming 60% of customers order coffee, 30% order pastry, and 10% order a bottle of water, then the spend is: $50,000 \times 60\% \times 4 + 50,000 \times 30\% \times 3 + 50,000 \times 10\% \times 2 = \$175,000$

Fixed Costs

Rent = $500 \times 12 = \$6,000$

Wages = $\$8 \times 12 \times 6 \times 50 = \$30,000$

Profits

Profits = $175,000 \times 50\% - 36,000 = \$52,500$

Assume a 40% tax rate:

Profits after tax = $52,500 \times (1 - 40\%) = \$31,500$

Top candidates note that the value of money decreases over time, so the payoff is 4-5 years.

Sample Summary:

As long as the sales would be consistent for the rest of the 5 years, it would be profitable to buy the coffee shop. Further analysis could be done on the management experience and the competition to ensure that sales would be consistent.

Case 2: ABC Conglomerate

Prompt: The CEO of a major conglomerate is dealing with poor profitability in each of his three divisions: A, B, and C. What should he do to maximize value for his shareholders?

Note that there is no information on specific numbers or the products sold. Instruct the candidate to rely only on the information they have. Information available upon request:

Division A

- Competition – The firm is the clear market leader with 60% share.
- Cost Structure – Manufacturing is done in Asia by all firms and is largely considered to be as low-cost as possible.
- Revenues – This division generates over 60% of the firm’s revenues but gross margins have been declining in recent years. The high fixed costs maintained by this division have moved net income into the red as gross margins have declined.
- Pricing – Prices have been becoming increasingly competitive. Division A has had to price aggressively to maintain sales volume, even with its strong market leadership position.
- Market Trends – The overall market for division A’s product has been shrinking in the last few years and looks like it may continue to do so.
- Customer Preferences – Customers are moving to an entirely new product category as a substitute, and prefer the product category of Division A less and less.
- Threat of Substitutes – A new product category is filling the customer need previously served by Division A’s product. Division A is not well positioned to enter this new category.

Best reaction: “This does not seem like a market we want to be in.”

Division B

- Competition – The firm has only 5% and is one of many players in the market.
- Cost Structure – This market is relatively new and it is believed that costs can be reduced significantly from their current position.
- Revenues – Revenues have been low but growing. The division is running a negative net cash flow as it is currently investing in marketing, R&D, and plant capacity.
- Pricing – A wide range of prices exist in the market currently with margins generally high.
- Market Trends – The overall market is growing at 10% a year and is expected to experience significant growth in the near future.
- Customer Preferences – This is a relatively new product category and consumers are not yet sure what they want or like.

Best reaction: “We have an opportunity to lead this market if we invest aggressively.”

Division C

1. Competition – The firm has 50% share with only one other major competitor and a few minor ones.

2. Cost Structure – The firm has significant economies of scale and has the lowest variable cost in the market. Significant expenditures are being made in marketing, R&D, and plant capacity in an attempt to grow revenues.
3. Revenues – Revenues have been strong with good operating margins, but have been flat for the past few years.
4. Pricing – Division C has a price leadership position in the market.
5. Market Trends – The overall market is not growing and expected to remain flat for the foreseeable future.

Best reaction: “This market likely does not warrant further investment, as we can profitably hold our leadership position here.”

Conclusion:

A star candidate will see that his/her time is nearly up and will present a recommendation for the client without prompting. If the interview is within 3 minutes of the end, ask: “The CEO just called and wants to know what he should do.”

Sample Summary:

Clearly the conglomerate needs to rationalize its company portfolio to maximize shareholder return. Each of the three divisions is in a different stage of the market lifecycle and needs to be treated accordingly.

Division A finds itself in a declining industry with no apparent way to move into a new product category. As the incumbent firms struggle to maintain volume in a shrinking market, prices have fallen along with volume. Operating income is no longer enough to cover a high fixed cost base and the company is bleeding with little chance to recover. Division A should be divested immediately.

Division B is in an emerging growth market. While it is not making money today, it is in a favorable industry and represents a strong investment opportunity. The division should invest aggressively in R&D, marketing, and production capacity in an attempt to become the market leader by developing differentiated, branded products.

Division C is the leader in a mature industry and has the ability to generate a steady stream of cash for use in other investments – namely Division B. Division C should streamline operations by eliminating all expenditures not directly needed to maintain profitability and should be managed as a cash cow.

Case 3: Retail Bank

Prompt: Our client is the private division of a retail bank that has 100,000 clients, \$500,000,000 in revenues, and \$150,000,000 in net income. Our client's goal is to double the revenues and profits of the business in 5 years. Assess the feasibility of the goal. Prioritize the two or three most important steps they should take in their action plan.

Information Gathering - share the information in each bullet only if the candidate asks for it in a clear and deliberate way.

- Pricing: they make their revenues from interest and fees
- Costs: transaction costs, salaries. The nature of the sale is one-on-one pitch between the bank salesperson and the customer. So the salary cost and the transaction costs tend to be high.
- Geography: They have a large presence in the North East and a moderate presence in the South East
- Products: They have 4 product lines, with the following ranks in revenue and profit generation:

	Revenue	Profit
Private Banking (loans, deposits)	1	1
Investment Management (brokerage, advice, access)	2	3
Trust (estate planning, transferred death)	3	2
Insurance	4	2

Customers: 20-25% of customers purchase more than one product. 75-80% of customers purchase only one product. They are segmented into 5 groups:

	Volume	Number of Customers
Ultra High:	\$10M+	5%
High Net:	\$1M-\$10M	10%
Affluent:	\$0.5M-\$1M	20%
Mass Affluent:	\$100,000-\$500,000	25%
Mass:	\$0-\$100,000	40%

- The Ultra High, High Net, and Affluent segments generate 60-70% of the revenues, while the Mass Affluent and Mass segments generate 30-40% of the revenues.

At this point the candidate has enough information to analyze the numbers and provide a fact-based recommendation.

Buyer selection: Since transaction costs tend to be the same for the different customer segments, it makes sense to grow the number of the higher revenue generating customers and decrease the number of the lower revenue generating customers. We can attract the top 3

segments by marketing more selectively and doing promotions for higher income customer groups. We can discourage less affluent customers by raising the prices on them, giving them the option to add more profits, or switch to a competitor.

Cross sell: Since 75% of customers purchase only one product. There's an opportunity for cross-sell between the different product lines. Assuming that we will only serve the top 3 customer segments:

Revenue generated by customers in top 3 customer segments = $\$500M \times 70\% = \$350M$

Revenue generated by customers who only have one product = $\$350M \times 75\% = \$262.5M$

If we assume that the 4 types of products generate comparable revenues, then if we cross-sell each customer 3 other products then the new revenue will be = $\$262.5 \times 4 = \$1,050M$

Conclusion:

It is feasible to double revenues and profits if we can only cross-sell our current customers the other products in our business. The next steps Private Retail Bank should take are:

- Give incentives to the bank's sales force to cross sell different products to its existing customers.
- Do promotions for the top 3 affluent market segments.
- Increase its prices in its bottom 2 mass market segments to "fire" its unprofitable market segments.

Case 4: Green Nutrient

Prompt: Your client is an agricultural products manufacturer. They invented a product called “Green Nutrient”. This is going to help the farmers by allowing a variable fertilizer rate. The company is interested in a pricing strategy and go-to-market options.

If asked, “what is a variable fertilizer rate?,” say that the product can optimize the amount of fertilizer used on crops, thus reducing fertilizer costs (from overuse) and increasing crop yields.

Information available upon request:

- “Green Nutrient” measures the amount of fertilizer required, allowing for a “variable fertilizer rate”
 - Two main benefits: Reduces overuse (reduce costs) and increase under-use (increase yield)
 - Benefit #1: 20% reduction in fertilizer cost per acre
 - 1 bag / acre @ \$15/ bag
 - Benefit #2: Improve yield 2%
 - Current average yield: 100 bundles/ acre @ \$ 2.5/ bundle
 - Farms average about 400 acres
 - 1000 Large farms: 1000 acres
 - 3000 Medium farms: 400 acres
 - 6000 Small farms: 200 acres
 - Unit works the same regardless of farm size
 - Product lasts 10 years
 - Product production cost: \$10K per unit
 - The fixed costs of developing the product and intellectual property protections are sunk.
 - Thus, these are 0. Only variable cost of per-product production matters.
 - Discount rate: 0%
 - No competition
 - Candidate should note that the company can price like a monopoly.
-

Calculation - on the margin is the fastest:

\$3.00 fertilizer savings per acre ($0.30 * \$15$)
\$5.00 yield increase per acre ($\$2.5 * 100 * 0.02$)

Total willingness to pay per acre: \$8.00 or \$3.2K per average farm per year
Large farm would be willing to pay 80K ($\$8 \text{ per acre} * 1000 \text{ acres} * 10 \text{ years}$)
Medium farm - 32K
Small farm - 16K

One Approach

1. Large: If we price the product at \$80k we sell 1000 and profit \$70M
 2. Large/Medium: If we price the product at \$32k we sell 4000; profit \$88M – BEST OPTION
 3. All farms: If we price at \$16k we sell 1000 and profit \$60M
-

Best Reaction: Selling to each of these is profitable. If candidate asks, say the product cannot be differentiated by farm size. Thus, selling in retail stores has the risk of large farms claiming to be small, or multiple farms buying one product to share its benefits.

If the candidate doesn't think of selling as a service, say the company is worried about patent protection. If it sells to farmers who set up the product themselves, it might be replicated or shared with a competitor.

Best Approach

1. Find a way to differentiate pricing based on farm size. But how?
2. Launch the product at \$80k, then "discount" it to \$32k and finally to \$16k.
3. Go door-to-door and price based on the acreage of the given farm -- isn't this risky, given that farmers talk to each other?
4. Offer a service to the farms at up to \$8/acre that will achieve a price discrimination based on acreage. (perfect price discrimination) – BEST OPTION, because it maximizes profits for any size farm, not just the three examined here.

Candidates that do both of these are phenomenal:

1. Perform calculations on the margin (to achieve \$8 per acre) **unprompted**
2. Suggest launching Green Nutrient as a service/subscription **unprompted**

Case 5: AirJet

Prompt: AirJet Inc. is a U.S. manufacturer of small, regional airplanes. It manufactures two types of aircraft: Jet engine (80 to 100-seat) and propeller aircraft (20 to 30-seat). In 2011, AirJet delivered 110 jet engine aircraft and 150 propeller aircraft. This represented a unit volume increase year-over-year of 10% and 5%, respectively, and revenues of \$794 million and \$225 million, respectively. Although overall AirJet turned a profit, profitability varied significantly by business. AirJet's senior management team has hired a team of consultants to help the company develop a value-maximizing strategy. We need your help to understand:

1. What are the key issues and opportunities at AirJet?
2. What solutions would you recommend to management?

A top candidate immediately decides to segment the businesses and asks for more information on the financial conditions of each.

2011	Jet Engine Aircraft Business		Propeller Aircraft Business	
	Financials (\$m)	% of Sales	Financials (\$m)	% of Sales
Revenues	794	100%	225	100%
COGS	-659	-83%	-86	-38%
SG&A	-99	-12%	-16	-7%
Delivery & Other	-42	-5%	-8	-4%
Net Income	-6	-1%	69	31%
Capital Charge (at 10%)	-25	-3%	-3	-1%
Economic Profit	-31	-4%	66	29%

Economic Profit = Net Income – Charge for Cost Capital

[Note] Economic profit includes a charge that accounts for the required return on capital. When EP > 0 value is created, when EP < 0 value is destroyed (even if Net Income is positive!), and at EP = 0 the business generates exactly the required return

A top candidate notes that the problem lies in the Jet Engine business, and looks for what is going wrong there by segmenting revenues and costs. Information available upon request:

- Costs of the jet engine business are in line with market average
- Jet engine parts are complex and typically bought from specialized OEMs

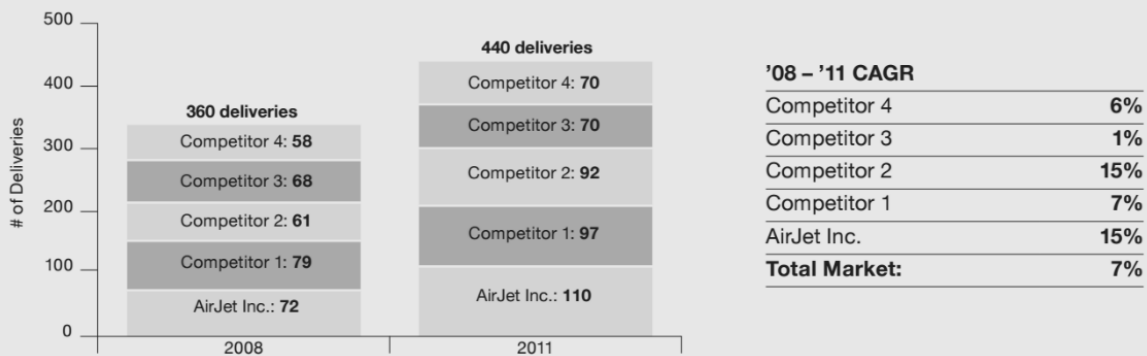
If costs are in line with the market average, either this entire market is struggling with margins, or AirJet is pricing too low. A top candidate turns either to the market or to competitors to pursue a hypothesis.

Market Structure and Economics

Overall Market Economics

	2011, \$m
Total US Market Size	3,520
Average Costs per Aircraft	\$6.8
# of Jets Sold	440
Total Capital Invested	3,300
Cost of Capital	10%

Market Structure



Key insights:

- This is a growing market.
- AirJet's market share rose from 20% to 25%, and outpaced the growth of its competitors.
- No dominant competitor.
- Top candidates note that the average price per aircraft is 8mm, so the market is turning an overall profit.
- Business intuition suggests that AirJet's speedier growth is due to pricing too low.

