

CFE SDM Model Solutions

Fall 2021

1. Learning Objectives:

2. The candidate will understand measures of corporate value and their uses in corporate decision making.
5. The candidate will understand the role that organizational behavior and communication play in organizational decision making and efficacy, as well as learn how ineffective communication is a risk to organizations.

Learning Outcomes:

- (2a) Assess various measures that firm can use to assess value and recommend appropriate measures to evaluate corporate value.
- (2b) Assess how performance metrics and incentives could impact key business decisions and create value for shareholders:
 - Explain how managerial accounting can impact strategic decisions.
 - Explain and recommend methods a firm may use to allocate its costs and how these methods impact the perceived performance of a firm or its component lines of business.
- (5a) Apply best practice techniques to structure and communicate ideas logically and persuasively:
 - Explain differences between good and poor communication techniques and their implications
 - Apply techniques to structure ideas logically
 - Develop clear fact-based messages that can be communicated persuasively

Sources:

Accounting for Decision Making and Control - Ch. 5, 173-175

Accounting for Decision Making and Control - Ch. 7, 281-300

Organizational behavior Chapter 9, 292-319

Organizational behavior Chapter 10, 339-343

Strategic Management and Strategic Competitiveness – Ch.1, 15-16

1. Continued

SDM-187-19 20 Cognitive biases that screw up your decisions, All

The Pyramid Principle - Ch. 8, 1-15

Commentary on Question:

Candidates need to pay attention to how the question is asked. For some questions, candidates did not receive full credits because their answers did not cover all aspects the question asked, examples include question (b), (d), (e).

Solution:

- (a) Explain whether Frenz' current overhead allocation approach is insulating or non-insulating. Justify your answer.

Commentary on Question:

Most candidates received full credit on this question.

The current system is non-insulating. Overhead is allocated based on sales, so the better one store performs relative to others, the higher the overhead allocation.

- (b)
- (i) Define externality.
 - (ii) Describe one positive externality that Jeff Bemowski's proposal would bring to Frenz store managers who have high sales of products with a high profit margin.
 - (iii) Describe one negative externality that Jeff Bemowski's proposal may bring to Frenz store managers who have low sales of products with a high profit margin.

Commentary on Question:

Most candidates were unable to recall the definition of externality and so did not get full credit for part (i). For parts (ii) and (iii), some candidates only answered the existing impact which has already occurred to the store rather than address what "would" or "may" be brought to the store under Jeff's method.

(i) Definition

Externality is costs or benefits imposed on other individuals without their participation in the decision and without compensation for the costs or benefits imposed on them.

(ii) Positive externality: Motivate stores to improve profitability; review the current system for potential enhancement; encourage high-volume stores over low-volume stores.

1. Continued

- (iii) Negative externality: More resource demanded to conduct the research
- (c)
 - (i) Describe the impact on a store's income statement and balance sheet if a store were to increase inventory of non-perishable, non-coffee products.
 - (ii) Explain whether changing to Jeff Bemowski's proposed approach would create an incentive to over-produce.
 - (iii) Explain whether changing to Jeff Bemowski's proposed approach would create an agency problem.

Commentary on Question:

Candidates did not perform well on part ii. Most relied on the general description of the incentive to over-produce problem rather than apply the concept to the scenario in the question.

- (i) Balance sheet: Stores can bring in more inventory, increasing the value of inventory on the balance sheet.
Income statement: An increase in ending inventory will decrease COGS and thus increase the profit reported. (if candidates read the increased inventory as purchased and claim a decrease on profit, full credit was also given as long as the rationale is provided)
- (ii) There is no incentive to over-produce. The store acquires products to sell (COGS) rather than making the products. Overhead is allocated to the sale, not the inventory.
- (iii) Yes, there is an agency problem. Frenz's mission is to become the most recognizable coffee brand in the world. The current overhead approach ensures coffee products are not disadvantaged in terms of profitability compared to non-coffee products. Jeff's approach would let each store pursue the product line that is most profitable (i.e., short term gains are incentivized at the expense of long-term objectives).
- (d) Explain the negotiation tactics used by Jeff Bemowski during his conversation with Kitty Dunn.

Commentary on Question:

Full credit given to candidates who correctly identified two or more tactics from the syllabus material.

1. Continued

Distributive Tactics

1) Jeff is 'preventing the other from making a firm commitment to an outcome close to her target'. He is not conceding any points, ensuring Kitty commits to something closer to his goal.

2) Convince the other that your own target outcome is fair / Convince the other that her target outcome is unfair. Jeff uses the concept of fairness to store managers as an anchor for why the current system is unfair and his system is fair

3) In relation to profitable stores, 'convince the other that important third parties favor your own target outcome'.

Integrative Tactics

Insist on fair criteria for deciding among possible solutions. See 2 above.

- (e) Explain the negotiation tactics used by Kitty Dunn during her conversation with Jeff Bemowski.

Commentary on Question:

Full credit given to candidates who correctly identified two or more tactics from the syllabus material.

Distributive Tactics

1)'Convince the other that you feel very committed to reaching your target outcome'. She is willing to entertain Jeff's ideas to reach an outcome that works for both parties.

2)'Convince the other that your own target outcome is fair'. She links fairness to the system's treatment of sales and discount items.

Integrative Tactics

1)'Demonstrate that you are flexible with respect to various solutions'. Kitty often concedes points and assures to Jeff that she will give his ideas some investigation.

2)'Insist on fair criteria for deciding among possible solutions'. See 2 above.

Attitudinal Structuring Tactics

1) 'Fight the antagonism, not the antagonist'. While Jeff is a little hostile, Kitty makes an effort to discuss Jeff's points rather than how he is treating her in this exchange.

