

BEVERAGE CENTER #4[©]

"Amber, as you know, the Gould state legislature passed legislation last year allowing alcoholic Center to be sold in retail establishments until 4:00 a.m. We don't have to close our shop by 10 p.m. as required by the previous law. However, I am wondering if it is economical for us to open until 4:00 a.m. How many additional customers would we get by extending our hours? Would doing so increase our profits? I would like you to look into this issue for our downtown location and give me your recommendation."

Mike King, General Manager of BEVERAGE Center, spoke these words to Amber Wright, his Operations Manager. BEVERAGE is a major beverage retailer. It owns several wine and spirit stores that are part of its alcoholic Center division. Beverage Center #4 is part of this chain of stores owned by the parent company. It is located in the downtown area, and while it has been reasonably profitable in the past, its financial performance has been declining in recent years.

A store manager, an assistant manager, and two sales and inventory clerks run the store. The division provides general business and administrative support to each store. These services include purchasing, bookkeeping, economic analysis, and legal advice.

To respond to King's request, Amber Wright asked her accountant, Jennifer Kelly, to provide her with some data on the revenue and costs for the store. Specifically, she wanted to know the average purchase per customer and the cost of extending the store hours. Jennifer decided to sample a small set of customer invoices to see what they purchased. She selected two random samples of 30 customers each and analyzed what they had bought and the cost of the items that they had purchased. One sample represented "day customers" (those who purchased before 6:00 p.m.) and the other was for "evening customers" (those who purchased after 6:00 p.m.). Attachment 1 provides this data.

During the data presentation, Jennifer remarked, "Amber, there are two other things you should know about extending our hours. First, we will have to pay a 50% overtime bonus to our two night salespeople at the store for any hours after midnight. Second, we will have to invest in a better security system. I estimate that this will cost us approximately \$21,000 in construction and rewiring cost. The improvements will have a life of seven years and we depreciate our assets using the straight-line method. The improvements are expected to have no salvage value."

After looking at the data collected by Jennifer, Amber Wright decided to experiment with different closing times for the store. Because Amber felt that the store closing was not simply a choice between two options -- 10:00 p.m. and 4:00 a.m. -- she asked the Beverage Center #4 store manager to experiment for two weeks each with different closing times. She wanted to know how many customers came in during each hour of business for each closing time. She did this by progressively extending the closing time beyond 10:00 p.m. until 4:00 a.m. Attachment 2 summarizes the results of her experimentation with hours of operation.

When all of the data was collected, Amber sent her analysis to Mike. Her analysis is reproduced in Exhibit 1 below.

Exhibit 1
Amber Wright's Analysis of Store Hours

MEMORANDUM

TO: Mike King, General Manager, BEVERAGE Center, Inc.
FROM: Amber Wright, Operations Manager
RE: Extending store hours of operation for Beverage Center #4
DATE: 13 November 2007
Cc: Jennifer Kelly

I have now completed a study of the economics of extending the store closing hours for the Beverage Center #4. On the basis of my analysis, I recommend that we extend store hours to the statutory limit of 4:00 a.m. each morning. This will result in an increased *annual* profit of more than \$40,000 before taxes. Even after the initial investment of \$21,000 to upgrade security, we will still have increased profit. I have reached this conclusion based on the following information and analysis.

- When we kept the store open until 4:00 a.m. on an experimental basis, we discovered the store got an average of five customers per hour even during the last hour of business, from 3:00 to 4:00 a.m. The number of customers was at least as large during each previous hour. (Attachment 2 summarizes the results of our experimentation with hours of operation.)
- Jennifer's sample of invoices shows that, on average, a typical customer makes purchases of about \$29. (Note: all dollar figures in this memo are approximate.) From my experience running the store, I can say that this number is consistent over all hours of operation (i.e., a day customer's buying decisions are not substantially different from an evening customer's buying decisions).
- Out of the \$29, about \$22 goes toward our purchase of the alcohol, which leaves us with a contribution margin of \$7.00 per customer. This figure does not include the cost of keeping the store open an additional hour. Therefore, the contribution margin of the additional units sold during the 3:00 to 4:00 a.m. period is $\$7.00 \times 5 \text{ customers} = \35.00 .

By keeping the store open for the additional hour from 3:00 to 4:00 a.m., we would increase our revenues by \$35.00. We must compare this to the added cost of keeping the store open one more hour. The overhead cost of the additional hour is almost nothing (since the refrigerators must be kept running overnight anyway), so the only substantial cost added is the wage of the clerks. By Gould state law, we must pay workers time-and-a-half, so our \$10/hour clerks must be paid \$15 each. The added cost of \$30 is less than the added revenue of \$35.00, and therefore staying open until the last hour would increase our profits. The same is true for all previous hours as well. (These calculations are summarized in Attachment 3.)

Comparing current profits with expected profits under my proposal, we will experience a profit increase of \$113 per day, or \$40,680 per year, before taxes. These figures are approximate, of course, because there are seasonal changes in alcohol purchases, and my estimates are based on experimentation during the last six months only.