Information available upon request:

- Market is likely to continue growing at 7% for the next 10 years.
- AirJet could increase price by 20% and still have a competitive product which provides a fair benefit to customers.
- AirJet offers a relatively undifferentiated product, meaning that pricing higher would lead to a loss of market share.
- Top candidates will want to pursue a price increase further.

AirJet's Customers

Once the candidate identifies pricing disadvantage as the issue, direct the conversation to lead to customer segmentation at the root of the issue. Provide the candidate with the following information

Jet Engine Economics

2011, \$m	Per Aircraft ¹	Total
Fixed Cost	\$1.5	\$165
Variable Cost	\$6.0	\$660
Total Cost²	\$7.5	\$825

Note

1 Per Aircraft costs based on 2011 volume of 110 planes

2 Total Cost includes Cost of Capital

Jet Engine Customer Segments

2011, \$m	Affluent Individuals	Corporate Customers	Lessors
AirJet Revenues	\$84	\$320	\$390
# Customers	10	13	4
# Aircraft sold	10	40	60
Market share	12.50%	33%	25%

Share the following information as requested by the candidate

- Affluent Individuals: Buy 1 aircraft during a buying cycle (approximately every 5 to 15 years)
- Corporate Customers: Buy 2-3 aircraft, mostly large multinationals for executive travels
- Lessors: Buy 15 or more aircraft and lease to airlines, governments, corporations etc.

Top candidates look at the pricing differentials by segment unprompted.

Information available to confirm or give upon request:

- Operating cost per aircraft produced and delivered is the same regardless of the intended customer
- The Lessor segment makes large purchases and exploits a negotiating leverage over AirJet
- Average revenue per customer is:
 - \$390M/ 60 aircraft = \$6.5M per aircraft from Lessors
 - \$8.4M from Affluent Individuals
 - \$8.0M from Corporate Customers
- Lessors comprise our largest customer segment
 - Segment 1: 80 planes, our share 12.5%
 - Segment 2: 120 planes, our share 33%
 - Segment 3: 240 planes, our share 25%

If the candidate asks about raising prices, Increase prices for Lessors: for every \$500K we lose 1 customer (15 aircraft). After a few calculations the candidate should see that with such elasticity this alternative cannot be profitable, e.g.

1. Increase in Price to \$7.0 mn, losing 1 customer
 2. Total Aircrafts sold = 10 + 40 + 45 = 95
 3. Total Aircrafts Cost = 165 + 95 x 6 = \$735
 4. Total Revenue = 84+320+ 7 x 45 = \$719
 5. Profit (Loss) = (\$16) mn [remains unprofitable at \$7.5m and \$8m – i.e. losing 2 or 3 customers]
-

Time for a new approach:

- Could we exit the lessor market?
 - Response: This is over half our jet engine market, so our costs would rise for our other segments. We would need to leave the entire jet engine market.
- Could we differentiate our products?
- Could we enter the leasing business? - **YES, AFFIRM WE SHOULD EXPLORE THIS**
 - Also creates a threat for the Lessor customer and improves negotiating leverage.
 - Ask the candidate: What should we consider before jumping in and doing this?

Market Growth: The jet engine, regional aircraft leasing market is large and growing. In 2011, the new aircraft leasing market represented almost 50% of all new aircraft delivered (with operating leases comprising half) and is expected to grow 5% per year.

Market Economics:

1. The aircraft leasing market is profitable with the average competitor generating ROE's of ~15% (cost of equity ~10%)
2. The key driver of profitability is cost of funds. AirJet would be at parity

Competition: Three aircraft lessors (also AirJet's customers) dominate the market with a combined share of 65%

Customer: AirJet has marketing relationships with all aircraft end-users who are leasing their aircraft from the company's aircraft lessor customers. AirJet works with these end-users to help them configure the plane during the front end of the sales process

Sample Summary:

AirJet has two businesses. The propeller segment is doing fine and further growth should be pursued. The jet engine business is operating at a loss. The loss is coming from its lessor segment, because the lessors buy 15 planes at a time and have significant negotiating leverage. AirJet has no options for selling these planes to lessors at a profit, so the best option is for AirJet to enter the leasing business itself, where it would be profitable. The leasing market looks favorable, and AirJet could retain its other customer segments in the jet engine business.

Case 6: Italian Paper

Prompt: Our client is an Italian paper manufacturer. They make high-end glossy and matte paper that's used in corporate brochures, magazine ads for Gucci and Prada, etc. It's a commodity product. They have one factory that produces 150,000 tons of paper a year. 90% of this is sold into the Italian market, which gives it about a 20% market share. The other 10% is sold outside of Italy.

They would like to build another factory to produce another 150,000 tons a year. This would cost \$100 million. They would like us to tell them whether or not this is a good idea.

Top candidate succinctly states that the standard of success for this investment is a profitable return. Will the client profit through additional capacity?

Information available upon request:

- The Italian market will continue to grow at about 10%. Germany is very hot and growing at about 15%. Other Eastern European markets are growing as well.
 - Your largest Italian competitor has 40% share. An international competitor has 10% and the other 30% is fragmented among small players.
 - There are about 12 players and only 2 paper machine manufacturers in Europe. Everyone knows what everyone else is doing and nobody else is investing in additional capacity right now.
-

Calculation to look for:

135,000 tons is about 20% of the Italian market, which means that the Italian market is 675,000 tons.

At a 10% growth rate, the Italian market could only absorb an additional 67,000 tons - not an additional 150,000 tons. It would make sense to look beyond Italy for the remaining tons.

Projected market trends for Italian market growth:

Before giving information, ask how the candidate would go about finding the info?

Possible approaches here:

- Historical trends
- Interviews
- Customer demographics

Top candidates ask why competitors are not investing:

- One reason could be lack of opportunity
- One reason could be lack of resources
- We ultimately don't know.

Would we see ROI?

- Yes.
 - No information on specifics, but it wouldn't take very long.
-

Sample Summary:

While I don't have all the information I would like, it seems that the European market could absorb the demand and since the competitors are not investing in additional capacity, this could be a great opportunity for the client to make inroads into a new market and increase revenues. Besides the new factory, they may also want to consider other growth options, such as building new capacity in an existing plant or acquiring a competitor.

Case 7: Bun on the Run

Prompt: Our client, Bun on the Run, operates a fast food restaurant chain. Their fast food outlets are located on toll roads and in airports. The industry's average profit margin is 3 to 5%. However, our client currently is making only 1.5%. How can you help them increase their margins to 3%?

Suggested Framework:

Margin is a spread between price and cost.

- Price
- Cost
- Market (maybe)

Top candidates initially suggest segmenting between toll roads and airports.

Information available on request:

- The airport outlets are franchises
- Airports constitute most of their business
- The low profit margins are due to their airport business
- The industry is fairly mature and stagnant – *huge clue that costs are the culprit

Airport-Specific information to be given if asked:

- Market: The client operates in 80% of airports, present in all large airports
- They service 90% of all airport passengers
- Competition: There is only one other competitor, who has the remaining 10% market share – their competitor's margins are on par with the industry
- Menu: Standard fast food menu; competitor is no different

Cost information available

1. Variable costs: 70%
 - a. COGS: 35%
 - b. Labor: 35%
 2. Fixed costs: 30%
 - a. Airport fee: 10%
 - b. Infrastructure: 5%
 - c. Rent: 15%
- COGS:
 - Core ingredients (bread, meat, etc): 70% of COGS
 - Already optimized and cannot cut costs anymore
 - Non-core ingredients (paper towels, ketchup, etc): 30% of COGS
 - Contracted through SYSCO and costs are competitive

- Labor:
 - Most employees are salaried and full time, earning minimum wage of \$6/hour
 - Benefits start after 6 months
 - Turnover: 200%
 - A new employee costs an additional \$18/hour; this cost includes training (4 weeks) and background check

Root cause of low margins: High labor costs due to high turnover

If asked why turnover is so high:

The client is experiencing a high turnover of employees who were getting trained and then going to work for a nearby McDonalds for higher wages. Since new employees are expensive (\$18 training per hour + \$6 wages per hour), the turnover is bleeding the client's profit margins.

Sample Summary:

Reduce turnover/increase retention rate, thereby reducing costs and increasing profit margins.

What are suggestions to increase retention rate?

1. Make benefits begin earlier
2. Raise wages to parity with McDonald's
3. Train employees in multiple functional areas
4. Qualitative improvements to the experience, like flexible hours
5. Bonuses for sales targets
6. Referral bonuses for bringing friends onboard

A top candidate has multiple ideas on raising the retention rate, and can also identify implications of their ideas (pros and cons).

Case 8: Switching Costs

Prompt: This company makes only one product – mechanical switches. These switches are then sold to companies which operate very heavy and complicated machines. The company has been consistently profitable and remains profitable today. However, the CEO believes there is an opportunity to improve profitability even further. How should this company increase profitability?

Suggested Framework:

- Revenue
 - Costs
 - Market
-

Information available upon request:

- The switches can only be used in specific industrial machinery.
 - Switch failure can cause serious damage to customer equipment, and therefore customers replace the switches frequently.
 - Customer equipment is extremely complicated and expensive (about \$10MM per machine, each company operates several machines).
 - Price is \$12/switch. Costs are \$5/switch.
 - There is only one competitor in the market, which has 60% market share.
 - The competitor sells its switch for \$15/switch.
 - There is no real difference between the switches the client makes and those made by its competitor, nor are there significant differences in delivery times, etc.
 - Products are completely undifferentiated.
 - The market share has been divided in this way for years and there hasn't been a change in prices for a long time (other than inflation). Therefore, the two companies in this market have excellent relationships with their customers.
 - New customers are not expected to be added in the foreseeable future.
-

Recommended Insights and Solution:

- Customer acquisition would be very expensive with very low chances of success.
- Customer relationships are a significant “barrier to entry” for market share gains/losses.
- Customers that are satisfied with the competitor's quality are unlikely to migrate to the Client just to save a few dollars/switch, given the price of machines and impact of faulty switches.
- The company has room to raise prices.
- The switches are a very marginal component of the customers' cost. The customers will likely not take chances with the quality of switches and therefore are willing to pay a premium.
- Since price does not dictate market share, the client should take advantage of its “secured” market share and increase prices.

What should the new price be?

- The new price could be a range. Push for the interviewee's rationale behind pricing.
- Less than \$15 might allow client to still claim to customers to be cheaper than competition, strengthening relations.
- \$15 could be passed off as price parity
- More than \$15 is possible if customers are truly price inelastic.

Follow-Up Questions:

1. How do you expect the competition to react?
 2. How high are you willing to risk going?
 3. What would happen if a low-cost competitor came in at \$6?
-

Sample Summary:

1. The interviewee understands the insignificance of the product cost to the customers. The market has unique and relationship-driven characteristics.
2. Interviewee recommends a price increase, as it has very strong supplier power.
3. The interviewee provides a clear rationale for how the company could/should position potential prices.

Case 9: Fine China

Prompt: Our client, FC Limited (Fine China Limited) manufactures sets of fine china (plates, tea cups, etc). They only sell the china in sets (never as individual pieces) at \$1,500 per set. Excess or lack of demand has never been a problem for FC, and they sell 10,000 sets per year. The company was started 50 years ago and has been successful and profitable throughout its history. However, in the last 7 years a key competitor recently entered the industry. FC's recently learned that the competitor has at least 50% higher margins and would like to match or exceed its results.

Suggested Framework:

- Price
 - Fixed Costs
 - Variable Costs
-

Case Information:

Info to be given as case progresses:

- FC sells 10,000 sets per year. They are exactly meeting demand and this number is not expected to change in the coming years. (Essentially, this is not a revenue generation issue)
- The company has been profitable, but as new entrants have arisen, they noticed that their margins are not as high as some of these new competitors.

Info to be given if asked: (The interviewer should encourage the interviewee once/if he/she goes down the supply chain path)

- Raw material costs (porcelain clay): in-line or less than that of their competitors.
- Manufacturing: takes place in FC's North Carolina headquarters. Manufacturing is efficient, and costs are slightly lower than those of their competitors.
- Distribution: FC has 6 warehouses: 2 in North Carolina, 2 in Ohio, and 2 in Southern California. FC manufactures the china in North Carolina. The sets are then distributed to the regional warehouses for quicker shipping to the retailers in those regions when orders are placed to the factory.
- The china is only sold as a set. It is the crème-de-la- crème of china; the sales channels are upscale retail stores like Neiman Marcus and Saks Fifth Avenue.
- These retail stores do not hold inventory of the china; they just have one set for their display case because the china is so delicate and susceptible to breakage. The stores do not want the liability of holding inventory. They take orders from customers for next day pick-up from the store or occasionally the sales person will make a personal home delivery.
- Delivery to the store requires "White glove service". No damage or sloppiness permitted. This is the reason for the warehouse network.

- “Shipping” – when the company started, they used rail-roads to transport the china from the manufacturing plant to the warehouses. In the last 30 years they moved to using trucks for this transportation.
- The key competitor is located in Tennessee (if the interviewee pushes, the location is in Memphis), has one warehouse and uses FedEx from their manufacturing site to ship quickly to retailers, they also have the one day delivery commitment. (Don’t volunteer the competitor’s distribution strategy until the candidate asks about FC’s value chain description and for comparison to the competitor.)
- Retailer to Customer link: customer sees the china in the retailer’s display case and places an order. The retailer immediately contacts FC to have a set shipped to the store for the customer.
- Pricing is in-line or slightly higher than their competitors, FC’s price will not change. Revenue not the issue here.
- Common carrier “white glove service” is more expensive than our current per box shipping cost allocation. No need to be precise in how much more expensive. If pressed, it costs \$150 per set.
- A good proxy for evaluating fixed cost mix is square footage in the facilities. The factory is twice the size of the average warehouse.

Once candidate goes down the *cost-cutting* road, encourage them to brainstorm possible cost items. What are margins presently?