1. Continued

- (f) Explain which model of above-average returns best fits Frenz' industry.

Commentary on Question:

Most candidates only explained why I/O model a good fit. However, full credit was only awarded to those who also explained why the resource-based model is not a good fit.

I/O Model:

This model has assumptions as below:

1. External environment imposes constraints
2. All resources and capabilities are highly mobile
3. Firms have similar resources and capabilities
4. Decision makers are all rational

Frenz meets three of the assumptions:

Assumption 1: External environment imposes constraints

The externality that Frenz is exposed to is employee behavior. It is not something Frenz can really control, and employee opportunistic behavior of over-producing may result in Frenz not achieving above average returns.

Assumption 2&3: All resources and capabilities are highly mobile, and all firms have similar resources

This is the case where coffee beans are readily available and labor required for coffee industry is not highly specific, they are easily replaceable.

Assumption 4 is the only assumption that does not meet the criteria because decision makers are not acting rationally, and there is an agency problem between corporate and the store managers.

As new entrants sell same or similar products in the area, the resource model is not appropriate as it assumes resources are a competitive advantage which does not apply to this case.

2. Learning Objectives:

3. The candidate will understand how to apply decision making models to general managerial decisions within specified business constraints.

Learning Outcomes:

- (3a) Apply fundamental techniques and frameworks of management science to make informed business decisions:
 - Apply linear optimization models to managerial decisions.
 - Develop decision trees, scenario tests, and simulation models.
- (3c) Evaluate business situations and describe how quantitative and statistical methods can improved decision making.

Sources:

Data, Models, and Decisions: The fundamentals of Management Science pg. 1-48, 323-410, 411-450

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Define “collectively exhaustive” in the context of a Decision Tree Model.

Commentary on Question:

This was a knowledge recall question; candidates did extremely well.

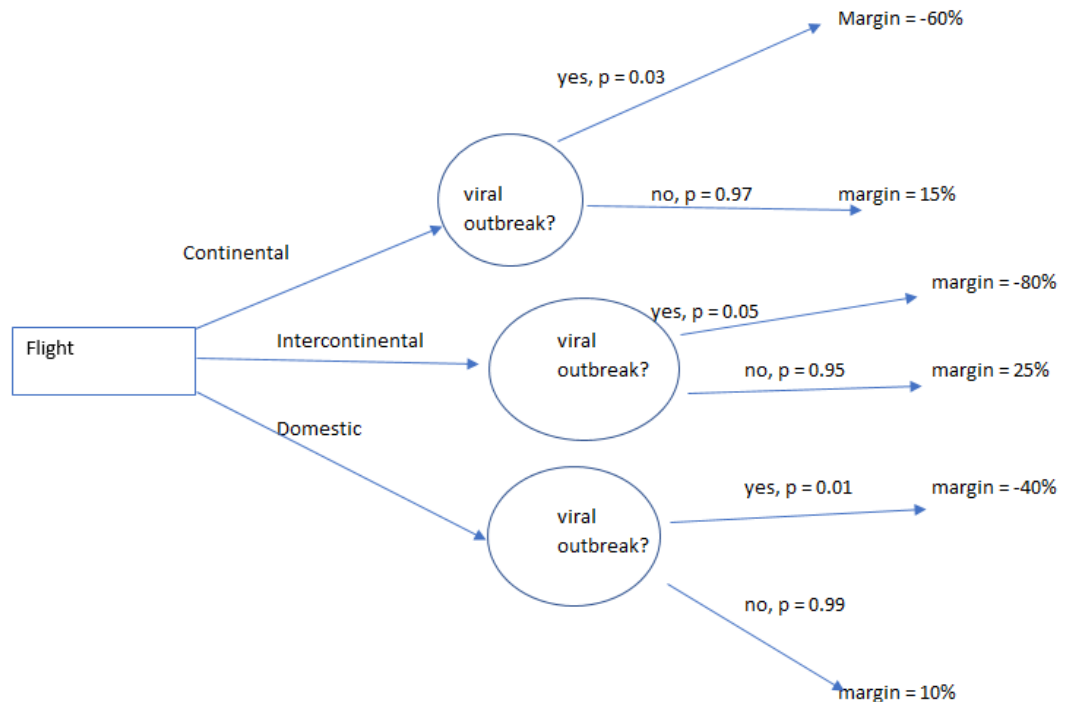
The term “collectively exhaustive” means that the set of outcomes considered represents the entire range of possible outcomes. That is, the possible outcomes considered entirely span the space of all possible outcomes.

- (b) Construct a decision tree to illustrate BJA management’s analysis for a given flight.

Commentary on Question:

Candidates did very well in this question.

2. Continued



- (c) State the objective function and constraint functions.

Commentary on Question:

Many candidates failed to consider the denominator in the objection function and only received partial marks for this question.

Let D and C be the number of domestic and international (continental) flights respectively.

Objection function:

$$\begin{aligned} \text{Max } & \left[\frac{D((99\%)(0.1) + 1\%(-0.4)) + C((97\%)(0.15) + 3\%(-0.6))}{50} \right] \\ & = \text{Max } [0.0019D + 0.00255C] \end{aligned}$$

Constraints:

$$D+C = 50$$

$$D, C \geq 0$$

$$\text{Var } (D) + \text{Var } (C) \leq 0.81$$

$$D(99\%)(0.01) + C(97\%)(0.03) \leq 0.81$$

$$0.0099D + 0.0291C \leq 0.81$$

2. Continued

- (d) For the optimization problem defined in part (c):
- Calculate the optimal solution. Show your work.
 - Critique BJA management's assumptions under the current model.
 - Explain the implications of Reputational Risk and how it relates to the current model.