This may seem an unusual approach for maximizing our profit, but I'm pretty sure it's correct. In my economics classes at Gould State, I learned that profit increases whenever marginal revenue exceeds marginal cost. The marginal revenue is the additional revenue from doing one more of something (in this case, one more hour of business), and the marginal cost is the additional cost from doing one more of something (again, one more hour of business).

Later that week Amber and Mike met to discuss Amber's analysis. "Amber", began Mike, "I appreciate the work that you and Jennifer have put into this analysis. Obviously, you two have collected a lot of data and thought this through carefully. However, I am unclear about a few things and I would appreciate it if you could clarify them for me. First, I don't get this 'marginal approach.' I took economics in college, and I am embarrassed to admit that I heaved a sigh of relief and promptly forgot everything once the course was over. I am confused how there can be two marginal costs in this situation, one for liquor and the other for the sales clerks. Second, Jennifer's sample suggests that evening customers seem to purchase a higher amount. Why then did you use the average purchase over all hours of operation? Third, I wonder if some customers who arrive during the very late hours might arrive earlier if the store closed earlier. Can you tell from your experimental data if that's true? And would that change your recommendation?"

Required:

Assume that you are Amber Wright and you have been asked to elaborate on the memo in Exhibit 1 to address the issues raised by Mike King in both of his conversations with you. Use the report form from the course website.

This case reviews the following LDC concepts: Financial accounting 4 and 9; management accounting 2 and 8; microeconomics 6 and 7; and statistics 2 and 4.

Attachment 1

Purchases and Purchase Cost for Randomly Selected Customers

Jennifer randomly selected 60 customer invoices – 30 from day customers, 30 from evening customers. The purchase revenue and cost data are shown below. (For example, the first day customer made a purchase of \$27.50, and the alcohol purchased cost \$20.89 to stock.)

DAY		EVENING	
Purchase Revenue	Cost	Purchase Revenue	Cost
27.50	20.89	35.29	29.00
30.22	22.90	29.66	22.20
34.99	27.40	30.87	21.01
18.08	13.53	31.40	25.60
34.48	25.32	25.95	21.95
25.55	17.17	28.69	19.42
19.77	15.49	28.82	22.89
25.13	18.11	29.92	20.07
26.16	21.91	30.15	22.39
29.67	22.75	27.89	19.99
27.37	22.03	31.30	25.63
35.71	26.61	33.44	26.51
28.07	20.31	27.49	22.36
38.86	26.51	29.91	22.26
40.88	33.39	47.78	34.08
37.31	26.83	32.43	25.81
31.69	26.89	25.20	16.86
38.59	25.51	32.99	23.54
26.38	20.55	21.90	16.19
27.09	18.66	42.19	31.88
21.78	14.93	28.48	22.12
21.39	15.38	39.20	33.09
28.84	19.96	28.52	19.76
27.39	22.24	32.15	23.24
20.29	14.72	30.81	23.79
16.11	11.41	32.61	22.68
22.60	19.23	25.29	21.51
32.79	22.50	26.07	20.27
33.37	26.00	19.35	16.50
22.14	18.31	29.90	25.07

Attachment 2

Customers per Hour During Experimental Period

Over a period of several months, Beverage Center #4 tested closing at seven different times -- each hour from 10 p.m. to 4 a.m. Each closing time was tested for two weeks. The table below shows the average number of customers during each hour of business, for the nine different closing times. For instance, the first column shows the average number of customers for each hour of business during the period when our closing time was 10 p.m.

	Customers per Hour if Closing Time Is:						
	10pm	11pm	12am	1am	2am	3am	4am
11-12noon	4	4	4	4	4	4	4
12-1pm	5	5	5	5	5	5	5
1-2pm	7	7	7	7	7	7	7
2-3pm	10	10	10	10	10	10	10
3-4pm	11	11	11	11	11	11	11
4-5pm	11	11	11	11	11	11	11
5-6pm	11	11	11	11	11	11	11
6-7pm	12	12	12	12	12	12	12
7-8pm	13	13	13	13	13	13	13
8-9pm	14	13	13	13	13	13	13
9-10pm	14	13	12	12	12	12	12
10-11pm		12	11	10	10	10	10
11-12mid.			10	9	8	8	8
12-1am				8	7	6	6
1-2am					7	6	5
2-3am						6	5
3-4am							5

The last column on the right (4am closing time) was used to find "customers per hour" for the table in Attachment 3.

Attachment 3

Marginal Revenue and Marginal Cost Analysis

Hour	New Customers	MR ¹	MC ²	Added Profit	Added Profit per Year ³
10-11	10	70.00	20.00	50.00	18000.00
11-12	8	56.00	20.00	36.00	12960.00
12-1	6	42.00	30.00	12.00	4320.00
1-2	5	35.00	30.00	5.00	1800.00
2-3	5	35.00	30.00	5.00	1800.00
3-4	5	35.00	30.00	<u>5.00</u>	<u>1800.00</u>
				113.00	40680.00

¹ The marginal revenue (MR) for the hour is the contribution margin per customer (\$7.00) multiplied by the number of customers. Note that if the marginal revenue is calculated in this way, it already takes into account the alcohol cost.

² The marginal cost (MC) for the hour is the wages for two clerks: \$10 per hour before midnight, \$15 after midnight.

³ There are 360 days in one business year.