1. The interviewer should tell the interviewee that current total costs are \$12mm
2. The interviewer should ask the interviewee what he/she thinks are the major cost items.
 - a. Fixed Overhead is 40% of total costs
 - b. Raw materials 20%
 - c. Labor 20%
 - d. Shipping 10%
 - e. Inventory 10%
3. As they are named, the interviewer should reveal the % of total costs.
4. Once all of the costs have been uncovered, the interviewer should ask the interviewee for the current profit margin. (20%)

What costs would change by switching to ship inventory through overnight services like FedEx or UPS? Candidate should predict up, down, or stay the same. Interviewer then provides exact figures.

1. Fixed Overhead cut in half. (down)
2. Raw materials stay the same. (same)
3. Labor cut 25%. (down)
4. Shipping outsourced, so up 25%. (up)
5. Inventory cut in half. (down)

Top candidate makes quick work of the numbers, derives the new profit margin (about 42%) and says, “We should pursue this!”

Sample Summary:

The current distribution system in this era of overnight shipping is inefficient and costly. They should cut out the middle distribution warehouses to reduce costs and increase profits. The increased transportation costs are more than offset by the potential cost reductions.

Exhibit should not be given to the candidate, but top candidates will use the provided information to produce something similar.

FINE CHINA, LTD						
CURRENT "INCOME" STATEMENT:				NEW INCOME STATEMENT		
DERIVED IN QUESTION 2A...				TO BE DERIVED IN 2B...		
Revenue (have interviewee calculate)	10,000 sets @ \$1,500/set =	\$ 15,000,000			\$ 15,000,000	
Costs: (figures given once cost head is named)	% of of \$12mm Total Cost (to be given to interviewee)		Expected % Reduction (to be given to interviewee)	WHY: (Interviewee should give intuition behind each number)		increase/decrease
Raw materials	20%	\$ 2,400,000	0%	stays the same b/c producing the same amount	\$ 2,400,000	\$ -
Fixed Overhead	40%	\$ 4,800,000	-50%	Reduction of warehouse space (keep some in NC)	\$ 2,400,000	\$ (2,400,000)
Labor	20%	\$ 2,400,000	-25%	Fewer laborers loading and unloading at warehouses	\$ 1,800,000	\$ (600,000)
Shipping	10%	\$ 1,200,000	25%	FedEx is more expensive than trucking overall	\$ 1,500,000	\$ 300,000
Inventory Costs	10%	\$ 1,200,000	-50%	Less inventory in warehouses	\$ 600,000	\$ (600,000)
Total:	GIVEN:	\$ 12,000,000			\$ 8,700,000	\$ (3,300,000)
Profit Margin		20%			42%	
		<i>Just need approx....</i>			<i>Just need approx....</i>	

Case 10: The End of the Road

Prompt: Car manufacturers (this case will use GM as a proxy for the hypothetical client name) sell vehicles to car rental agencies, corporations, and nonprofits under the umbrella of “fleet sales.” At the end of that period, GM essentially recalls the vehicle and manages its sale into the aftermarket (used car market). It is easiest to think of this as GM owns the car and leases it out for a fixed period.

The client has initiated a small pilot that is exploring more profitable ways of disposing of fleet vehicles. Your job is to determine if we should roll out this pilot more broadly.

Under the old system, a fleet vehicle comes available in LA. GM contacts an auctioneer who purchases the vehicle from GM for \$500. The auctioneer picks up the vehicle, refurbishes it, and sells it to a local dealer. The local dealer sells the car to local customers.

Under the pilot scheme, GM has built an online auction site for customers located in Milwaukee. Online customers visit the site and can choose from fleet cars located anywhere in the US. Once a customer chooses a car, she can buy it online using GM financing or other personal means. The average auctioned car price is \$2500, so the new system has incremental revenue of \$2000.

Should we roll out the pilot further?

Suggested Framework:

Profitability

- Price
- Costs

Case Information:

Info to be given as case progresses:

- GM would continue to sell other fleet vehicles through the existing channel. It would cherry pick the best 30-50% of cars for this program.
- An auctioneer near the vehicle would pick up the car and refurbish it
- The vehicle would be transported to a dealer local to the customer
- The customer would test drive the vehicle at the local dealer, confirm terms, and take home the vehicle

Information available upon request:

- Customer can buy a car from any physical location
- The customers are the same type as before
- The auctioneer realizes the same margin on refurbishment but loses the margin on sale to dealer

- The dealer sells both new and used GM cars. The dealer realizes the same margin on services, but loses the margin on sale to customer
 - Fleet sales comprise 10% of sales
 - Resale revenues (profits) under the old system comprise \$25 MM (on 50K vehicles)
 - GM costs under new system:
 - \$600—Auctioneer for refurbishment
 - \$100—Transportation to customer
 - \$400-\$700—Dealer for transfer costs / warranty service
 - \$200—Administration and online infrastructure
 - If asked, depreciation is baked into these numbers
-

Recommended Solution:

- Original profit is \$500 per vehicle (\$25 million / 50,000 vehicles)
 - Under the pilot, GM sees an additional profit per vehicle of \$400-\$700. (\$2000 incremental revenue minus costs GM now bears as the car owner, totaling \$1300 - \$1600)
 - Total profit is now \$900-\$1200 (ask them this, they will likely forget that the \$400-\$700 is incremental and think the new system only generates \$400-\$700 profit)
 - So the new system is more profitable for GM
 - Auctioneer and dealers lose out on margin from value chain sales
-

Overall Recommendations:

A good answer includes:

- Calculating the math to derive unit profits
- Understanding that auctioneers and dealers lose out on this
- A better answer includes:
- Reference to the fact this is creating only \$20-\$35 MM additional profit for GM, and yet is disrupting the channel to do it
- Reference to the complicated logistics of owning the vehicle in the channel, including when GM should post the vehicle? Where does the vehicle sit while waiting to be bought online? Is there a time limit?
- Reference to the microeconomic effects that cherry picking cars for GM program will have on fleet sales that continue to operate through original channel
- A superior answer includes:
- Recognizing that GM could lose significantly if the channel revolts or if customers react to lesser quality vehicles available through existing sales channels
- A very measured approach for rollout that monitors effect on channel / partners with channel in a unique way
- Alt: Cancels the pilot to protect the channel
- Alt: Recognizes that the problem is having two channels; migrates all sales to online and eliminates old system

Things to avoid:

- Spending a long time calculating total MM impact – unit is sufficient
- What goes into GM profit calculation in old system – auctioneer buys from GM for \$500.

Weird Cases

In partner-level interviews, you may experience

- Not being given time to think and develop a framework
- A very quirky root cause
- A very quirky solution to the client's problem
- A different standard of success for the client than you are used to
- No quantitative information provided

You will be thrown into the fire, and you cannot quite prepare for what you will face. However, more practice will increase your exposure.

Be sure to remember:

1. Focus on the key question of the case. A business may have 99 problems, but a case usually only focuses on one of them.
2. Be 100% sure you know what the goal is. What does success for the client look like?
3. You can always "take a step back" to restate what you know and plot your path forward. Structure the client's options.
4. Do not go in circles.
5. Get creative. Be willing to be scrappy to solve a client's problem.

Case 1: Circuit Boards

Prompt: Your client is CircuitNow, a company that provides second-hand manufacturing expertise to golf courses. When an irrigation device breaks down at a golf course, CircuitNow replaces one of the device's dysfunctional circuits with a circuit that CircuitNow has refurbished in-house. CircuitNow's business model has worked well for many years, but as the company has expanded, it is struggling to replace circuits as fast as it had before. Golf courses rely on CircuitNow to provide same-day or next-day service, so CircuitNow will need to improve its performance to restore its client relationships.

CircuitNow's CEO has brought you on to determine the root cause of its slow delivery and suggest strategies for speeding up its services.

Question 1: What are the factors you would investigate to determine why replacement takes longer than before?

After 5-10 seconds jump in and say, "We don't have time to plan out every detail. Where would you like to start?"

Question 2: If the candidate wants to explore anything but inventory, tell them confidently that the answer does not lie in that direction.

When a candidate notes inventory, say the following:

You are correct that CircuitNow has an inventory problem – 50% of the time, the firm simply does not have enough refurbished circuits prepared to meet demand. Management has determined that this problem is not going to go away – its refurbishment processes are too slow, and golf courses are upgrading their irrigation systems all the time.

If the candidate does not jump in or gets off track, use the following leading question and deduct a few points: **What are the options for CircuitNow to have more inventory on hand?** A very good candidate will offer the following ideas (top candidate may have even more) *without* prompting.

1. Make circuits in-house
 - a. If candidates suggest this, inform them that CircuitNow does not have the in-house capabilities required to do this.
2. Purchase/Source circuits from:
 - a. Suppliers
 - i. If candidates suggest this, show Exhibit A.
 - b. Golf Courses
 - i. If candidates suggest this, show Exhibit B.

From Exhibit A, candidates should realize that the market value of a circuit is \$5,000, whereas the CircuitNow's margin multiplied by its number of replacements ($\$500 * 8$) is only \$4,000. Thus, sourcing circuits from the original suppliers would be unprofitable.

From Exhibit B, candidates should recognize that the scrap value of an irrigation machine is \$36,000, or \$3,000 per circuit. This option would be profitable.

A very good candidate would note that the 1 in 8 rate of dysfunctional circuits could be lower if CircuitNow buys from early adopters, so the \$1,000 margin is likely an underestimate.

A very good candidate says something along the lines of, "Financially, the best path forward is sourcing our circuits from early adopters. Now, we need to explore the potential risks or qualitative factors."

- **Risks** – the standard adopters may be buying from the early adopters at the mark-down: say this is unlikely
- Anything else: say don't worry about it
- **Opportunities** – Bundling buying scrap irrigation machines with refurbishment
- Higher scrap value could lead to more early adopters.

A top candidate at this point can summarize and recommend unprompted.

EXHIBIT A

Golf Course

Original Cost of Irrigation Unit to Golf Courses: \$60,000
Average Number of Units per Golf Course: 5
Number of Circuits per Irrigation Unit: 12

CircuitNow

Total Refurbishment Costs: \$250
Sale Price to Golf Courses: \$750

Every 1 in 8 circuit units is dysfunctional beyond repair.
These are scrapped for \$0.

EXHIBIT B

Irrigation Providers

New models are produced on an annual basis.
Each model sells for the standard \$60,000.
Circuits are subject to change from one model to the next.

Golf Courses

Type	Adoption Rate	Scrap Value
Early Adopters	Annually	60%
Standard Adopters	2 years	50%
Late Adopters	3 years	20%

Case 2: Zootopia

Prompt: Your client is the National Zoo in Washington, D.C. The Zoo is part of the Smithsonian Institute and thus funded by the federal government.

The Zoo has been thinking about getting a panda bear. Should they?

Key Insights (unprompted is best):

1. Two or more panda bears that can procreate is a longer-term solution, and aligns better with the “endangered species” theme.
 2. Profitability is not a concern, because this is government. The key driver of success for our client is foot traffic.
 3. Greater foot traffic is possible due to panda bears.
 4. Marketing will be essential to the success of adding panda bears.
 5. Something Creative (example): There are spillover effects that could be generated, such as a better U.S.-China relationship.
-

Question 1: What would you like to investigate?

After 5-10 seconds jump in and say, “We don’t have time to plan out every detail. Where would you like to start?”

Directions on reasons, goals of investment: A good candidate will clarify the client’s goal, while suggesting multiple. Confirm that attendance and awareness are important factors, but mostly attendance.

1. **Reasons/Goals of Investment – Attendance**
 - a. Note that zoo attendance is down slightly and management would like to see higher visitor traffic.
 - b. Follow-up: Would pandas generate more visitor traffic? Say, “We don’t know. How would you investigate that?”
 - c. Candidate should have a bunch of ideas. If they note evaluating prior additions to the zoo, say, “A few years back the zoo added flamingos and saw higher traffic. If pandas had the same effect, the zoo would meet its goals.”
 - d. A good response is, “A panda bear is a bigger deal than a flamingo. We should pursue this.”
 2. **Reasons/Goals of Investment – Profits (?)**
 - a. If the candidate asks about the *financial* considerations, note that the zoo can afford it. If asked further, say, “The zoo has free admission.”
 3. **Reasons/Goals of Investment – Awareness**
 - a. If candidate asks, say, “Yes, the panda is an endangered species we would want to promote.”
-

Directions on capabilities. While the answer to all of these questions is, “the zoo can handle it,” grouping all of these questions together should win a candidate a lot of points:

1. Does the zoo have the right climate?

2. Is there room for an exhibit?
3. Does the zoo have training on taking care of the panda?
4. Can the zoo feed the Panda properly?
5. Will the Panda otherwise survive in the zoo?
6. Any other similar, "Is the zoo able to care for the panda?" questions:
 - a. Answers are all, "Yes, the zoo has what it takes."

A top candidate will note/confirm that the zoo can handle it and not return to the topic, moving on to something else.

Directions on logistics. A good candidate will ask the following two questions within close proximity to one another:

1. Where is the zoo getting the panda?
2. What is the lifespan of a panda? **OR** Why just one panda?

Answer to (1): The panda would come from China through government negotiation. The zoo believes negotiations would be successful.

Answer to (2): Giant pandas live between 14 and 20 years in the wild and up to 35 years in captivity. The particular pandas we would purchase are 25-30 years old.

- Should prompt a follow-up of "that's not a very long time to have a panda."
-

If the candidate goes anywhere else beyond these topics, try to steer them back with questions like, "Is that really important to the decision?"

If the candidate nails these items but continues to ask other questions, say, "I think you have all you need to make an initial judgment call."

- A good candidate responds: "We should get multiple pandas."
-

Once there is agreement on getting the panda, say the following, "The zoo agreed and set up a contract with the Chinese government that they could have both 1 male and 1 female panda. Baby pandas will go back to China."