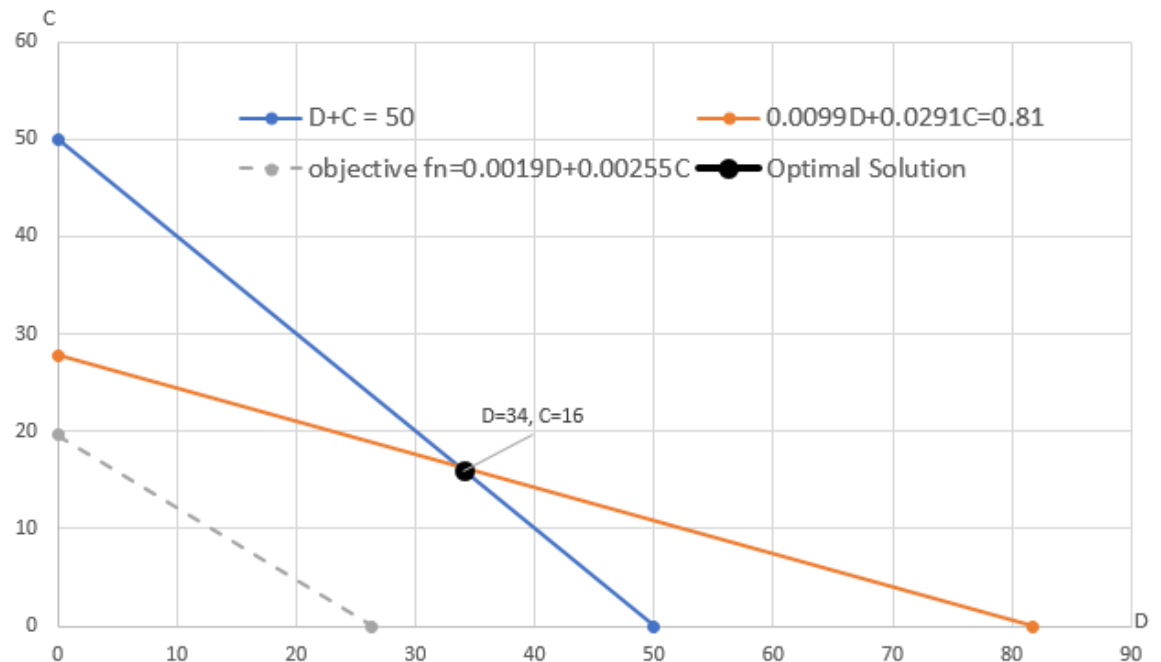
Commentary on Question:

Many candidates struggled with part (i) as they could not arrive at a reasonable solution. Parts (ii) and (iii) were well done.

(i)

Plotting the constraints and the objective function from part (c), we see that the optimal solution lies where the variance constraint and the sum constraint intercepts, where $D=34$ and $C=16$.

The objective function at the maximum is equal to 10.54%.



2. Continued

(ii)

There are a few issues with BJA management's assumptions. Assuming all flights are independent may not be appropriate. If the virus begins to spread in one region, adjacent regions, or other regions that are linked are more likely to become affected than completely unrelated regions. Management should consider that, especially considering that a lot of the routes might share destination stops. Further, personnel such as flight attendants, mechanics, and pilots might be used on more than one flight/route, which creates further dependence between them.

(iii)

BJA management is not considering reputational risk at all in their current model. If an outbreak occurs on one of their flights, it is highly likely that profitability could be impacted across the organization, as the organization is viewed as a collective. So management should consider the company-wide implications of reputational damage occurring from even a single instance of a viral outbreak occurring on one of their flights.

- (e) Recommend two ways to improve the model. Justify your answer.

Commentary on Question:

Connecting the solution with answers from c(ii) and c(iii) were required for full marks.

Consider correlation between prior flight's possibility of outbreak to subsequent flight's outbreaks. As mentioned in previous statements, BJA's model assumes independence of outbreaks between each flight. BJA should adapt a negative binomial instead of current binomial model which ignores interdependence. BJA should add an additional constraint around reputational risk to the model in the form of estimated financial impacts due to bad reputation causing reduction in number of customers. This helps reflect and adjust profit margins based on the risks BJA bears for these situations.

- (f) Critique your colleague's approach as it relates to creating and overcoming organizational barriers to effective communication.

Commentary on Question:

In general, students performed well on this question. Students who were able to identify what organizational barriers created AND what was overcoming these barriers with proper explanations received full marks.

2. Continued

My colleague's suggestions created the following organizational barriers:

Information overload – the complete analysis includes very technical details that may not be useful during high-level decision-making process, and it may cause people to focus on the wrong thing when making a decision, or create further confusion and making the meeting ineffective

Jargon/Know audience – the complete analysis contains a lot of special jargons that may not be understood by non-team members. This information should be adjusted and refined more appropriately for the targeted audiences

My colleague's following suggestions help overcome organizational barriers:

Regulate flow/timing – this is a very technical analysis with a lot of contents. It is important to send out pre-read material in advance to ensure the details are reviewed and appropriate questions are raised during discussion, making the in-person meeting more efficient and effective

Receive feedback – having an in-person meeting, non-verbal and verbal feedback can help ensure messages are delivered and understood correctly. An in-person meeting will also allow the presenters to be active listeners and respond to any of their concerns.

- (g) Explain the differences between a firm's general environment and a firm's industry environment.

Commentary on Question:

Candidates did fairly well in this section.

The general environment is composed of dimensions in the broader society that influence an industry and the firms within it.

