Matching Supply with Demand 5th edition Cachon Solutions Manual

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Matching Supply with Demand: An Introduction to Operations Management 5e

Solutions to Chapter Problems

Chapter 2
The Process View of the Organization

Q2.1 Dell

The following steps refer directly to Exhibit 2.1.

#1: For 2001, we find in Dell's 10-k: Inventory = \$400 (in million)

#2: For 2001, we find in Dell's 10-k: COGS = \$26,442 (in million)

#3: Inventory turns $= \frac{26,442\$/year}{400\$} = 66.105$ turns per year

#4: Per unit Inventory cost $= \frac{40\% \text{ per year}}{66.105 \text{ per year}} = 0.605\%$ per year

Q2.2. Airline

We use Little's law to compute the flow time, since we know both the flow rate as well as the inventory level:

Flow Time = Inventory / Flow Rate = 35 passengers / 255 passengers per hour = 0.137 hours = *8.24 minutes*

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Q2.3 Inventory Cost

(a) Sales = \$60,000,000 per year / \$2000 per unit = 30,000 units sold per year

Inventory = \$20,000,000 / \$1000 per unit = 20,000 units in inventory

Flow Time = Inventory / Flow Rate = 20,000 / 30,000 per year = 2/3 year = 8 months

Turns = 1 / Flow Time = 1 / (2/3 year) = 1.5 *turns per year*

Note: we can also get this number directly by writing: Inventory turns = COGS / Inventory

(b) Cost of Inventory: 25% per year / 1.5 turns = 16.66%. For a \$1000 product, this would make an absolute inventory cost of \$166.66.

Q2.4. Apparel Retailing

(a) Revenue of \$100M implies COGS of \$50M (because of the 100% markup).
Turns = COGS / Inventory = \$50M / \$5M = 10.

(b) The inventory cost, given 10 turns, is 40% / 10 = 4%. For a 30\$ item, the inventory cost is $0.4 \times \$30 = \$1.20$ per unit.

Q2.5. La Villa

(a) Flow Rate = Inventory / Flow Time = 1200 skiers / 10 days = *120 skiers per day*

(b) Last year: on any given day, 10% (1 of 10) of skiers are on their first day of skiing

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This year: on any given day, 20% (1 of 5) of skiers are on their first day of skiing

Average amount spent in local restaurants (per skier)
Last year $= 0.1 * \$50 + 0.9 * \$30 = \$32$
This year $= 0.2 * \$50 + 0.8 * \$30 = \$34$
$\%$ change $= (\$34 - \$32) / \$32 = 6.25\%$ *increase*

Q2.6. Highway

We look at 1 mile of highway as our process. Since the speed is 60 miles per hour, it takes a car 1 minute to travel through the process (flow time).
There are 24 cars on ¼ of a mile, i.e. there are 96 cars on the 1 mile stretch (inventory).
Inventory = Flow Rate * Flow Time: 96 cars = Flow Rate * 1 minute
Thus, the Flow Rate is 96 cars per minute, corresponding to 96*60 = 5760 cars per hour.

Q2.7. Strohrmann Baking

The bread needs to be in the oven for 12 minutes (flow time). We want to produce at a flow rate of 4000 breads per hour, or 4000/60 = 66.66 breads per minute.

Inventory = Flow Rate * Flow Time: Inventory = 66.66 breads per minute* 12 minutes
Thus, Inventory = 800 breads, which is the required size of the oven.

Q2.8. Mt Kinley Consulting

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We have the following information available from the question:

Level	Inventory (number of consultants at that level)	Flow Time (time spent at that level)
Associate	200	4 years
Manager	60	6 years
Partner	20	10 years

(a) We can use Little's law to find the flow rate for associate consultants: Inventory = Flow Rate * Flow Time; 200 consultants = Flow Rate * 4 years; thus, the flow rate is 50 consultants per year, which need to be recruited to keep the firm in its current size (note: while there are also 50 consultants leaving the associate level, this says nothing about how many of them are dismissed vs how many of them are promoted to Manager level).

(b) We can perform a similar analysis at the manager level, which indicates that the flow rate there is 10 consultants. In order to have 10 consultants as a flow rate at the manager level, we need to promote 10 associates to manager level (remember, the firm is not recruiting to the higher ranks from the outside). Hence, every year, we dismiss 40 associates and promote 10 associates to the manager level (the odds at that level are 20%)

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Now, consider the partner level. The flow rate there is 2 consultants per year (obtained via the same calculations as before). Thus, from the 10 manager cases we evaluate every year, 8 are dismissed and 2 are promoted to partner (the odds at that level are thereby also 20%).

In order to find the odds of a new hire to become partner, we need to multiply the promotion probabilities: 0.2*0.2 = 0.04. Thus, a new hire has a 4% chance of making it to partner.

Q2.9. Major US Retailers

a. Product stays on average for 31.9 days in Costco's inventory
b. Costco has for a $5 product an inventory cost of $0.1311 which compares to a $0.2049 at Wal-Mart

Q2.10. McDonald's

a. Inventory turns for McDonald's were 92.3. They were 30.05 for Wendy's.
b. McDonald's has per unit inventory costs of 0.32%, which for a 3$ meal about $0.00975. That compares to 0.998% at Wendy's where the cost per meal is $0.0299.

Q2.11. BCH

I = 400 associates, T = 2 years. $R = I/T = 400 \text{ associates} / 2 \text{ yrs} = 200 \text{ associates} / \text{yr}$.

Q2.12. Kroger

$\text{Turns} = R/I = 76858/6244 = 12.3$

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