Ask for ideas on marketing so that the zoo achieves its goals of higher traffic (and less so endangered species awareness). Top candidates have endless marketing ideas:

1. Newspaper ads and billboards
2. Direct mail to the zoo's donors and subscribers
3. Email marketing or direct text message marketing
4. Social media is huge

Creative ideas

1. Live video feed of the panda (this actually exists)
2. "Sign up for updates on the panda's path from China to the U.S."
3. Social media posts on what pandas need to stay healthy in the zoo, which trainers can film as they prepare for the pandas.
4. Panda blog

Case 3: Pharmaceutical Pricing

Prompt: Your client is a pharmaceutical firm that has developed an AIDS drug. They have already created a plan to roll the drug out to the developed world (e.g., U.S., Europe, Japan), but have not yet developed a roll-out plan for the developing world, with nations that range from extremely poor, such as sub-Saharan Africa, to nations that are close to developed, such as Eastern Europe. The client wants to know how it should price this drug for the developing world.

Candidate should indicate that the drug will be priced differently depending where in the developing world it will be sold.

- If mentioned, say that you intend to look at four broad regions: China, Africa, Eastern Europe and the Middle East.
- A top candidate will have four separate discussions of each.

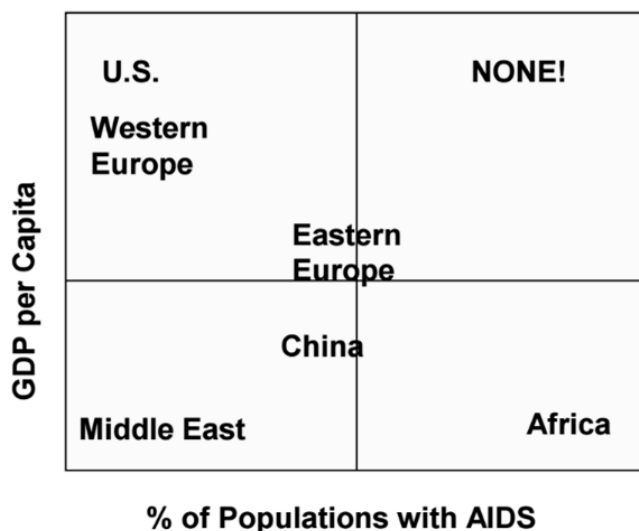
When the candidate walks through his/her framework, push them to tell you what factors should be considered in pricing the drug. The two most important factors are

1. GDP/Capita (proxy for the countries willingness to pay), and
2. Percent of population infected with HIV/AIDS.

Once the candidate identifies the above two criteria, have them draw a matrix with GDP/Capita on the y-axis and HIV/AIDS population on the x-axis. Ask the following questions:

- Where would you plot the U.S.?
- Where would you plot China?
- Where would you plot Africa?
- Where would you plot Eastern Europe?
- Where would you plot the Middle East?

You can work with the candidate to produce roughly the following chart:



Key Insights for Candidates:

What drives the penetrations of AIDS:

- Level of education
- Degree to which religion influences the society (e.g., in the Middle East)

Specific Countries – hypothesizing very welcomed

- U.S.: high income and low AIDS rate due to education and affluence; same with Western Europe
- Eastern Europe: lower GDP/Cap than U.S., but still not a “poor” region. More incidences of AIDS than U.S., but not yet a huge issue
- China: Income lower than Eastern Europe but similar level of AIDS incidence
- Middle East: low income (on average), but low level of AIDS due to influence of religion
- Africa: very poor and have highest AIDS incidence
- Upper right: there are no countries that fit this criteria.

Ask candidates if they can think of any countries in the top-right quadrant. Top candidates will note that no countries fit those two criteria.

Discussion 1: China – Market Sizing – How would you do it?

- Population of China x % with AIDS x percent that can be reached x market share x price of drug. Once established, offer info as requested:
 - Population: 1 billion
 - Percent with AIDS: 1%
 - Percent that can be reached: 20%
 - Market share: 4 other firms with the same AIDS drug: 20% share
 - Price: \$50/month
- Candidate should reach \$240mm

Discussion 2: Africa

- Ability to pay (income) is below the cost of manufacturing and selling the drug – what are the client/s options?
- Walk away – this would a PR disaster since Africa is the region with worst AIDS problem in the world and could lead to regulatory repercussions in the West.
- Give the drug away (charity)
- How can the client give the drug away and prevent it from being smuggled to the West?
- Legal enforcement – governments in Africa will be pre-occupied with other issues
- Distribution – have drug distributed in single doses at hospital or by Red Cross
- How can the client tell if the drug is being smuggled to the West?
- Color-code pills by region

Discussion 3: Eastern Europe

- Need to worry about people in Eastern Europe buying the drug and bringing it to Western Europe.
- Because income in Eastern Europe is not too much lower than income in Western Europe, the drug can be priced to prevent arbitrage:
- Price of Drug in Eastern Europe = Price of Drug in Western Europe – Cost of Transporting Drug from Eastern to Western Europe

Discussion 4: Middle East

- Can walk away from this market – AIDS is not a serious problem here.

Case 4: Megabank Underpenetration

Prompt: Megabank is a bank that issues credit cards. New cards are sold in three main ways:

1. Cross-sell to existing banking customers
2. Sell to new customers via direct mail campaigns
3. Distribute via private label partnerships with retailers and airlines

Megabank is looking for new card member growth areas in the United States. Its Hispanic market penetration is low compared to comparable banks' penetration rates. That group is a fast growing ethnicity and the bank wants to capitalize on it. What is the current problem (i.e., what are the possible reasons for the underpenetration in the Hispanic market?)? How should the bank move forward?

Question 1: What do you think might be going wrong?

Suggested answers, can be discussed briefly:

- Product Definition – Does the card, as it has been defined meet the needs of the customer?
 - Pricing of Credit Card Terms – Are the fees and rates on par with other comparable cards?
 - Marketing/Advertising – Are the messages properly directed to the audience (both content and distribution)?
 - Channel Partners – Does our target audience shop at / eat at / buy from our partners?
 - Internal Sales Messages/Incentive Structure – Are the sales messages correctly structure to entice our potential customer? Is our internal sales force (i.e., teller and desk personnel) trained and incented properly to promote the card? Discuss in detail (i.e., what might be misaligned, how that might affect adoption rates, etc.).
-

Question 2a: Calculate the number of additional members Megabank wants to add based on the following information:

- There are 40 million Hispanic people in the US
- 3/8ths of them are too young to have credit cards
- The average customer is worth \$180 to the bank over the course of his life
- Due to decreased acquisition costs, the average Hispanic customer is worth 10% more
- Currently, the bank's penetration rate is 10% (of valid customer prospects)
- They want to get to a 30% level over 5 years

Answer: 3/8ths of 40M are too young, so 5/8ths of 40M are valid customer prospects. That translates to a market of 25M people.

They want an additional 20% of the market, 20% of 25M = 5M

They need 5M additional members over 5 years

Question 2b (or follow-up): How much would Megabank be willing to spend on that additional market share?

Answer: If the average customer lifetime value is \$180, but the average Hispanic customer is worth 10% more, each customer is worth \$198. Rounding that to \$200, the total value of 5M extra members is \$1B.

Question 3: Cross-selling to branch customers is significantly below the industry norms (Average = 15,000 to 20,000 per month; Megabank = 5,000 per month). What might be the reason?

Possible Answers:

- Product – Is the Megabank product different from competitors' products? Interviewer: NO
 - Pricing – Are the fees and rates different than other comparable cards? Interviewer: NO
 - Customer – Are we targeting a fundamentally different audience?
 - Interviewer: NO
 - Channel Partners – Are the distribution channels misaligned?
 - Interviewer: NO
 - **Marketing/Advertising – Is there something wrong with our sales mechanism?**
Interviewer: **Let's investigate – move to Question 4.**
-

Question 4: Megabank uses direct mail campaigns to solicit new card members.

- Average response rate for the non-Hispanic population is 1%.
- Megabank's historical response rate from Hispanic prospects is 3%.
- The bank is planning to target 15M potential customers with each of 3 mailings this year.
- It expects that after the first mailing, the response rate will drop by 1/3rd in each of the subsequent mailings.
- The bank has a conversion rate of 45% of respondents.

How many new customers should the bank expect after the third mailing?

Calculation:

3% * 15M = 450,000 from first mailer
450,000 – 1/3*450,000 = 300,000 from second mailer
300,000 – 1/3*300,000 = 200,000 from third mailer
950,000 * 45% conversion = ~450,000 new customers – it's perfectly fine if the candidate gets a more exact number

Top candidates note that this ~450,000 is NOT enough to get to the 1 million yearly goal.

Summary Question: You bump into the SVP of Sales in the hall and she asks, “How does it look?” How do you respond (1 minute only)?

Sample Answer:

We are still crunching the numbers, but based on your current market position, your goal of increasing penetration by 20%, and historical conversion rates for direct mail campaigns, our initial estimates suggest that you will fall short of your goal by mainly relying on that method of acquisition. In fact, it will only get you about halfway to your goal. We need to discuss other measures to increase penetration of the Hispanic market. Specifically, we need to look at your sales force compensation structure, training and specific sales and marketing messages. Let's plan to review our formal recommendations later in the week.

Case 5: Everlasting Light Bulb

Prompt: You are a scientist. You have just invented the world's first everlasting light bulb. Fortunately, you have been granted a rock-solid patent for it. The current light bulb industry is a global monopoly, and it's yours for the taking. So how much is your patent worth?

Note to Interviewer: This case requires a thorough pre-read by the interviewer in order to make it work. Read thoroughly and expect a tense interview.

Info available upon request:

- Assume that the patent is for eternity.
 - You are valuing the PATENT not an individual light bulb.
 - This is a domestic light bulb only so has no commercial applications such as offices or cars.
 - There are 7B people in the world. You can assume that only 4B people have access to electricity.
 - You can assume that there are 8 people on average per household (HH).
 - Conventional light bulbs price: \$2. Everlasting light bulbs will be priced at \$5.
 - You can assume that conventional bulbs last 2 years.
 - Assume everyone switches to everlasting in year one. The phase of the transition will have little impact on the eternal patent value, right?!
 - Assume a profit margin of 20% on conventional and everlasting bulbs.
 - Can assume a 5% discount rate.
-

Recommended Solution:

A good candidate will ask what type of bulb this is as a clarifying question upfront before they attempt a framework. They should also ask for the length of the patent. They will discover it is a domestic bulb with an eternal patent.

A good candidate then sizes the market for domestic light bulbs. A typical way to start is with 7B people in the world, assuming, say, an average HH membership of 8. Assume only 4B people have electricity-supplied houses. Therefore there are 500M HH in the world.

Assume there are 5 rooms in the global average HH (not everyone is a rich American). Therefore there are 2.5B domestic rooms. Assume 2 bulbs on average so 5B domestic bulbs globally. With \$2 per bulb, amateurs then say the industry today is worth \$10B pa. But bulbs last for 2 years.

Therefore the industry today is worth \$5B. If the candidate doesn't get \$5B, just round a bit and call it \$5B. This is the "schoolboy" trap in this case. With a 20% margin, current profit is therefore \$1B pa.

Would people switch?

Yes. \$2 every two years or \$5 one-time is a no-brainer decision for the consumer to make. The everlasting bulb will pay for itself in a mere 5 years.

What is the value of the new industry?

Well, you only buy one everlasting bulb. Therefore $5B \text{ bulbs} * \$5 = \$25B$. 20% margin so \$5B one-time profit. Another “schoolboy” error is to say \$25B sales every year. Remember: it is an everlasting bulb.

So what?

The everlasting bulb will destroy an industry pumping out \$1B pa profit for the monopoly and cause a \$5B bonanza for the scientist.

So how much is the patent worth? The interviewer should then try to trick the interviewee and say its worth \$1B pa in profit so at 5% discount rate in perpetuity it's worth \$20B right?

It is surprisingly easy to get them to agree to this. Challenge them as follows.

But if it's worth \$5B in a one-off bonanza to the scientist, the monopoly should pay \$15B or less, right?

Again, it is easy to get them to agree to this new answer. Once they agree with \$14.5B you say...

But hang on, why not buy it and lock it in a safe? If the patent is bulletproof it's only worth \$5B, i.e. the standalone value to the scientist, right? Alternatively, aren't you a monopoly?

So you are the only potential buyer right? An external buyer would only pay \$5B (the value of the standalone patent). So why not pay \$5B and one cent?

They will then agree to this new answer, which is 1/3 of the \$15B they were proposing a while ago.

But hang on, the scientist is just a scientist. So he has no sales and marketing infrastructure. So it's worth less than \$5B, right? That just assumed a 20% steady state profit margin but he has no infrastructure. So assuming \$500m sales cost it's only worth \$4.5B, right?

Again, it is easy to get them to agree to this. They will be getting very suspicious of all the pat answers you are giving them but they are not far off here though.

So it's worth \$4.5B and one cent, right?

At this point they will feel so confused and stupid that they will be wary of you. A great candidate will confidently state yes but they are typically utterly demoralized at this point. But this is the “right” answer.

Notes:

Candidates often panic at the start as no real framework exists to answer this, except for the simple market sizing at the start. It is a great conceptual thinking decision flow-chart what-if style question that rewards candidates for confident thinking on their feet. It can be a very hard case. The best candidates remain composed while bombing certain sections. This test of this case is to show grace under fire. The role of discounting is also very unrealistic for most cases.

Supplements

This supplement is designed to build the basic skills needed for a case interview. Essentially, each case interview will put these skills together in a cohesive way. If you have never done a case, it is good to start with Supplement A and learn about the recruiting process through a quick one-pager.

We highly recommend starting here to build the raw structuring and math skills first, before jumping into full-length cases.

- Structuring – Initial frameworks are important to get right, because they either begin your case interview on the right foot or on the wrong track.
- Math – Quantitative prep is about collecting, processing, and delivering information in a clear and linear manner.
- Creativity – If you have practiced cases for a while, but find you struggle to come up with a large number of ideas, the creativity section is for you.

The best way to use this supplement is to participate with it. Simply browsing through the document will not build the skills you need. Remember, case skills are like parallel parking: you just have to get in your car and practice.

