1450 Midland Ave – Suite 200 & 300
Scarborough, ON M1P 4Z8
(416) 290-0200

BU1283 – Operations Management – Group Assignment

Case Study Jack's Hardware

Several years ago, Jack Adams decided he had been working as a skilled building contractor long enough. He wanted to establish himself in a more predictable and pleasant work environment. He realized there was an opportunity in the medium-sized village where he lived, in that there was no local hardware store. People from the village would have to travel by car for more than 30 minutes to find the nearest hardware store, and Jack figured many in his village (and surrounding countryside) would rather come to a local store for their needs. His knowledge of hardware gained from his years as a contractor would serve him well in the hardware business.

The venture turned out to be quite successful, and his business grew. The problem he was currently facing was that the village was also growing, and at least one large hardware chain company was starting to look at the village as a possible opportunity for a new store. Jack realized that if he had competition in town, he needed to evaluate his business.

Jack had never paid much attention to the "small details" of his cost structure. He knew that his prices were somewhat higher than what the chain hardware stores in the nearby city charged, but he knew that his customer still came to him because he was in their village and also because they knew that Jack had lots of knowledge about hardware and could almost always answer their questions. His customers were loyal, but he also knew that if another store opened in the village with lower prices, he would certainly lose at least some of his business. Since those chains could order in bulk and get quantity discounts, they could charge less for their products.

One of Jack's clerks had recent experience in a warehouse setting and suggested to Jack that he might want to evaluate his inventory policies. If he could save some money with inventory, he might be able to lower his prices enough to stay reasonably price competitive, especially because of his great reputation for customer service.

Jack had a good friend who had a daughter who was a business student studying operations management at a well-known university, so Jack asked his friend if his daughter might be able to help. She agreed and asked Jack to provide basic data about two of his more important products. She said she would evaluate options for Jack, and if it was successful, he could expand the approach to more of his items.

Here is the data that Jack provided for the two items:

ITEM A

Item Cost: CAD 2.80 each

Order Cost: CAD 15.00 per order

1450 Midland Ave – Suite 200 & 300
Scarborough, ON M1P 4Z8
(416) 290-0200

Inventory Holding Cost: 18% per year

Average demand per year: 1000

Currently (at the recommendation of the supplier) the amount ordered per order = 100

ITEM B

Item Cost: CAD 12.50 each

Order Cost: CAD 22.50 per order

Inventory Holding Cost: 18% per year

Average demand per year: 750

Currently (at the recommendation of the supplier) amount ordered per order = 60

Actual demand over the last 20 weeks:

ITEM A	Week	ITEM B
24	1	12
15	2	9
21	3	17
11	4	20
8	5	18
26	6	6
18	7	12
30	8	16
14	9	4
21	10	13
28	11	5
7	12	19
19	13	22
23	14	8
12	15	10
29	16	11
17	17	16
9	18	13
22	19	8
13	20	19

The current inventory (at the beginning of week 1) for item A is 30, and item B is 25.

The student doing the evaluation said she wanted to evaluate using and economic order quantity (EOQ) and a periodic order quantity (POQ) and compare both to the existing policy using the same criteria (the only difference being the

1450 Midland Ave – Suite 200 & 300
Scarborough, ON M1P 4Z8
(416) 290-0200

order size). The current policy on reordering items was to order when the inventory level dropped to one week's average usage (the supplier was able to respond to all orders from Jack in about one week), but just in case that week's demand was little higher than average, he wanted to add a bit of a buffer of 15% weekly demand. He didn't want to lose a sale if he ran out before his new order from the supplier came in. In the past he didn't care so much because most of his customers could wait for a day or two for a part was out of stock, but Jack knew that with a potential new competitor coming to town that many of his customers might go to the new store if Jack was out of stock, and he thought that even though the 15% extra might cost him a bit more in inventory cost it was likely worth it to prevent lost sales and perhaps lost customer loyalty.

The student was a bit concerned about evaluating the POQ situation because it meant the inventory would not be monitored on a regular basis until the end of the defined period. While that was an advantage for saving constant inventory counts, it might mean that if the demand were unusually high, they could run out of stock without even knowing it was low. Given that the items are sold on demand, there is no opportunity to "look ahead" at demand.

For the two items in question, the average weekly usage is as follows:

The average weekly usage for A = 100/52 = 19.2 or 19 units

The average weekly usage for B = 750/52 = 14.4 or 14 units.

Applying the 15% "buffer," the critical inventory values are 22 units for item A and 16 units for item B Applying those values for the current lot size and the EOQ would be simple-whenever the inventory equalled or went lower than the critical value, then a replacement order would be activated.

The POQ situation was a bit different. For convenience, the student decided that when the end of the period came that they should order based on the following approach:

Order size = EOQ + (critical inventory value) – (existing inventory at time of reorder)

She decided this since the POQ is based on the EOQ, she did not want to order too much (in case there was lots of inventory at the time of review) yet she also wanted to try to keep the inventory as close to the "critical value" as possible by the end of the review period.

1. Calculate the EOQ for both item A and B
2. Calculate the ordering period for each item using period order quantity (POQ) based on the EOQ.
3. For the 20 weeks (and the current inventory) calculate the order receipts using the current order size, the EOQ, and the POQ. Calculate the ending inventory for each week, and then the total inventory carried over the 20 weeks. For the POQ calculation, assume that week 1 is the review period for calculating the order.

1450 Midland Ave – Suite 200 & 300
Scarborough, ON M1P 4Z8
(416) 290-0200

4. Based on the data and calculations, calculate the total cost (order cost and inventory holding cost) for each order quantity over the 20 weeks.
5. Since the POQ is calculated based on the EOQ, why do you think the results on your charts are different from each other?
6. Based on the full 52 weeks of the year and the fact that those two items represent about 4% of the total of similar items in the store, project the potential saving using what appears to be the best approach.
7. Can you think of a better approach to use in this situation?