A firm cannot directly control the general environment. They rather seek to recognize and predict the trends in each segment of the general environment.

The industry environment is the set of factors that directly influences a firm and its competitive actions and responses (Porter's 5 forces): the threat of new entrants, the power of suppliers, the power of buyers, the threat of products substitutes, and the intensity of rivalry among competing firms.

A firm may be able to influence/affect the industry environment in which they work by responding to the 5 forces. The interactions between the five factors of the industry environment determine an industry's profitability potential and the greater a firm's capacity to favorably influence its industry environment, the greater the likelihood it will earn above-average returns.

2. Continued

- (h) It is expected that passenger traffic across the industry will be reduced by 99% during a pandemic. BJA is considering using Code Sharing as a response.
- (i) Identify the type of strategic alliance that best describes code sharing. Justify your answer.
 - (ii) Recommend a specific action to help manage competitive risks in the type of alliance identified in (i). Justify your answer.
 - (iii) Explain whether using code sharing is a valid strategic response to a 99% drop in passenger traffic.

Commentary on Question:

For (ii), Candidate responses must be based on the reading, citing risks applicable to the material and a valid approach to managing the risk.

For (iii), candidates must conclude “No” to receive the full credits.

(i)
This is a Horizontal Complimentary Strategic Alliance. Firms are sharing planes (resources) at the same stage of the value chain.

(ii)
BJA and its partner(s) should clearly identify and document the logistics of the alliance, for example, which routes will each partner take, which fleets will be used, etc. In the code sharing agreement, BJA should clearly outline responsibilities of all of the airlines.

(iii)
No. Code sharing would minimize cost while allowing BJA to offer service to passengers. Complimentary Strategic Alliances are often used in response to rivals/competition. A drop in traffic due to the pandemic is likely a temporary change in the external environment that will not be sustained, thus it is not the right reason to use this strategy.

3. Learning Objectives:

4. The candidate will be able to analyze and model dynamic systems and evaluate the risks and sustainability of these complex systems.

Learning Outcomes:

- (4a) Identify and model the dynamic processes within a complex system:
 - Develop and apply causal loop diagrams that model the feedback structure of complex systems
 - Apply stocks and flows to dynamic modeling
 - Apply dynamic modeling to business decisions
- (4b) Explain the underlying factors that drive the sustainability and stability of a dynamic system:
 - Evaluate the structure and behavior of dynamic systems
 - Identify the factors that contribute to risk and instability in dynamic systems
- (4c) Evaluate complex systems and describe how actuarial principles can mitigate risks and improve sustainability.

Sources:

Business Dynamic Book by Steman, Chapter 9 S-Shaped Growth: Epidemics, Innovation Diffusion, and the Growth of New Products, pg. 295 - 347

Case Study, Frenz Corporation pg. 55 - 70

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Assess Frenz's financial health using Stocks & Flows.
 - (i) Identify the stocks on Frenz's financial statements. Justify your answer.
 - (ii) Identify the flows on Frenz's financial statements. Justify your answer.
 - (iii) Describe the change in two of the flows over the last 5 years.

Commentary on Question:

Candidates generally did well, full credit answers indicated examples of stocks and flows along with the financial statement where those items are found. Full credit for part iii required a description of what the candidate observed in the change of a flow not simply a directional indication.

3. Continued

- (i) Stocks are the accumulation of business activity – Asset and liabilities listed on the balance sheet are stocks within Frenz’s financial statements.
 - (ii) Flows are the total value of business transactions – Revenue and expenses found on the income statement are flows within Frenz’s financial statements.
 - (iii) Both expenses and revenue are rising, the pace of expense increases is offsetting additional sales revenue creating a relatively flat net income across the past 5 years.
- (b) Critique the CRO’s direction based on the Modelling Process. Justify your answer.

Commentary on Question:

Candidates scored well on this question when answering within the context of the Modelling Process. Candidates needed to answer within that context and indicate both Pros and Cons (Advantages/Disadvantages) of the CRO’s direction to receive full marks. Partial marks were assigned for incomplete answers. No credit was given for generic criticism.

Pros:

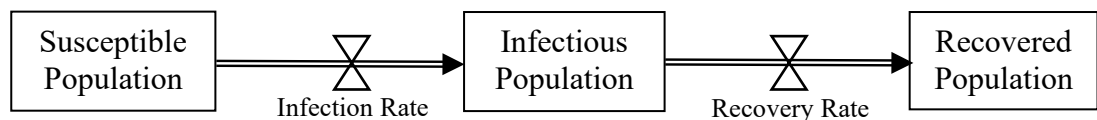
The CRO has narrowed the model down to solve a problem rather than attempt to model the entire system.

The proposed path allows for reasonability testing within the modelling process.

Cons:

The CRO has oversimplified the modeling process and failed to account for other material impacts to Frenz’s revenue these may include: (1) additional reduction in sales from the non-infected population, (2) added sources of revenue (grocery, etc.)

The CRO has proposed using the following SIR model.



- (c) Identify one variable referenced in the CRO’s original statement that has been explicitly excluded from the SIR model.

Commentary on Question:

Many candidates described variables implicitly or potentially excluded rather than explicit exclusions. To receive full credit, candidates needed to link the exclusion of the supply chain from the model to their answer.

3. Continued

The supply chain referenced in the CRO's original comment is explicitly excluded from the SIR model. This may be intentional, as he does not expect the supply chain to materially impact our ability to sell coffee.

Past pandemics have illustrated phenomena (I to IV):

- I. Once a pandemic is declared, governments take action to limit contact between people.
- II. As the infectious population increases, the infection rate increases.
- III. As the susceptible population decreases, the infection rate decreases.
- IV. Following a medical breakthrough, the time to recover from the infection decreases greatly.