Take out paper, and build a framework. Talk the math problems out loud. Take the time to think through the creativity problems. The beginning of each section has a brief guide that teaches how to use the material – you will also learn what the interviewer will be looking for once you are in front of them.

Thanks again for working with the Notre Dame case materials, and hopefully you watch yourself grow in the preparation process!

Supplement A: Recruiting

At most consulting firms, you will have two cases in the first round of interviews and two or three cases in the second round. This case book does not address the behavioral portion of interviews, but behavioral factors can be weighted very heavily in interviews, and your poise while working through a case is highly important.

Why case interviews? Case interviews are an in-person diagnostic of your potential skills as a consultant. With investment in case practice, you can learn the necessary skills and perform well in your interviews.

Skills you will want to demonstrate:

- Prompt
 - Learning and synthesizing new information quickly
 - Nailing down the client's objective and standard of success
- Structuring
 - Shredding a problem into its component parts
 - Communicating in a systematic way
- Quantitative
 - Processing and articulating numbers clearly
 - Understanding the relevance of a calculation to a business decision
- Creativity
 - Suggesting innovative solutions to client problems
- Building rapport with the interviewer as you accomplish the client's objective

How do I practice? Preparation requires quantity and quality.

- We recommend starting with 5 structuring problems and 5-10 quantitative problems, and then moving to the hot air balloons case with a partner.
- Seek out a case partner who can provide you with honest feedback on your performance.
- In the next case, focus on improving those areas of feedback.
- There will be a point when you can always arrive at the "right" answer, but may not yet have a linear path to get there and/or a polished delivery.
- At this level, you should drill particular areas of improvement.
 - For example, if your verbal walkthroughs in math are unpolished, go back to the quantitative prep section and do 5 problems, receiving feedback after each one.
 - For example, if you lack creative ideas, go to Supplement D on creativity.
- As you advance, practicing with multiple people will make you well-rounded in your case performance.
- At an advanced stage, it is recommended you reach out to employees at consulting firms for additional guidance.
- Most candidates who truly accept feedback can reach a consistently high level of performance by 50 or 60 cases.

Supplement B: Initial Structuring

Many candidates struggle with structuring when they begin their preparation for case interviews. For McKinsey, this would pertain to the very first "What are the factors you would consider?" question. For Bain, this pertains to the way you initially lay out your approach before following that approach to a tee.

The only way to improve is through practice. Here are two ways to think about frameworks.

1. Buckets – You create initial “buckets” that are exhaustive in laying out where the root cause(s) of the problem/issue could lie. From these buckets, you can list several bulleted factors in each, or you can create an “issue tree.” The issue tree needs to be similarly exhaustive in identifying the root cause(s).
2. Levers – Imagine your initial buckets are the levers you can pull in addressing the case question. Then, once you pull a lever, a bunch of different stories can be the root cause of the problem you're trying to solve.

The textbook example is the profitability case. In a profitability case, a company that is struggling with declining profits approaches the consulting firm for help. For a profitability case, the three buckets are ALWAYS (1) revenues, (2) costs, and (3) market. Then, within each bucket, a bunch of things could be the culprit driving down revenues, ballooning costs, or shrinking/shifting the market.

As I said earlier, the best way to improve is to practice. The first portion of this guide has basic frameworks for easier case questions:

1. Ford, an American automaker, is facing declining profitability in its consumer truck division. What are the factors you would consider in assessing what do?
 2. Exxon Mobil, the world’s largest oil and gas company, has three main divisions – upstream, downstream, and chemicals. Its upstream business accounts for 70% of annual revenue, and involves both exploring new fields and extracting usable oil and gas from these fields. In recent years, Exxon Mobil has faced profitability setbacks in its upstream business. What factors would you consider here?
 3. Hilton Hotels manages a very successful chain of resorts around the world. For many years both its commercial hotels and resorts hotels were performing well. About 10 years ago, there was a marked decline in profits in **just** its resort hotels. However, nearly a decade later, profitability has still not been restored, and its executives are concerned. What factors would you consider here?
 4. WeChat, a Chinese mobile application, serves a function similar to WhatsApp. The company earns the bulk of its revenue through advertisements and WeChat pay. Tencent, the company that owns the app, is eager to expand into the South American market before going global. What factors would you consider here?
 5. Wegmans is a regional grocer in the New England and Mid-Atlantic United States. The company wants to expand its business model to home delivery of groceries, but is unsure whether it should or not. How would you decide?
-

Sample Frameworks:

(1) Ford, an American automaker, is facing declining profitability in its consumer truck division. What are the factors you would consider in assessing what do?

1. **Revenues are Down**
 - a. Declining number of Trucks sold – people buy cars instead?
 - b. Declining number of services associated with trucks
 - c. Declining price per truck sold
2. **Costs are Up**
 - a. Labor costs for the manufacturing process are up
 - b. Non-labor hardware costs for truck materials are up
 - c. Non-labor software costs for electronics/entertainment rose
3. **External Market Factors**
 - a. Nobody buys trucks anymore
 - b. A competitor makes a superior truck at a cheaper price

(2) Exxon Mobil, the world's largest oil and gas company, has three main divisions – upstream, downstream, and chemicals. Its upstream business accounts for 70% of annual revenue, and involves both exploring new fields and extracting usable oil and gas from these fields. In recent years, Exxon Mobil has faced profitability setbacks in its upstream business. What factors would you consider here?

1. **Revenues are Down**
 - a. Oil revenues are down
 - i. Oil prices OR quantity sold
 - b. Gas revenues are down
 - i. Gas prices OR quantity sold
2. **Costs are Up**
 - a. Oil/Gas – regulatory, labor, equipment, transportation, tax
 - b. Exploration – becoming costlier, or EV of success is down
 - c. Extraction – wells are more hidden, equipment sophisticated
3. **External Market Factors**
 - a. Alternative energy has overtaken oil and gas

Key to this framework is segmenting oil and gas for your interviewer.

(3) Hilton Hotels manages a very successful chain of resorts around the world. For many years both its commercial hotels and resorts hotels were performing well. About 10 years ago, there was a marked decline in profits in **just** its resort hotels. However, nearly a decade later, profitability has still not been restored, and its executives are concerned. What factors would you consider here?

1. **Revenues are Down – now ask, where do these come from?**
 - a. Business trips are down – post-2008 frugality?
 - b. Lavish vacations are down – families limiting expenses?
 - c. Use of hotel services has declined, e.g. spa, dinner, parking
2. **Costs are Up – must indicate costs specific to resorts**
 - a. Resorts are in countries with uncertain political landscapes
 - b. Hilton overly invested in resorts (either quantity or quality)
 - c. Maintenance costs of resorts have spiked

3. External Market Factors

- a. Trend away from resort vacations or conferences

Key to this framework is coming up with ideas that would apply to resorts but NOT to commercial hotels.

(4) WeChat, a Chinese mobile application, serves a function similar to WhatsApp. The company earns the bulk of its revenue through advertisements and WeChat pay. Tencent, the company that owns the app, is eager to expand into the South American market before going global. What factors would you consider here?

1. Financial Considerations

- a. Fixed Costs – setting up shop, regulatory/tax, investment
- b. Variable Costs – running the technology, maintenance
- c. Revenues – how many people would use such an app?
- d. Who will advertise with WeChat in South America? Prices?
- e. How much money will be transacted in South America, at what fee?

2. Market Factors

- a. Socio-Cultural – do South Americans send money via apps?
- b. Competitors – other players in chat, advertising, cash transfer?

3. Operational Factors

- a. Translating the app for Spanish and Portuguese market
- b. Regulatory – is it easy to expand a tech business to S. America?

(5) Wegmans is a regional grocer in the New England and Mid-Atlantic United States. The company wants to expand its business model to home delivery of groceries, but is unsure whether it should or not. How would you decide?

1. Financial Considerations

- a. Fixed Costs – trucks, packaging, marketing, distribution centers
- b. Variable Costs – labor, food and other inventory, gas
- c. Price & Quantity – how many people would use this service and how much would they be willing to pay for it?

2. Market Factors

- a. Competitors – Amazon, who else? Are we an early mover here?
- b. Cannibalization – Do people buy less overall if they buy online?

3. Operational Factors

- a. Infrastructure – do we use an app, do we use a website?
- b. Business model – product, service, subscription model?

These are just sample frameworks, so if you have all the same ideas in a structure, do not be worried if your buckets look different.

The above were more traditional case frameworks. Note that it is important to do the following:

- Be case-specific. Apply $P = R - C$ to a case, rather than simply writing it down.
- Be creative. You will be remembered if you have more ideas, or more innovative ideas.
- Be relatively quick. More than 2 minutes is too long. 45-60 seconds is ideal.

More Difficult Frameworks:

Let's try a few harder frameworks – you could see something similar in partner-level interviews. Use the skill of bucketing as before.

None of the examples below are going to be simple profitability or investment frameworks, but here are some everyday situations. What are your overall 2-3 buckets? What do you put in each?

1. Notre Dame's beautiful south quad is in danger. Father Jenkins is toying with the idea of covering this quad with a forest of planted trees. What are the factors he would consider when evaluating the idea of planting trees on all of south quad?
2. What are the factors you would consider when deciding whether to take notes on a notebook or electronically?
3. What are the factors your professor would consider when deciding how many students to have in their class? How to format their class (seminar, lecture, online lecture)?
4. Let's do some soul-searching. Say you want to get married. How would you determine the ideal age to marry someone?
5. Your client is a private equity firm evaluating adding an investment to its portfolio. What factors would you consider in determining yes or no?
6. Your client manages a parking lot -- all its costs are sunk, and now it wants to maximize revenue. What factors would you consider in determining how to charge for parking?
7. With current oil prices so low, your client is desperate to cut costs in its supply chain. What factors would you investigate in how to cut costs for an oil and gas company?

Sample Frameworks:

(1) Notre Dame's beautiful south quad is in danger. Father Jenkins is toying with the idea of covering this quad with a forest of planted trees. What are the factors he would consider when evaluating the idea of planting trees on all of south quad?

1. **Quantitative**
 - a. One-off set-up costs
 - b. Maintenance costs (grass v. forest)
2. **Qualitative – Aesthetic Factors**
 - a. Attracting students
 - b. Donors' reaction (tradition)
 - c. Light obstruction into surrounding buildings
3. **Qualitative – Practical Concerns**
 - a. Hosting events
 - b. Foot traffic flow
 - c. Length of time for trees to grow

(2) What are the factors you would consider when deciding whether to take notes on a notebook or electronically?

1. **Note-taking efficiency**
 - a. Speed
 - b. Accuracy

- c. Potential for distractions
- d. Cleanness of handwriting
- 2. **Storage**
 - a. Potential for loss/damage
 - b. Ease of access, review
- 3. **Memory**
 - a. Which allows for better commitment to long-term memory?
 - b. Do you learn better from studying written or typed notes?

(3) What are the factors your professor would consider when deciding how many students to have in their class? How to format their class (seminar, lecture, online lecture)?

These two questions are different and inter-linked. It is worthwhile to ask the interviewer clarifying questions regarding the subject the professor teaches.

- 1. **Student Demands**
 - a. How many students want to take the course?
 - b. Would student demand differ depending on the format?
 - c. Do students have access to online resources?
 - d. What teaching formats would the students have exposure to?
- 2. **Content**
 - a. Is the material objective or subjective?
 - b. Is it better learned through one-way teaching or collaboration?
 - c. What types of assignments will there be, and how are these corrected?
- 3. **Style**
 - a. Does the professor appreciate participation?
 - b. Does the professor want to know their students beyond the classroom?
 - c. In the professor's field, is a certain type of teaching more likely to lead to tenure?

(4) Ideal Marriage Age

- 1. **Pre-Marriage Considerations** – impacts the amount of time you'd want to wait before getting married
 - a. Education
 - i. Which degree is your goal?
 - ii. What city will you be in?
 - iii. How long does it take to attain this education?
 - b. Career
 - i. How stable do you want to be before marriage?
 - ii. How much travel?
 - iii. How far do you wish to be promoted prior to marriage?
 - iv. What are your salary expectations prior to marriage?
- 2. **Post-Marriage Considerations** – impacts the amount you'd like to accomplish after marriage
 - a. Children
 - i. How many children do you desire to have?
 - ii. Is it important to have a certain amount of distance between kids?
 - iii. What sort of home, job, and location do you need in order to raise kids the way you want to? How much time is required for this, and how much is achievable before marriage?
 - b. Career

- i. How do you expect your career to change after marriage?
- ii. Do you need to take on more or less responsibility in your career to support your family?
- iii. Will marriage limit your potential/commitment regarding your career? Does this conflict with your goals?

(5) Your client is a private equity firm evaluating adding an investment to its portfolio. What factors would you consider in determining yes or no?

Before we dive into this, we need to ask a number of questions. For a McKinsey interview, these questions can be “the most important factors” that we would consider. For Bain and BCG interviews, they are basic questions that you should get out of the way before drawing up your framework.

1. What is their goal? – To generate a positive return on investment i.e. to sell the business for more than the purchase price.
2. What is the opportunity cost? – Let’s assume the next-best investment of the same size will appreciate by 5% each year for the next 5 years.
3. What is the desired duration of our investment? – Let’s assume they’re investing for a 3-5 year period.
4. What is our investment thesis? Are we looking for multiple expansion, value appreciation as a result of debt reduction, or operational improvements? – Let’s assume they are looking at investing and improving the company’s operations.
5. How much would we invest in this business? – Let’s assume a \$100 million investment for 100% ownership of the business.
6. What industry is the business currently operating in, and do we have expertise/experience in that industry? – This is a consumer goods business and we do not have specific industry experience.

If you tried to build all of these questions into the framework for a Bain/BCG-type case, it could become unworkable. Having answered these questions however, we can set up a reasonable framework that will allow us to drive toward an answer. Once we have reached this point and understand that this case will be driven by improvements in operational efficiency, we can use a standard profitability framework to assess potential profit increases and their effects on the value of our investment.

