

IE460 – Spring 2019

Case 0 - Due date – March 15, 2019 – 17:00 pm SOLVED INDIVIDUALLY

Information on Case 0

- **Case 0 is 2%.** Make sure that you review course material before you start. Cite sources used if any.
- **Grading Policy:** The case grades will not be only based on the correctness of the answers provided, but on the perceived degree of effort on the returned assignment. This means that even without obtaining the correct answers one can obtain full credit. The grade scale will be “2” (full effort, all questions); “1” (some effort or full effort, some questions); “0” (no effort or no submission). The submissions that exceed expectations may get a bonus – grade will be “3” (extra effort). Note that “2” corresponds to a grade out of 100% - 2% of the overall grade in this case. In this case, full effort means that you have outlined a consistent approach to solve the problem and understood the essence. Late submissions will not be accepted.
- The grading scale for the first 2 study questions are 2 points each (2 means close to full effort, 1 point means some effort and 0 point means no effort or no submission). The third study question is 1 point in total (1 means close to full effort or some meaningful effort and 0 point means not sufficient effort or no submission). Total points that would lead to your overall HW grade are given below:

Total Points	HW Grade
5+	3
4-5	2
1-3	1
0	0

- **Academic Dishonesty (taken from IE460 Course Information):** For assignments: Discussion of the course material and working in groups are effective ways of learning. However, this does not mean that you can copy the assignment from one of your friends. You can discuss with your friends, but you should be alone, without any written solution in front of you, when you actually prepare your assignment. It is extremely important to understand the value of this exercise in the process of learning. Any violation of the above understanding will result measures outlined in the student rules and regulations.
- **Submission Information:** An assignment submission box is to be placed in front of office EA325 about two days before submission date and is to be removed at the time of the deadline. You need to put your assignment in the designated box before the deadline. **Submission via e-mail is NOT accepted.**

Case 0 - China Imports: (page 444 of your text-book – see also the course WEB site).

The goal of this case is to get students to evaluate the cost of using different transportation modes for various product categories. Air freight and ocean shipping are the two transportation modes considered. Air freight is faster and has a lower minimum requirement but it is more expensive than ocean shipping. Smart-phones and decorative hardware are the two product categories considered. Smart-phones have high value and low weight while decorative hardware has lower value and greater weight. Also, demand for smart-phones is more unpredictable than demand for hardware.

Suggestions: Before you start solving the Case:

- 1) Read the case carefully. Although the case is at the end of Chapter 14, most related material is in Chapter 11, Chapter 12, as well as Chapter 14. Review/ read these chapters before solving the case (Note I haven't covered Chapter 12 in this course – you may also want to review Chapter 4 and Chapter 5 of Nahmias and Olsen – the text you used for IE375). The way things are described in the new text may be a bit different than your previous text-books.
- 2) Within the third study question, there are 3 sentences, each can be considered as a part. The first one is a bit more general and expects you to consider supply chain factors which are not considered by your model. The second part asks you to use your computations in Study Question 1 and 2 and respond. The last part is basically asking you how to generalize your finding in the second part considering the factors you have mentioned in the first part.

Hints on the solution:

- Hint 0: Outline how you would approach the problem and eventually respond to the question asked in Study Question 3, second sentence (I defined it as the second part above).
- Hint 1: Components of expected total cost to consider are: Inventory Holding Costs (Cycle, Safety Stock and In-transit); Transportation Costs (Shipping Costs – fixed and variable) – Read Chapter 12 to understand the replenishment policy to use – page 330 and more)
- Hint 2: Equation 12.11 in your text book to handle variability in lead-time as well as in demand.
- Hint 3: Use of spreadsheet to simplify computations – Note that you need to explicitly write the equations (formulas you are using in the spreadsheet).

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modality (per ton/km). Ed wondered which intermodal configuration would have the best sustainable performance for this supply chain.

Questions

1. Which intermodal configurations are possible for transporting the grain from Poland to 4Farmers?
2. Which intermodal configuration is the least expensive on a monthly basis?
3. Which intermodal configuration has the lowest GHG emissions (carbon foot print) on a monthly basis?
4. Which intermodal configuration would you suggest to be the most sustainable? Base your decision making on costs and the three environmental issues of greenhouse gas, nitrification, and acidification.

CASE STUDY

Selecting Transportation Modes for China Imports

Jackie Chen, vice president of China Imports, was looking to design a framework to select transportation modes for various products imported from China to the United States. His basic options were to either use air freight or ocean shipping in 20-foot containers. Air freight was faster and more reliable, but ocean shipping was much cheaper. He decided to evaluate the shipping decision for two very different product categories—consumer electronics, such as smartphones, and decorative hardware, such as door handles and hinges.

China Imports provided a variety of products to its customers from a warehouse near the port of Long Beach, California. The company incurred a holding cost of 25 percent on all inventory held and aimed to provide a 98 percent cycle service level on its products. The high level of service aligned with the high quality of products that the company imported.

Transportation Options from China

Air freight and ocean shipping were the two options available to move product from China to the United States. Air freight charged \$10 per kilogram shipped and required a minimum shipment of 50 kg. Besides being fast, air freight was also quite reliable. The average lead time on air freight was one week, with a standard deviation of lead time of 0.2 weeks. Ocean shipping was much cheaper and cost \$1,200 per 20-foot container. Given that each container could hold up to 15,000 kg, the shipping cost per kilo by ocean was more than a hundred

times cheaper than air freight. Ocean shipping, however, took longer and was less reliable. The average lead time using ocean shipping was nine weeks, with a standard deviation of three weeks.

Product Characteristics

Weekly demand for smartphones averaged 1,000 and had a standard deviation of 400. Each smartphone cost \$300 and weighed 0.1 kg. The typical life cycle for a smartphone was about one year; it was critical to not lose demand early in the life cycle because of a lack of product availability. Weekly demand for decorative hardware averaged 5,000, with a standard deviation of 1,000. Each unit of decorative hardware cost \$20 and weighed 1 kg. Decorative hardware tended to have a long life cycle—the company was still selling door handles and hinges that were introduced more than a decade earlier.

Study Questions

1. What is the annual cost of using air freight to import smartphones? What is the annual cost of using ocean shipping to import smartphones?
2. What is the annual cost of using air freight to import decorative hardware? What is the annual cost of using ocean shipping to import decorative hardware?
3. What other factors should be considered in the choice of transportation mode? What mode would you recommend for each product? Suggest a general framework that Jackie can use across all product categories.