- (d) Explain whether each phenomenon (I to IV) is endogenous or exogenous. Justify your answer.

Commentary on Question:

Most candidates received most of the marks for this question. Full credit required correct classification between exogenous and endogenous with a consistent explanation. Explanations that were vague or contained contradicting statements did not receive credit.

- I. Government interaction is **exogenous** as an outside force limiting the contact with the infected population, lowering the infection rate and ultimately the infected population.
- II. Increases in the infected population resulting in an increase in the infection rate in turn additionally increasing the infected population is **endogenous** and can be modeled as a reinforcing loop.
- III. Decreases in the susceptible population lowering the infection rate is **endogenous** and can be modeled as a balancing loop within the population limiting the increase in the infected population
- IV. Medical breakthroughs are **exogenous** they are an outside force that would significantly increase the recovery rate, reduce recovery time OR reduce the susceptible population.

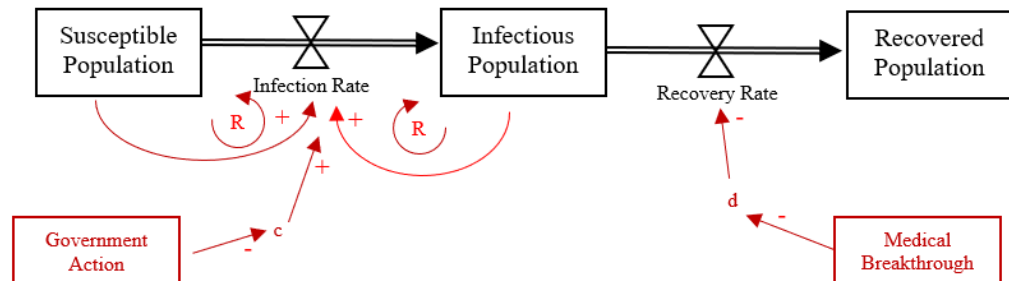
- (e) Sketch causal loops for each phenomenon (I to IV), including how they fit into the existing SIR model.

Commentary on Question:

Most candidates were able to get more than half of the total points. Most candidates drew the arrows with correct pointing, but not with correct signs. Most candidates missed the double R, with only one indicated.

3. Continued

Below is the chart of the correct answer. It is ok to not have everything in one chart, but the arrow needs to point to the right place, and the sign needs to be correct in order to receiving points.



- (f) Possible government actions (phenomenon I) include stay-at-home orders and mandatory transition to remote work rather than in-office.
- (i) Explain how these orders may affect Frenz’s competitive environment.
 - (ii) Recommend an enhancement to the CRO’s model based on your answer in (i).

Commentary on Question:

Most candidates missed the points on part (i), either didn’t cite the case, or didn’t specify the impact to the “prime locations”. Most candidates received the score for part (ii), the scores would be credited as long as the answers were consistent with part (i).

- (i) From case study: The profitability of individual companies depends on the ability to secure prime locations, drive store traffic, and deliver high-quality products. Stay-at-home and remote work will change where people go, which means “prime locations” will no longer be prime and store traffic will be limited.
 - (ii) Considering the facts of government actions, it is reasonable to assume non-infections population spends at a rate of 50% as the rules of stay-at-home and mandatory transition to remote work been implemented.
- (g) Propose a way to integrate the SIR model and the Stock & Flow model used for Frenz’s finances.

3. Continued

Commentary on Question:

Most candidates did mention the co-flow model but didn't specify the direction of movement or indicate how the SIR model would allow Frenz to model changes to financials (flows). To receive the full credits, candidates need to indicate the reductions of both inflows and outflows.

Frenz could introduce a co-flow model utilizing the SIR model developed. This would allow for the modeling of revenue and expenses as a result of the SIR output. Frenz would then be able to forecast sales (revenue inflow) reductions as a result of the pandemic and adjust inventory purchases, staffing, etc. (expense outflow) to better meet their financial obligations.

- (h)
- (i) Recommend a metric that avoids narrow framing and bias. Justify your answer.
 - (ii) Calculate the recommended metric for each initiative. Show your work.
 - (iii) Recommend which initiative(s) should be approved based on your answer to parts (i) and (ii). Justify your answer.

Commentary on Question:

Most candidates showed the understanding of narrow framing and bias. Most candidates could calculate correctly, but about half of the candidates didn't test option 1 and 3 together as the sum of these 2 is still under the budget.

- (i) To avoid bias, the management desirability rating should be excluded from the metric. To avoid narrow framing, the metric should include all other 3 factors into the calculation. Since the goal is to minimize the number of infections, a good metric could be the cost of each infected person reduced (Cost / (Number of customers impacted * Infection rate reduction)).
- (ii) Option 1: $500,000 / (15\% * 100,000) = \33.33
Option 2: $700,000 / (25\% * 90,000) = \31.11
Option 3: $350,000 / (10\% * 50,000) = \70
Option 1&3: $(500,000 + 350,000) / (15\% * 100,000 + 10\% * 50,000) = \42.5
- (iii) Based on the results from previous step, the lower number the better option is, the option 2 will be recommended. Even with option 1 and 3 together, which is still under the budget of 1 million, the cost efficient is still not as good as option 2.

4. Learning Objectives:

2. The candidate will understand measures of corporate value and their uses in corporate decision making.
5. The candidate will understand the role that organizational behavior and communication play in organizational decision making and efficacy, as well as learn how ineffective communication is a risk to organizations.