For most private equity decisions, it can be helpful to think in three ways:

1. **Profits**
 - a. What return does the PE firm want, and in what time frame?
 - b. How does the PE firm expect the return to be achieved?
 - c. How much ownership does the firm receive in the investment?
 - d. How will the investment be structured?
2. **Precinct**
 - a. Is the industry/sector familiar to the firm?
 - b. Does the investment fall in line with the typical conditions sought?
 - c. Is the investment just an injection of capital, or more hands-on?
3. **People**
 - a. What is the perception of management?
 - b. Does the PE firm have ongoing relationships with management?
 - c. Does the PE firm expect management to follow its directives?

(6) Your client manages a parking lot – all its costs are sunk, and now it wants to maximize revenue. What factors would you consider in determining how to charge for parking?

1. Pricing

- a. What is the elasticity of demand?
- b. Are there any nearby competitors that we compete with on price?
- c. What are the other parking options nearby?
- d. What other transport options exist?
- e. What is our pricing format?
- f. Hourly, Daily, Weekly, Monthly, Overnight
- g. Do we use mobile, meters, or do we need an attendant?

2. Quantity

- a. How many spots can we fit in while still leaving space for large cars?
- b. Can we designate specific spots for cars of varying sizes?
- c. Is the mix of car sizes consistent across days and times?
- d. What percentage of the parking lot is typically full? At peak hours? At quiet hours?
- e. How can we increase this?

3. Alternative Business Models

- a. Designated spots for local businesses or local homeowners
- b. Allow customers to purchase their own designated spaces

(7) With current oil prices so low, your client is desperate to cut costs in its supply chain. What factors would you investigate in how to cut costs for an oil and gas company?

1. Labor Costs

- a. Off-Shore
 - i. Drilling, Supervising
 - ii. Pipeline Maintenance
- b. On-Shore
 - i. Support Services
 - ii. Management

2. Non-Labor Costs

- a. Off-Shore Equipment
 - i. Drills, Rigs (ships)
- b. On-Shore Equipment
 - i. Piping
 - ii. Transport Equipment

In capittally-intensive industries, fixed and variable costs can be a useless distinction.

Supplement C: Quantitative Prep

Case math is not seeing how quickly you can do $75 \text{ multiplied by } 40 = 3,000$. The math in these interviews is less about raw calculation and more about how you process a quantitative situation to arrive at a decision. Here is the general set of steps I would prescribe when working through the quantitative portion of a case.

1. Repeat the final answer your interviewer wants you to pin down
2. Identify information you may be missing and ask for it
3. Outline an approach you have in mind
4. Don't be afraid to outline half the problem you want to nail down first...and then see where things stand once you're there
5. Talk through what you're thinking if you get stuck, and be coachable -- interviewer is there to help
6. Go systematically through the problem to arrive at an answer, and throw it out there in a clear sentence
7. So what? Be decisive here: "great idea" "bad investment" "unrealistic goal" "this is a no-brainer" – feel free to qualify with info from your personal experience or from earlier in the case

For the following problems, I recommend working through them in two ways. The first way is to read the question on your own and try to solve it on scratch paper. Then you can do 3-4 questions at a time, and check the answer key to see if you get them right.

The second way is to give a friend the list of questions, and have that friend read the question aloud. This way allows you to practice listening, asking for missing information, and communicating your approach to obtaining the solution and reaching a decision. Ask for honest feedback from your friend, and you will improve.

Questions are on pages 92 through 96.
Answers are on pages 97 through 105.

Quantitative Prep Sample Questions:

(1) A \$15 million investment is projected to grow market share by 10%.

Does the investment payoff if the total market is \$100 million? \$200 million?

Bonus: What is the “breakeven size” of the market (for which the \$15 million investment leads to \$15 million market capture opportunity)?

(2) You’re considering a \$5 million investment in marketing efforts that pays off that very same year in \$5 million in added sales. That means there’s 0 gain in **profit** over the year.

One important quantitative factor to think about is naturally, will the added sales of this year spill over into future years?

Name 3-5 qualitative factors you would consider when reasoning through the investment (see a bunch of them at bottom of page).

(3) A competitor firm sells products for \$8 with a \$6 margin. Our products sell for \$12 a piece, and our variable costs are \$4.50. By what dollar value do we need to cut costs to have the same percentage profit margin as our competitors?

A competitor firm sells products for \$10, and their cost structure represents half of that price. If we want to undercut them by \$1 but make the same profit they do per product, how much would our product sell for and what would our costs have to be?

(4) You have a new technology, but it’s not profitable to bring it to market.

Name 3-5 options you have. How might you decide differently depending on the industry (let’s say a new bag of chips vs. a new diabetes self-testing solution)?

(5) A company has \$5 million in cash, and they are looking at leveraging that cash to expand into 3 markets – EMEA, Australia, China.

If the company played in all three markets, it would see \$20 million in profits.

If the company played in China, it would make double the profits of Australia.

If the company played in Australia, it would make \$20 million more in profits than if it played in EMEA.

What are the profits in each region?

It costs \$5 million to make an investment in each of the three regions. What should the company do?

(6) Healthcare is huge right now. In the population of America (300 million people), 20% of people are 50 years old or older. In the under 50 population, healthcare costs are \$5,000 per year, but for those in that 50+ cohort, costs are triple that figure. What are the total annual healthcare costs in the U.S.?

Bonus quantitative question:

(a) If the population increased to 500 million with the same demographic dynamic, by how much would healthcare expenditures grow?

Bonus qualitative questions:

- (a) If you are trying to cut total costs, which group would you focus on, 50+ or under 50? Why?
- (b) If healthcare costs are rising in the U.S., do you have any idea why?

(7) A retailer sells three items, with different cost structures.

Product	% Profit	Total Profit from Product
Shirts at \$20	15	\$7500
Pants at \$30	20	\$15000
Shoes at \$50	15	\$3000

How many shirts, pants, and shoes sell?

The retailer is considering a promotional sale of shoes for \$48.50. How many more pairs of shoes do they have to sell to make the same profit for shoes?

(8) A company with revenues of 54 million is operating at a loss that is equivalent to 10% of its costs. By how much does revenue need to increase so that 10% of its costs are profits?

(9) ½% (or .5%) of all customer service complaints are flagged for further review. Your team is investigating a new review process that is more thorough but would increase the time of each review from 20 to 25 minutes. The firm will not invest further resources in reviews, but will instead simply process fewer complaints. The team currently reviews 100% of flagged complaints. Under the new system, what percentage of flagged complaints would be reviewed?

If only 80% of flagged complaints were currently reviewed (rather than 100%), how would your answer change?

(10) A company classifies its consumers by tiers. Tier 1 customers average \$50 per visit and make an average of 12 visits per year. Tier 2 customers pay \$150 per visit and make 20 visits per year. Tier 3 customers pay \$250 per visit and make 30 visits per year. The company is considering a marketing strategy to move 800 customers from Tier 2 to Tier 3. In the middle of your analysis, the CEO walks in and wonders out loud, “couldn’t we just target a Tier 1 to Tier 2 transition instead?”

How many customers would need to move from Tier 1 to Tier 2 to equalize the impact of 800 customers transitioning from Tier 2 to Tier 3?

(11) A company in the healthcare space is considering raising their prices. If they raise prices 15%, their chances of getting sued are 10% (otherwise zero now), and if they raise prices 40%, their chances of getting sued are 30%. Market demand is 1 million units no matter the price (currently \$20), but a potential lawsuit would pack a 20 million dollar punch. Should the company raise prices at all?

(12) A firm wants to bundle hats and gloves, rather than sell them separately. Hats are currently \$15 with a \$5 profit margin, and gloves are currently \$25 with a 40% margin. As a bundle, they would price the combo at \$37. If the firm sells 1 million units of each product now, how many combos need to sell to break even?

Now the firm explores a hybrid option – selling both individual products and the combo. It forecasts selling 500,000 hats and 650,000 gloves under this schema. How many combos need to sell to restore the same level of profitability?

(13) A wedding ring diamond is often prescribed by jewelers to cost 1 and a half months' salary. To set the diamond in a band is usually 1/6 the cost of the diamond. If you're making two trips to the jeweler already, you decide to buy your own ring as well, but you're setting a total budget of 20k. How much can you spend on your own ring if your salary is \$108,000?

You are also exploring the idea of buying a Notre Dame class ring, but your wife won't be happy if your wedding ring costs less than the \$2500 class ring. Can you pull off buying both while staying under budget? By what percent does the ND class ring need to be discounted for your scheme to pay off?

(14) You toy with the idea of becoming a paperboy or papergirl, because you got a bike for Christmas, thereby dropping your investment costs to zero. The job goes like this: You buy 100 papers at 10 cents each and sell them for 25 cents a piece. You're new to this, so you estimate there's a 20% chance of a good day (sell 80 papers), 20% chance of a fair day (sell half) and a 60% chance of a flop (sell 10 papers). Should you pursue this career?

You have a cuter younger sibling who has a 60% chance of a fair day and a 20% chance of a flop. However, you have to pay your sibling \$1.50 for their hard work. Is this plan worth it?

(15) A library is considering moving more books to an electronic format. They want every dollar invested in the transition to lead to an additional 5 withdrawals per year. In the magazine section, the library has determined three things:

1. Moving to the electronic format will double the amount of magazines that can be stored in the magazine section.
2. There are currently 12,500 magazines and 100,000 withdrawals. However, expanding the number of total magazines will probably involve mixing in lower quality materials.
3. The investment amounts to \$15,000.

Among the new magazines made possible by the investment, how many withdrawals need to be made for the investment to be justifiable?

(16) Your client is a new airline that has opted to work with planes of size 100 seats

Seat	Space Required	Revenue
Economy	1 seat	\$100
Business	2.5 seats	\$300
First	3 seats	\$500

- (a) If your client wants to have 70 seats of economy class, how should it allocate the other 30 seats to maximize revenue? What is the annual revenue of the plane if it makes 50 flights per year?
- (b) An analyst at the client site has informed you that there is generally only demand for five (5) first-class seats per flight. How should you allocate seats now? What is your updated estimate for annual revenue?
- (c) Unfortunately, your client did not modify the plane in time. It has the seat configuration of part (a), and your client has pursued all possible strategies to fly a

full plane. To reconfigure the plane would cost \$650,000. How long would it take for reconfiguration to pay off?

(17) You are advising between two preschools for a friend's three-year-old child.

The first option is a \$800 per month child-care center, PlayNow. The second option is YouCare, which costs \$1000 per month. YouCare has a family plan, allowing each additional child to pay less. The first child costs \$1000 monthly, the second child costs \$600 monthly, the third child costs \$500 monthly, the fourth child costs \$400 monthly, the fifth child costs \$300 monthly, the sixth child costs \$200 monthly, the seventh child costs \$100 monthly, and the eighth child and every child thereafter is free.

Your friend is expecting a second child, but you have no idea whether she is planning to have any other kids. How would you go about making a recommendation?

(18) Your client is a premier cellphone company, and their latest model of the MePhone sold 700 million units. In preparation for the next version of the MePhone, the MePhone 2, the company has requested your assistance. They would like to see a 25% increase in units, and 20% increase in profits.

Each MePhone sold for \$500, of which 20% was profits. The MePhone 2 will sell for \$400 at the same percentage profit margin. Will the MePhone 2 lead to the desired 20% increase in profits? If not, what price increase is required to achieve the desired increase in profits, assuming the number of units sold would remain the same?

(19) A publisher is considering a \$10 million investment in 3D printing. This would allow for faster publishing times, and a permanent 20% reduction in maintenance and administrative costs. Currently, the publisher prints 12 books per year, each of which bring in \$1 million. Maintenance and administrative costs are a combined \$10 million each year.

What percent more books need to be published for the investment to pay off in two years' time?

(20) Bob's Bakery sells scones for \$1.50 each, or \$16.00 for a dozen. The bakery also sells scones by the gross (144 scones) to local grocery stores for \$160.

What is the cost savings by buying by the dozen? By the gross?

For some regulars who visit Bob's Bakery in person, Bob can offer the "Baker's Dozen," which means 13 scones rather than 12. Would it be preferable for a local grocery store to become a regular and buy several dozens this way?

(21) YouTube is considering broadcasting an original series. They anticipate capturing 8% of the billion-dollar market. However, if they could increase their market capture by 50%, they would break even on broadcasting not one, but two original series. Assuming the cost per series is equal and there are no fixed costs, what are the costs in broadcasting one original series? And what are the profits to YouTube if they enter with just one series as anticipated?

(22) Notre Dame is considering switching from Adidas to Under Armour for the upcoming season. This would impact two of the university's revenue streams – corporate athletics and casual bookstore sales. Regarding corporate athletics, it would cost \$2,500,000 per 30-second

ad spot to use the Under Armour brand in a commercial, rather than \$2,000,000 with Adidas. In terms of casual bookstore sales, the university makes \$5,000,000 in profits every year with Adidas. The university expects to price higher, raising profits by 40%. If the university produces two commercials per year, should it switch to Under Armour?

(23) Your client operates five YumBurger restaurants via a franchise agreement. The five-year franchise agreement dictates that the stores be open for a set number of hours per day and sell particular products under the YumBurger brand. Otherwise, the manager has considerable discretion regarding whom to hire and how to offer menu items.

Currently, your client is in the third year of the five-year agreement, which costs \$30 million (or \$6 million for each of the five years). Your client makes \$2 million per year in profits, but is considering switching to the YumFry brand. Under YumFry, your client expects to earn similar revenues, but the five-year agreement is only 2/3 the cost of YumBurger's agreement. If it costs \$15 million in legal fees to terminate the existing YumBurger contract and switch to YumFry, what should your client do?

(24) Your client is a wedding photographer that sells two kinds of photo package. The value package costs \$1500, and costs the photographer approximately 6 hours of time. The premier package costs \$4500, and requires approximately 12 hours of the photographer's time.