Learning Outcomes:

- (2a) Assess various measures that firm can use to assess value and recommend appropriate measures to evaluate corporate value.
- (5b) Evaluate the impact of human behavior factors on the effectiveness of decision-making processes within organizations:
 - Explain the role of cognitive biases on making suboptimal individual decisions
 - Evaluate the role of organizational behavior on organizational decision-making processes and efficacy

Sources:

Damordaran on Valuation Chapter 7 Relative Valuation pg. 254

Damordaran on Valuation Chapter 9 Value Multiples pg. 299-300

Damordaran on Valuation Chapter 13 Value of Control, pg 457-496 493-495

SDM-187-19, 20 Cognitive Biases that Screw Up Your Decisions

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a)
 - (i) Explain the benefits of a Cross-Border Acquisition for an acquiring firm.
 - (ii) Explain why Cross-Border Acquisitions are subject to more risk than those within a firm's home country.
 - (iii) Describe three pitfalls QRS may encounter with the acquisition of Darwin. Justify your answer.
 - (iv) Describe two ways QRS can mitigate the pitfalls mentioned in (ii). Justify your answer.

4. Continued

- (i) The acquired firm understands the customers in its home region and offers an established brand.
 - (ii) There are legal and political obstacles in different countries that make cross-border acquisitions more risky.
 - (iii) **Too much diversification (geographic):** the scope created by additional amounts of diversification often causes managers to rely on financial rather than strategic controls to evaluate business units' performance, rather than a true understanding of the business. For new regulation and a new portfolio of insurance products, ABC senior management will focus on short-term investments rather than long-term investments
Relying on acquisitions (instead of internal development): This results in the ability to innovate decreasing and causing a need for acquisitions to compete.
Becoming too large: size can also increase the complexity of the managerial challenge and create diseconomies of scope - not enough economic benefit to outweigh the costs of managing the more complex organization. Because ABC Life's management has a relatively simple product suite and regional scope, the increased complexity that Darwin brings to the organization will reduce or eliminate any economies of scale that could be achieved.
 - (iv) ABC can make sure the people in place at every level of management are knowledgeable and effective. This makes sure that the right information is being presented to the right people and the correct decisions are being made

If ABC ensures Darwin has robust R&D capabilities, they can maintain long-term competitive advantages
- (b) Alexis asks you to determine Darwin's current Fair Market Value as of year-end 2020.
- (i) Explain the difference between Firm Value and Enterprise Value.
 - (ii) Explain why Darwin's Enterprise Value may look low relative to Darwin's Firm Value.
 - (iii) Calculate a range and midpoint for Darwin's valuation using industry P/B and Forward P/E multiples in Exhibit 1 of Section 7A in the Case Study. Show your work.
 - (iv) Identify what values you have calculated in part (iii).

4. Continued

- (i) Firm Value = Market value of Equity + Debt
Enterprise Value = Market Value of Equity + Debt – Cash
- (ii) Darwin's enterprise value may look low due to large amounts of cash.
- (iii) Price to book relative valuation
Look up Darwin's [2020YE] book value from case study = statutory equity = \$678.6mm
Look up Industry Average price-to-book ratio from case study = 1.4
Valuation: \$950.04mm

Price to earnings relative valuation

Look up Darwin's [2021E] net income from case study = \$132.9mm
Look up Industry Average price-to-earnings ratio from case study = 11.3
Valuation: \$1501.77mm

Range / Midpoint

\$950mm to \$1502mm / \$1226mm

- (iv) This is the equity value.
- (c) QRS proposes to acquire Darwin for \$1.6 billion.
- (i) Explain the implication of a 0% control premium.
 - (ii) Describe two changes QRS could make at Darwin that would increase Firm Value. Justify your answer.

Independent analysts determine Darwin's optimal value is \$1.4 billion.

- (iii) Calculate the control premium using the midpoint value from part (b-iii). Show your work.
- (iv) Interpret the difference between the purchase price QRS is willing to pay and the optimal value. Justify your answer.
- (v) Explain how Darwin's activities and performance over the last 10 years have affected firm value. Justify your answer.

4. Continued

- (i) If control premium is 0%, this implies that the target company is optimally managed and the acquiring company cannot increase value through change in management.
- (ii) **Existing assets may be are poorly managed** → Darwin's margins are low (per case study), but QRS may have sufficient returns to have excess cash to invest and expand.

Management is overusing debt → Per case study. ABC has cash to reduce debt load.

- (iii) Control Premium = Optimal value / Fair Market Value – 100%
= $(\$1400 / 1226) - 1 = 14.2\%$
- (iv) The purchase price includes the control premium as well as the expected value of synergies created by purchase. ABC is looking for a distribution network, part of Darwin's growth has been by selling more products through financial institutions.
- (v) Increase growth from new investments
In 2013 the company expanded annuity distribution into financial institutions. It aims to add major new outlets, penetrate existing outlets, and expand the agency distribution by 2 - 3 regional offices per year. → Increase firm value.

Lengthening the high growth period

Darwin has invested in technology and staff to service both the customer and distribution channels and established a team so that a client service representative answers the phone within four rings 95% of the time. This attention on customer and distribution sets the company apart from its peer group and supports an aggressive organic growth strategy. → Increase firm value.

Increase efficiency in usage of existing assets

Unfavourably high leverage, expenses, operating income margin. → Decrease firm value.

4. Continued

- (d) Explain the cognitive bias in each statement and its potential risks in decision making.
- (i) “One clear benefit of QRS acquiring us is we will be able to leverage the technology and business techniques that may not be popular here yet. It will put us way ahead of our competitors!”
 - (ii) “Just last week, I read an article in the Wall Street Journal about how product innovation is just terrific in most European jurisdictions. We should be open to following QRS’s example to avoid being left behind here.”
 - (iii) “It’s great QRS made the first offer and showed their hand on how much they’re willing to pay. We can just negotiate the price up from there.”
 - (iv) “We’ve been consistently hitting our strategic targets since being acquired by RPPC in 2014. I’m certain we’ll be able to take on the growth opportunities from being acquired by QRS!”
- (i) **Pro innovation bias** → it is assumed that there will be at least as much value in the technology applied in Darwin’s region as it is in QRS’.
 - (ii) **Recency bias** → more weight is being placed on one new article rather than looking at a complete picture.
 - (iii) **Anchoring bias** → Too much reliance is being put on the first piece of information being presented.
 - (iv) **Overconfidence bias** → The statement shows that despite the increased risk and complexity of the merger, there is still confidence that growth targets can be hit.
- (e) Explain how an email from an assigned devil’s advocate could help combat the bias in the email sent by Brandon.

Since people know that the devil’s advocate is assigned into their role, they can present opposing ideas without fear of people judging or getting upset at them

By presenting the best opposing argument in writing, recipients can leverage both Brandon’s and the devil’s advocate’s messages and facilitate conversation.

5. Learning Objectives:

1. The candidate will understand and apply strategic management concepts and frameworks to corporate financial and ERM business problems.
3. The candidate will understand how to apply decision making models to general managerial decisions within specified business constraints.
5. The candidate will understand the role that organizational behavior and communication play in organizational decision making and efficacy, as well as learn how ineffective communication is a risk to organizations.

Learning Outcomes:

- (1a) Evaluate and apply strategic management concepts, recognizing factors that affect development and implementation of strategies:
 - Analyze the firm's external environment and the internal organization.
 - Describe and apply strategic management models, including Porter's five forces and value chain analysis.
 - Define types of business-level strategies and recommend an appropriate business-level strategy for a given situation.
 - Explain the impact of competitive dynamics on strategic management.
- (1b) Evaluate commonly used business growth strategies and their application under different economic risk and business environments:
 - Critique and evaluate internal/organic and external/inorganic growth strategies.
 - Assess and recommend growth strategies under different business situations and market opportunities, utilizing the applicable strategic management models.
- (3a) Apply fundamental techniques and frameworks of management science to make informed business decisions:
 - Apply linear optimization models to managerial decisions.
 - Develop decision trees, scenario tests, and simulation models.
- (3b) Apply statistical and quantification methods to analyze managerial decisions with uncertain conditions:
 - Apply probability distributions to business situations with random variables.
- (5b) Evaluate the impact of human behavior factors on the effectiveness of decision-making processes within organizations:
 - Explain the role of cognitive biases on making suboptimal individual decisions
 - Evaluate the role of organizational behavior on organizational decision-making processes and efficacy

5. Continued

Sources:

Case Study 2020 section 7 Darwin Life Insurance Company and 8 Snappy Life Insurance Company pg. 89-127

Data, Models, and Decisions: The fundamental of Management Science
Chp 1, Decision Analysis pg. 1-34, 54-65

Organizational Behavior - Ch. 10 pg. 323-327

Organizational Behavior - Ch. 12 pg. 378-392

Commentary on Question:

Commentary listed underneath question component.

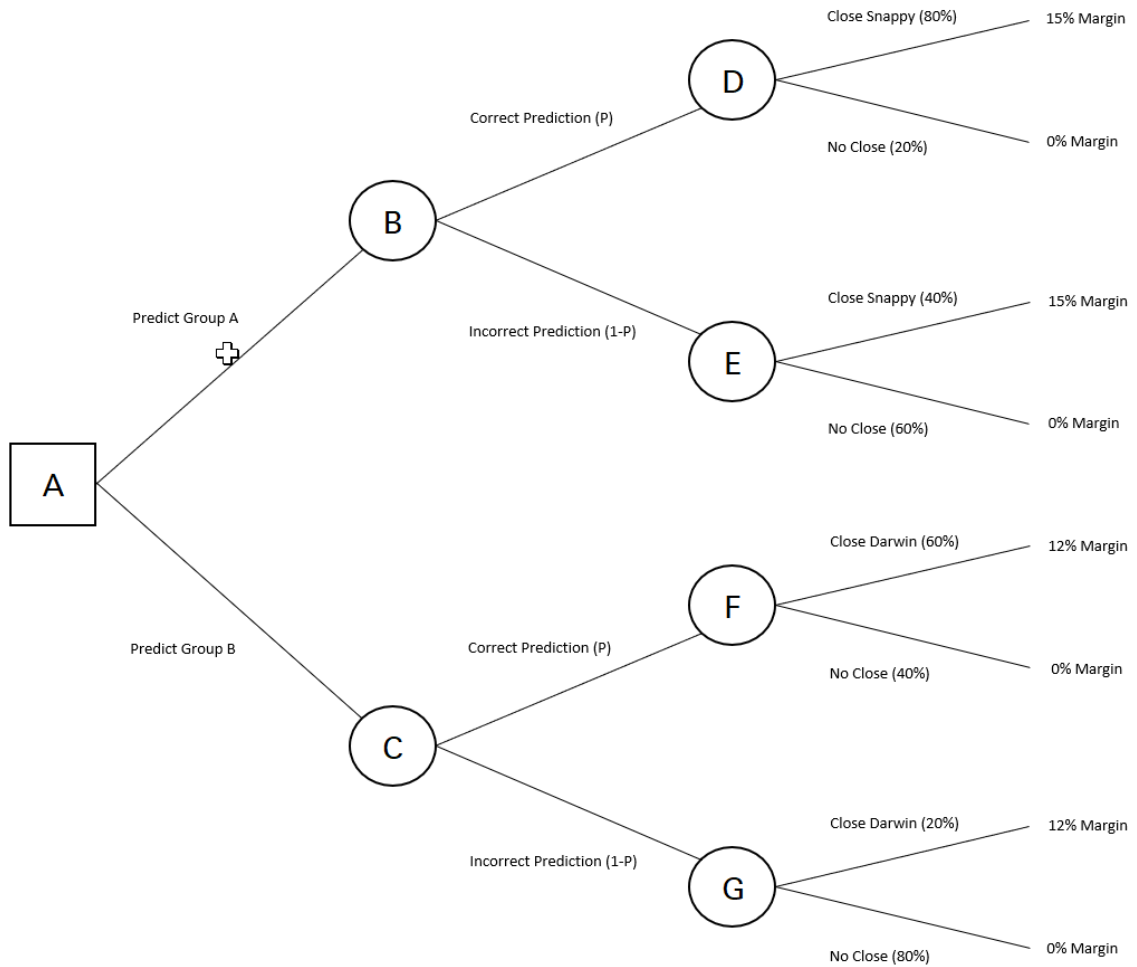
Solution:

- (a) Construct a decision tree describing the after-tax margin per potential customer.

Commentary on Question:

Candidates did reasonably well on this question with points earned for correctly identifying the decision path as well as noting the prediction probabilities, close rates, and margins. A common pitfall was to stop the decision tree too early and not show the "close / no close" split and the associated margins.

5. Continued



- (b) Calculate the Expected Monetary Value (EMV) for each possible algorithm outcome, as a function of P . Show your work.

Commentary on Question:

Partial credit was given if candidates were able to correctly calculate the EMV of the terminal nodes (D-G) but did not show the EMV's of Node B & C as a function of P .

5. Continued

Identified nodes are based on the decision tree displayed in part (a).

$$E[\text{Node D}] = 0.8 * 15\% = 12\%$$

$$E[\text{Node E}] = 0.4 * 15\% = 6\%$$

$$E[\text{Node F}] = 0.6 * 12\% = 7.2\%$$

$$E[\text{Node G}] = 0.2 * 12\% = 2.4\%$$

$$\begin{aligned} E[\text{Node B}] &= P * E[\text{Node D}] + (1-P) * E[\text{Node E}] \\ &= 0.12P + 0.06(1-P) \\ &= 0.06 + 0.06P \end{aligned}$$

$$\begin{aligned} E[\text{Node C}] &= P * E[\text{Node F}] + (1-P) * E[\text{Node G}] \\ &= 0.072P + 0.024(1-P) \\ &= 0.024 + 0.048P \end{aligned}$$

- (c) Determine the minimum value of P the algorithm needs to achieve in order to produce an overall EMV of at least 8.00%. Show your work.

Commentary on Question:

Part (c) is an extension of the work from part (b). Candidates needed to recognize they should weight the EMV for Nodes B & C together at 50% each and solve for that equation to be greater than 8%. Common pitfalls were not applying the 50% weighting or using an incorrect combination of the EMVs noted in (b).

Identified nodes are based on the decision tree displayed in part (a).

$$\begin{aligned} E[\text{Node A}] &= 0.5 * E[\text{Node B}] + 0.5 * E[\text{Node C}] > 0.08 \\ 0.03 + 0.03P + 0.012 + 0.024P &> 0.08 \\ 0.042 + 0.054P &> 0.08 \\ 0.054P &> 0.038 \\ P &> 70.37\% \end{aligned}$$

The algorithm needs an accuracy of at least 70.37% to achieve an overall EMV of at least 8%.

5. Continued

- (d) Recommend two enhancements to the algorithm in the platform workflow that can help improve the EMV. Justify your answer.

Commentary on Question:

Candidates generally did poorly on this part of the question. Many stated if one product isn't bought the other should be shown. The purpose of the algorithm is to determine which one of the two products to display, so showing both would be counter to its purpose. Some also provided improvements unrelated to the algorithm itself. To receive credit, candidates needed to provide reasonable, relevant enhancements to the algorithm, including justification. Many answers are possible, below is a sample response that would receive credit.

- 1) Given the more moderate discrepancy in the close rate among Group B, showing everyone the Snappy product regardless of classification has a 9% expected margin (average of 12% and 6%). A more effective naïve algorithm is just to show Snappy product.
 - 2) The algorithm can incorporate other relevant underwriting factors captured from the lifestyle questionnaire to provide even more customized pricing and potentially increase close rate among all customers.
- (e)
- (i) Identify two pitfalls of group decision making exhibited by the small group of Snappy employees. Justify your answer.
 - (ii) Identify the type of conflict occurring. Justify your answer.
 - (iii) Recommend a response and negotiating tactic for management. Justify your answer.

Commentary on Question:

The candidates had mixed performance on part (e). Many people were able to identify at least one of the two pitfalls listed below in part i. Some didn't provide an appropriate justification consistent with the definition of the pitfall. For part ii, the candidate needed to recognize that being an innovative, fast-mover company is a goal of Snappy, not a process/procedure. For part iii, some candidates provided more general responses instead of referencing specific conflict responses and negotiating tactics from the syllabus material. Some points were given for part iii for stating the compromise response if properly justified.

5. Continued

- (i) Group think - the disagreeing information offered by those members who met with leaders at Darwin is being dismissed in order to maintain consensus.

Common information basis – the small group is only considering the email sent to everyone, while failing to be mindful of the information from the group that met with Darwin's leaders.

- (ii) Substantive - the concern is in relation to goals of the new organization.
- (iii) The collaborating response utilizing integrative bargaining negotiating tactics is the best approach to realize both goals of Snappy and Darwin (win-win outcome).