Assume there are 50 weeks in the year, and the photographer books no more than 2 weddings per week. Can the photographer make \$180,000 by only selling value packages? What is the minimum number of premier packages that must be purchased to achieve \$180,000 in annual income? How many hours per year will the photographer expect to work under these circumstances?

(25) Your client is interested in entering the SmartHome industry. In order to simplify the customer experience, the client wants to sell three differentiated products. The first product is a "Control Center" that is essentially a tablet-like device that can control multiple functions in the house. The Control Center would sell for \$2,000. The second product is a series of five distinct "hubs," which include window washing, roof repair, etc. Each hub can be sold separately for \$500, and when purchased, essentially becomes an app on the Control Center that can be accessed in a centralized location. The third product, "AllControl", is a six-piece set, which includes the Control Center and all five hubs. It will retail at \$4,000.

After conducting market research, you estimate that the market for Smart Homes is 100,000 households, of which your client will capture an initial 10%. Within its market capture, 70% will purchase just a Control Center, while 30% will purchase AllControl. Half of the people who purchase just the Control Center will buy one hub, 30% will buy two, and 20% will buy three or more.

How much revenue does your client expect to make in the SmartHome industry upon market entry?

Quantitative Prep Answers:

(1)

10% of a \$100 million market is \$10 million, so you don't get your \$15 million back. Don't make the investment. However, if we double the market, 10% of the \$200 million market is double \$10 million, or \$20 million. The \$15 mm investment now pays off.

Bonus: For the investment to just break even, 10% of the market has to equal the size of the investment, or \$15 million. So if \$15 million is 10% of the market, \$150 million is the total 100% size of the market.

(2)

- (a) Is brand awareness something worth promoting?
- (b) How will competitors respond in the future?
- (c) Will we limit potential market entrants from coming into the market?
- (d) How loyal are our customers? This ties to, will the investment spill over into future years?
- (e) Do we have excess inventory we want to get rid of? Or how much product are we planning to produce, and is \$5million more in product sold a tough ask?
- (f) Are we selling core products, or are we experimenting with new types of products?
- (g) Are we bringing something innovative to the market that allow us to explore our brand?
- (h) What else can we be doing with this \$5 million that might have greater impact?

The point is that there are endless possibilities.

(3)

A \$6 margin of an \$8 sale is a 75% profit margin. 75% margin of a \$12 product is \$9. That means costs have to be \$12 minus \$9, or \$3. If current costs are \$4.50, that means we need to cut costs down by \$4.50 minus \$3, or \$1.50. This means cutting costs by a third – sounds ambitious, but if a competitor is making a similar product in a similar quality way, it's clearly doable.

Now a competitor firm sells products for \$10, and has \$5 in costs (and \$5 in profits). We want to undercut them by \$1 – that means our products sell for \$9 rather than \$10. The hope here is that people buy from us instead, because we're cheaper. We want to make the same profit per product (\$5) as our competitors. That means our costs have to be the sale price of the product minus our profit. $\$9 - \$5 = \$4$.

(4)

- (a) Hold onto the technology for later. Patent it so we don't have legal woes.
- (b) Leverage the technology for a product that will sell. This would be like transferring one set of skills to another (using statistics in a psychology class).
- (c) Sell the technology to a competitor, or to the market in general.
- (d) Explore a combination of this unprofitable product with a different, more profitable product. Sometimes people will pay a premium for a "combo."

If the product is potato chips, there's not a lot you can do. If the product is a self-testing service diabetes, you may be able to more easily figure out how to create self-testing services for

bloodwork, cholesterol, or something else – these could potentially be more profitable in the market.

You could say a few things:

- More innovative industries may see a greater likelihood of advancing this technology further, so a sale is more likely.
- If the product is more expensive or reaches a larger market, you might be able to sell your proprietary knowledge at a higher price.

(5)

Set up some equations.

$$E + A + C = 20$$

$$C = 2A$$

$$A = E + 20 \quad \text{or} \quad A - 20 = E$$

Looks like three equations, three unknowns.

$$E + A + 2A = 20$$

$$A - 20 + A + 2A = 20$$

$$4A = 40$$

$$A = 10$$

$$C = 20$$

$$E = -10$$

Looks like China is your best bet, followed by Australia. EMEA looks like a disaster.

Take the \$5 million you have and invest in China. If you need to invest quickly in Australia, take out \$5 million in debt and invest in Australia immediately too. Otherwise, let China pay off and move into Australia from there.

(6)

Segment your populations. Out of 300 million people, 60 million are 50+ and 240 million are under 50. Now find the costs for each cohort. In the under 50 pool, 240 million have \$5000 in costs per year. What I do is make 5000, $5 * 1000$. $5 * 240$ million is 1.2 billion, and then $1.2 \text{ billion} * 1000$ is **1.2 trillion**. Then I have the 50+ pool of 60 million people, each paying \$15,000. I'm going to do the same thing. $15 * 60$ million or $(3 * 5 * 60)$ million is 900 million, and then $900 \text{ million} * 1000$ is **900 billion**. The total annual costs in the U.S. are 1.2 trillion + 900 billion, or 2.1 tril.

Because the demographic dynamics are the same, you don't need to recalculate the sizes of each population pool and then find the revised costs. Take a second to think about why that is. If your demographic dynamics changed, you would recalculate.

So you're growing the market from 300 mm to 500 mm, and that is an increase of 200 mm (or $2/3$ of the current market). $2/3$ of the current market is 1.4 trillion, so the total costs would balloon to $2.1 + 1.4 = \$3.5$ trillion. Some people would do $(500/300) * 2.1$ trillion and that would work too.

Who would I focus on? My gut tells me that older people cost a lot more anyway, and the costs as a whole are smaller in absolute terms (.9 trillion < 1.2 trillion). Thus, there seems to be more reduction potential for the under 50 cohort.

If you have some good reasons for the 50+ population (e.g. their costs are triple, so if their costs were reduced to the under 50 level, that would be 600 billion in savings), you will crush it with that answer too.

Do some structuring here. Either the population has to grow, and/or the cost per person has to grow.

Population grows: More people = more costs.

Costs per person grow: If proportionally more people are 50+ (demographic shift), that would raise costs per person, and thus raise total costs. If the healthcare costs themselves are rising, that could also explain it.

(7)

I would drop some columns in here.

Product	% Profit	Profit per Product	Total Profit of Product	Total Profit/ per product
Shirts at \$20	15	$\$20 \times 15\% = \3	\$7500	2500 shirts
Pants at \$30	20	$\$30 \times 20\% = \6	\$15000	2500 pants
Shoes at \$50	15	$\$50 \times 15\% = \7.50	\$3000	400 pairs of shoes

If they sell shoes for \$1.50 less, their profit per pair of shoes goes down to \$6.00. (See how I made somewhat of a shortcut there?)

The retailer wants profit to stay the same at \$3000, so at \$6 profit per pair of shoes, you'd have to sell 500 pairs of shoes to "break even." Any marketing promotion can be thought of as an "investment in price" that "pays off" by greater quantity sold.

You'd have to sell 100 more pairs of shoes to achieve the same profit. So what?

Selling 25% more shoes seems like a lot, but in absolute terms, 500 pairs of shoes is not a lot. Depending on whether this is an online retailer, one store, or multiple stores, and depending on whether these are daily figures, weekly figures or otherwise, and depending on how similar promotions usually perform, you could add some real insights to your answer.

(8)

At present, a revenue of 54 million represents 90% of the costs, but the targeted revenue is 110% of the costs. Thus, the multiplying factor would be 11/9, and 54 million * 11/9 = 66 million. That means the increase would be 66-54 or 12 million.

Another way to think about this is looking at costs. To figure out current costs, we set up: $(C - R)/C = 10\%$. $(C - 54) = (.1C)$ $.9C = 54$
 $54/(0.9) = 60$

So current costs are 60 million. And we want profits of 10% of this, or 6 million. Thus, the targeted revenue is $60 + 6 = 66$ million. $66 - 54 = 12$ million.

(9)

You don't need to know how many total complaints there are to answer this problem, but you can pick a number of complaints to simulate the problem.

The time of each review will increase by 5 minutes, which is a 25% increase. In order to compensate an increase of $(5/4)$, you have to multiply by the reciprocal of $(4/5)$. That means that 80% of flagged reviews would be processed, because 80% is $4/5$ of 100%.

Let's say there are 10,000 reviews, 50 are flagged, and each takes 20 minutes, so 1000 minutes are spent on reviews. In the new world, 50 will be flagged, but 1000 minutes of review time only covers 40 reviews when reviews take 25 minutes. That is a 20% reduction.

Thus, the next part of the problem tests your ability to keep track of what is going on. Regardless of how many reviews are processed, if the timing is the same, only $4/5$ or 80% of the number right now can be processed. Thus, if 80% of flagged complaints were reviewed in the old system, the new system would only be able to review $(4/5)*80\% = 64\%$ of flagged complaints.

(10)

The first step is establishing the revenue impact of each Tier of customer. Tier 1 value is $(\$50)(12) = \600 annually. Tier 2 value is $(\$150)(20) = \3000 annually. Tier 3 value is $(\$250)(30) = \7500 . Thus, moving someone from Tier 1 to Tier 2 yields $3000 - 600 = \$2400$, while moving someone from Tier 2 to Tier 3 yields $7500 - 3000 = \$4500$.

There are two ways you can approach the problem. You can look at the ratio of one transition to another. $\$2400:\4500 simplifies to 8:15. That means for every 8 customers transitioning from Tier 2 to Tier 3, 15 customers would have to transition from Tier 1 to Tier 2 to achieve equal revenue gain. Thus, 800 customers making a 2-3 transition is equivalent to 1500 customers making a 1-2 transition.

The second way is to look at the current marketing strategy, which would yield 800 people paying \$4500 more annually. Whenever I multiply by 800, I double a number three times. Then I add two zeroes. 4500, 9000, 18000, 36000, 3,600,000. Now I want to make 3.6 million from the \$2400 higher spend transition. I'm going to knock out two zeroes, leaving me with $(36,000) / 24$. If you can't do that in your head, factor 24 to 6 and 4, and then divide $(36,000) / 6 / 4$. $6000 / 4 = 1500$ people

(11)

The first thing I would notice is that current profits are \$20 million.

If prices rise 15% and the quantity sold is the same, profits will rise 15%, or \$3 million. The cost will be the **increased** expected value of the lawsuit, or $(10\%)*20$ million = 2 million. So you're factoring a profit increase of \$3 million and a cost increase of \$2 million. Sounds like a \$1 million win. Let's look at another.

If prices rise 40%, that means an \$8 million increase in profits $(40\%)*(\$20 \text{ million})$. The potential lawsuit packs the same punch, but the chances have tripled, so the increased expected cost is $(30%)*(20 \text{ million}) = \6 million . The difference in expected profit increase and cost increase is $8\text{mm} - 6\text{mm}$ or \$2 million.

You should recommend a 40% price increase while pushing back on the assumptions that demand remains constant and there may be other non-monetary risks (public goes wild, congressional hearings).

(12)

The total current profits are 1 million (\$5) + 1 million (\$25) (40%) = \$15 million
You can also think of the total profits as \$15mm, since 1 million of each are sold.

Now, the combo is priced \$3 less than the items bought separately, thus reducing profits for both hats and gloves from \$15 to \$12. An increase in quantity sold needs to compensate here. How do we get \$15 million in profits when we only make \$12 per bundle?

$\$15 \text{ million} / \$12 = 1.25 \text{ million bundles}$. That is 25% more of each product to achieve the same profitability.

Hybrid option: We still want to hit \$15 million. 500k hats make \$5 each, so that's \$2.5 million. 650k gloves make \$10 each, so that's \$6.5 million. That means \$9 million is accounted for by separate sales, so \$6 million $(15 - 9)$ must come from combos, which still make \$12 in profits. $\$6 \text{ million} / \$12 = 500,000 \text{ combos}$.

(13)

Sometimes it's fun to pretend to be rich. Monthly salary is $108\text{k}/12 = 9\text{k}$, so 1.5 months of salary is $(1.5)(9000) = \$13,500$. Now, $\$13,500/6$ is the cost of setting, and this equals \$2,250. Thus, the total cost of the diamond + setting is $\$13,500 + \$2,250 = \$15,750$.

If your budget is \$20,000, the remaining amount is $20\text{k} - 15.75\text{k} = \$4,250$. \$2500 is more than half of \$4,250 so you can't do both. If the class ring costing more is an issue, the best you can do is pay equal amounts for both. $\$4250/2 = \2125 .

Now what percent discount gets you from \$2500 to \$2125? You can set up $2125/2500$ and take the difference, or take the difference first and set up $375/2500$.

How do I solve for $2125/2500$? I want to get to a percentage, so I target dividing the denominator by 25 to get to 100 at the bottom. But $2125/25$ – who does that? Again, I factor and divide one at a time. $2125/5 = 2000/5 + 125/5 = 425$. Then I divide by 5 again, because dividing by 25 once is the same as dividing by 5 twice. $425/5 = 85$. So \$2125 is 85% of \$2500, and you'd want a 15% discount. $375/25 = 15\%$.

(14)

This is an expected value problem. You have to invest \$10, and want to make that back.

You have a 20% chance of making \$20, 20% chance of making \$12.50, and 60% of making \$2.50.

Your expected income is:

$$\begin{aligned}\text{Profits} &= (.2)(80 \cdot .25) + (.2)(50 \cdot .25) + (.6)(10 \cdot .25) \\ &= (.2)(20) + (.2)(12.5) + (.6)(2.5) \\ &= (4) + (2.5) + (1.5) = \$8\end{aligned}$$

If you expect to make \$8 per day, but you pay \$10 per day, this sounds like an awful deal.

Let's look at the cute sibling idea. Now, you will pay both \$10 for the papers and \$1.50 for your employee, or a total investment of \$11.50.

The expected value rises to \$12 per day.

$$\text{Profits} = (4) + (7.5) + (.5) = \$12$$

Thus, if you can convince your younger sibling, you have a good idea.

(15)

You have to process a bunch of numbers here to see what the target is. The target is that a \$15,000 investment leads to 75,000 withdrawals.

The question looks at the new (or additional) magazines. If magazines double, that amounts to 12,500 new magazines, and the library wants 75,000 withdrawals from these magazines. $75,000/12,500 = 6$ withdrawals per year.

The current level is $100,000/12,500 = 8$ withdrawals per year, so this sounds reasonable, even if the quality of new magazines is a little worse. The follow-up questions are: Can you find magazines just as easily? Will people want electronic versions 75% as much?

(16)

(a) An economy seat brings in $\$100/1 = \100 per seat. A business seat brings in $\$300/2.5 = \120 per seat. A first class seat brings in $\$500/3 \sim \167 per seat. Thus, a revenue maximizing strategy is to assign all 30 discretionary seats to first class, and yield 10 first-class seats.

Revenue per flight for economy would be $70 \text{ seats} \cdot \$100 \text{ per seat} = \7000 . Revenue per flight for first-class would be $10 \text{ seats} \cdot \$500 \text{ per seat} = \5000 . Thus, each flight would yield $7000 + 5000 = \$12,000$. Annual revenue at 50 flights per year would be $\$600,000$.

(b) If five first class seats are being filled, that means five first class seats are running empty. This takes up 15 seats on the plane, which should be allocated to business class, the next most profitable seating arrangement. $15/2.5 = 6$ seats. Updated revenue would subtract half of the first class revenue ($\$5000/2 = \2500) and add back 6 seats of business class revenue ($6 \cdot \$300 = \1800). This is a net reduction of \$700 per flight, or \$35,000 annually. Expected annual revenue would fall \$35,000 to \$565,000.

(c) This portion is designed to solicit some conversation. The plane configuration in part (a) has 10 first class seats, and only five are filled with first class passengers. However, the remaining five seats would be filled with economy passengers who would be "upgraded," as this

earns the airline \$500 more than it would earn by keeping those seats empty. This \$500 could be increased to \$1800 per flight if the plane were to be configured to business class seats. The marginal revenue per flight is thus \$1300, which should be compared to the price of configuration, or \$650,000. $\$650,000/\$1,300 = 500$ flights, which would take 10 years at fifty flights per year. Thus, the investment does not seem sound. A potential work-around would involve branding five of the first class seats as business by offering fewer services. This could potentially be a cheaper strategy.

(17)

For two children, PlayNow would cost $\$800 * 2 = \1600 . YouCare would cost $\$1,000 + \$600 = \$1,600$ as well for two children. If there are no qualitative differences between the two, YouCare is the safer choice in the case more children may be on the way. Otherwise, you would make the decision on qualitative factors.

(18)

Client goals are 875 million in unit sales (a 25% increase) and 20% increase in profits.

The MePhone achieved \$100 profit on all 700 million units, which is \$70 billion in revenue. The MePhone 2 will only achieve \$80 in profit on 875 million units. You can go ahead with the calculation, and you will reach \$70 billion, but there is a short-cut. The profits of the MePhone 2 are $4/5$ of the profits of the MePhone. The units sold of the MePhone 2 are $5/4$ of the units sold of the MePhone. Thus, if you multiply any level of profits by both $(4/5)$ and $(5/4)$, you will stay at the same level of profits. Thus, profits will be flat, rather than the anticipated 20% increase.

In order to achieve your client's objectives, the price must increase. In the real world, a price increase corresponds to some decline in units sold, but we disregard that here for simplicity. As before, the necessary price increase can be found using numbers or fractions. We will use fractions here.

The desired profits increase is $120/100$, or $6/5$, the current level of profits. Units sold will be $5/4$ of the current level. Thus, the profit per unit must be $(6/5) / (5/4)$ of the current level. This is $24/25$ or 96% percent of the current profit of \$100. Thus, the profits per unit must be \$96, which is a \$16 jump from current profits of \$80. Considering the phone retailed for \$500 last year, \$416 this year is still a solid decrease in retail price.

Fractions can be confusing, so think intuitively. If unit growth is increasing by 25%, but the client wants a profit increase of 20%, should the profits per unit rise or fall? Profits per unit should fall, because the 20% objective is more than compensated for by unit growth.

(19)

There are two benefits to the investment. The first is known, namely the 20% reduction in maintenance/administrative costs. This amounts to \$2 million per year. If the investment must pay off in two years' time, we must recoup \$10 million in two years. The reduction in maintenance/administrative costs recoups \$2 million each year for 2 years, for a total of \$4 million. The other \$6 million must be recouped by books, each of which bring in \$1 million.

That means an additional 6 books must be published across two years' time, or 3 books a year on average. 3 extra books per year is a 25% increase in books published per year.

(20)

$\$1.50 * 12 = \18.00 for buying a dozen scones individually. \$2 can be saved by purchasing by the dozen.

A gross is a "dozen dozen." Thus, buying a gross of scones for \$160 is cheaper than buying a dozen dozens ($\$16 * 12 = \192). The savings would be \$32. Buying a gross saves even more if the alternative is buying individually. $144 * \$1.5 = \216 , so savings would be \$56. This can also be derived by adding the cost savings from the individual to the dozen \$2 per dozen * 12 dozens = \$24 to the cost savings from the dozen to the gross \$32. $\$24 + \$32 = \$56$.

Buy purchasing 11 bakers' dozens, you would receive $13 * 11 = 143$ scones for a price of $\$16 * 11 = \176 . Even assuming that a difference of one scone is a wash, \$176 is still more expensive than buying by the gross for \$160.

(21)

YouTube's anticipated market capture is 8% of \$1 billion, or \$80 million. If this was augmented 50%, or \$40 million, they would break even on two series of equal cost. This means that \$120 million is equivalent to 2 series, and each series costs \$60 million.

Current profits can be forecast at \$80 million – \$60 million = \$20 million.

(22)

When multiple revenue streams are impacted, it is best to examine each individually.

In corporate athletics, Under Armour is \$500,000 more expensive than Adidas per commercial, and at two commercials per year, this amounts to \$1 million annually.

In bookstore sales, Under Armour would increase profits by 40% of \$5 million, or \$2 million per year.

Thus, the switch can yield \$1 million in yearly profits. However, if the number of commercials exceeded 4, Adidas would be the better deal.

(23)

This is an investment decision, where the cost of the investment is \$15 million.

For YumBurger, current annual profits are \$2 million, and current annual costs are \$6 million, so revenues are \$8 million.

For YumFry, revenues would remain \$8 million, but costs would fall to \$4 million (or \$10 million over five years), leading to \$4 million in annual profits.

Switching would lead to a marginal increase of \$2 million in profits, which should be compared to the switching cost of \$15 million. It would be unwise to switch now, since you could switch at

the end of the contract and save the \$15 million. Thus, switching is a good idea, but not right now.

(24)

The photographer does 100 weddings per year ($50 * 2$). The value package brings in \$1500. Selling exclusively (100) value packages brings in \$150,000 annually, which is less than \$180,000.

What is the minimum number of premier packages that must be purchased to achieve \$180,000 in annual income? By switching one package from value to premier, the photographer makes $\$4500 - \$1500 = \$3000$ in additional revenue. By switching 10 weddings from value to premier, the photographer can raise their salary \$30,000 from \$150,000 to \$180,000. This achieves the targeted income.

How many hours per year will the photographer expect to work under these circumstances? 90 weddings are value, and take 6 hours of time. This is 540 hours of time for value weddings per year. 10 weddings are premier, and take 12 hours of time. This is 120 hours of time for premier weddings per year. $540 + 120 = 660$ hours per year worked.

(25)

Simplifying the customer experience requires significant back-end work.

Your client expects to capture 10,000 households in the SmartHome market. 7,000 will purchase a Control Center, each costing \$2,000. $7000 * \$2000 = \14 million
Subtotal revenue = \$14 million

Of these 7000, half (3500) will buy one hub (\$500). $3500 * \$500 = \1.75 million
Of these 7000, 30% (2100) will buy two hubs (\$1000). $2100 * \$1000 = \2.1 million
Of these 7000, 20% (1400) will buy three or more hubs. The average of three and five hubs is four hubs (\$2000). $1400 * \$2000 = \2.8 million
Subtotal revenue = $\$1.75\text{mm} + \$2.1\text{mm} + \$2.8\text{mm} = \6.65 million

3000 homes will purchase AllControl (\$4000). $3000 * \$4000 = \12 million
Subtotal revenue = \$12 million

Expected revenue is the summation of these revenue streams, or \$32.65 million.

Supplement D: Creativity

This is a brief document on creativity. There will be three questions. Your goal is to come up with as many ideas as you can. I recommend timing yourself for 2 minutes initially to see what comes to mind, but then taking up to 5 or 10 minutes to keep considering more ideas.

Then, compare your answers to those provided. You may find you overlooked a solution bucket entirely. Or you may find that you came up with ideas not mentioned here. Either way, you will hopefully gain exposure to the multitude of ways to solve a problem.

Having the ideas is one thing, but verbalizing them is another. With practice, it will become easy to articulate a laundry list of solutions, and top candidates can even create solution “buckets” on the fly.

(1) You are nearly finished with a case for a shaving company that sells its products to younger men. Profits are down due to lower sales: all products are types of men’s razors sold in retail stores nationally.

Your interviewer asks: “How would you go about improving sales?”

(2) You get through a case and realize your client in Boston can cut a ton of supply costs by sourcing its cement from a Middle Eastern country. You don’t have any specific details yet, but Egypt and Yemen are clear front-runners.

Your interviewer asks “How would you choose between the two?”

(3) A superintendent of city school district has come to you for help. More than 90% of the students have scored below proficient in English and Math for the past 15 years.

How will you solve this long-standing academic performance problem?

Sample Answer Guide:

(Sample Answer to 1)

1. Marketing our Current Products
 - a. Physical Strategies
 - i. Billboards
 - ii. Print/Direct Mail
 - iii. Location Strategy –
 - iv. Free Samples or Investing in Price
 - b. Digital Strategies
 - i. Email Campaigns
 - ii. Website, Commercials – use a celebrity?
 - iii. Social Media (build an app?)
2. Launching New Products/Channels
 - a. Products
 - i. Women's
 - ii. Older Men/Women
 - iii. Different sized products (travel pack)
 - iv. Other sharp products
 - v. Shaving Cream, Soap, or other Complements
 - b. Channels beyond Retail Stores
 - i. Could we sell our products to hotels?
 - ii. Could we sell our products to hospitals?
 - iii. Could we sell our products to retirement facilities?
 - iv. Grocery stores, Gyms, Backpackers
3. Business Model Tweaks
 - a. Do people still want to buy razors in retail stores?
 - b. Bulk – Amazon / CostCo / Sam's Club quantities
 - c. Subscription Model
 - i. Could we pull off a dollar shave club business model?
 - ii. Could we innovate on this model using an app?
 - iii. Order from your phone?
 - d. High-End Product
 - i. Sell in salons?
 - ii. Open our own brick and mortar stores?

(Sample Answer to 2)

1. Financial
 - a. Is cement in one place cheaper? (Raw product costs)
 - b. Are prices set to rise in the future? Currency shocks?
 - c. Costs of setting up operations, legal expenses
 - d. Overhead costs of maintaining operations, labor expenses
2. Geographical
 - a. From Boston, Egypt is on the “near” side of the Suez Canal, whereas Yemen is on the “far” side – the Suez Canal has tolls, meaning it may be necessary to go around Africa
 - b. Are we shipping this ourselves or outsourcing?
 - c. What sort of ports are in each place? Are they always open? Safe? What size boats are accessible?
3. Relational
 - a. Do we have any alignment of management? Contacts?
 - b. Is the government stable? Do we need a license?
 - c. How well do we have to know the government?
 - d. Do we have experience lobbying in this region?
 - e. Language barriers?
4. Operational
 - a. How large is their supply of cement vis-à-vis what we need?
 - b. Who else is buying from them? Should we partner and buy a larger amount?
 - c. Is cement the only material we will pursue long-term? Do these countries offer other products we might buy as well?
 - d. Is there a bidding process for cement contracts, or just a market price? How flexible is our supplier on quantity?

(Sample Answer to 3)

There are two ways to approach this: Either the education is bad, and poor scores simply reflect that lack of quality, or the education is okay, but there is a misalignment between the schools' education and what is tested.

1. Staff
 - a. Who are our teachers? How educated are they? IQ level?
 - b. Are they experienced? Length of teaching in our district?
 - c. How are they evaluated? Do we have data to track efficacy?
 - d. How are principals evaluated? Where is the accountability?
 - e. Are they satisfied? Do we have burdensome policies?
 - f. Are they paid well? Do we have a performance bonus?
2. Students
 - a. What sort of home life do our kids come from?
 - b. How do they get to school? Does transportation take a while?
 - c. What proportion is disabled, mentally ill, or unable to learn?
 - d. Do we have any experience with improving outcomes, even for a very small subgroup of our students?
 - e. How do we address behavioral issues? Too harsh/lenient?
 - f. Are they satisfied? Rewarded for success?
 - g. How long do they spend on homework?
 - h. Do college outcomes match poor outcomes seen in K-12?
3. Curriculum
 - a. What do we seek to teach our students? Does this align to the material covered on the test? What content goals do we set?
 - b. Do teachers specialize? Or teach multiple subjects?
 - c. Do we have enough books? Do we update regularly?
 - d. How interactive/lecture-based are classes?
 - e. How much homework vs. classwork is assigned?
4. Educational Delivery
 - a. How long are kids in school? How much math and reading per day? Two periods per day of each or more may be appropriate.
 - b. How long is each class? Are important classes in the morning?
 - c. Are there breaks between classes? Recess?
 - d. Are we offering enough arts classes? Too many?
 - e. How much do we spend per student? Where does the \$ go?
 - f. Are public schools best? Charter or private options?