Appendix 4A

**Problem 4A-1** (20 minutes)

1. Decision tree:

2. Calculate expected profits.

Campaign A:

.3(–100) + .6(200) + .1(800)

–30 + 120 + 80 = $170

Campaign B:

.3(20) + .6(150) + .1(900)

6 + 90 + 90 = $186

The marketing manager should choose Campaign B because it has a higher expected profit. There is also no loss identified as possible so it may be considered less risky.

**Problem 4A-2** (20 minutes)

(a) Decision Tree

(b) For “make” alternative:

Expected profits = (.3 × 150) + (.4 × 90) + (.3 × -30)

= 45 + 36 – 9

= 72

= $72,000

For “buy” alternative:

Expected profits = (.3 × 105) + (.4 × 90) + (.3 × 25)

= 31.5 + 36 + 7.5

= 75

= $75,000

The company should buy the subassembly because it has a higher expected operating profit. There is also no loss identified which indicates a lower risk.

(CGA-Canada Solution, adapted)

**Problem 4A-3** (20 minutes)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IF Win |  |  |  |  |  |
| **Proposals** | **Revenue** | **Costs** | **Net** | **Tax 30%** | **After Tax** |
| A | $1,000,000 | $300,000 | $700,000 | $210,000 | $ 490,000 |
| B | 1,000,000 | 100,000 | 900,000 | 270,000 | 630,000 |
|  |  |  |  |  |  |
| IF Lose |  |  |  |  |  |
| A | 0 | 300,000 | (300,000) | 90,000 | (210,000) |
| B | 0 | 100,000 | (100,000) | 30,000 | (70,000) |

Expected profits:

Proposal A: ($490,000 x .6) + (-$210,000 x .4)

$294,000 -$84,000 = $210,000

Proposal B: ($630,000 x .2) + (-$70,000 x .8)

$126,000 -$56,000 = $70,000

Since Proposal A has the higher expected value, it should be submitted to the city.

(SMAC, adapted)

**Case 4A-4** (45 minutes)

**Unit Contribution Margin Analysis**

Expected contribution margins per unit at the three suggested selling prices are as follows:

Selling price $24.00 $27.00 $31.50

Variable costs ($2,800,000 ÷ 350,000) 8.00 8.00 8.00

Contribution margin/unit $16.00 $19.00 $23.50

**Expected Value Analysis**

**Market Research Data**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Volume** | **Probability** | **Expected**  **Volume** | **Unit**  **CM** | **Total Expected**  **Contribution**  **Margin** | **Ranking** |
|  | | | | | |

Selling price = $24.00

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 500,000 | .20 | 100,000 |  |  |  |
| 400,000 | .50 | 200,000 |  |  |  |
| 300,000 | .30 | 90,000 |  |  |  |
|  | 1.00 | 390,000 | $16.00 | $6,240,000 | 2 |
|  | | | | | |
| Selling price = $27.00 | | | | | |
|  | | | | | |
| 400,000 | .25 | 100,000 |  |  |  |
| 350,000 | .45 | 157,500 |  |  |  |
| 250,000 | .30 | 75,000 |  |  |  |
|  | 1.00 | 332,500 | $19.00 | $6,317,500 | 1 |
|  | | | | | |
| Selling price = $31.50 | | | | | |
|  | | | | | |
| 300,000 | .30 | 90,000 |  |  |  |
| 250,000 | .50 | 125,000 |  |  |  |
| 200,000 | .20 | 40,000 |  |  |  |
|  | 1.00 | 255,000 | $23.50 | $5,992,500 | 3 |

**Case 4A-4** (continued)

**President’s Data**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Volume** | **Probability** | **Expected**  **Volume** | **Unit**  **CM** | **Total Expected**  **Contribution**  **Margin** | **Ranking** |
|  | | | | | |
| Selling price = $24.00 | | | | | |
|  | | | | | |
| 500,000 | .10 | 50,000 |  |  |  |
| 400,000 | .50 | 200,000 |  |  |  |
| 300,000 | .40 | 120,000 |  |  |  |
|  | 1.00 | 370,000 | $16.00 | $5,920,000 | 3 |
|  | | | | | |
| Selling price = $27.00 | | | | | |
|  | | | | | |
| 400,000 | .20 | 80,000 |  |  |  |
| 350,000 | .40 | 140,000 |  |  |  |
| 250,000 | .40 | 100,000 |  |  |  |
|  | 1.00 | 320,000 | $19.00 | $6,080,000 | 2 |
|  | | | | | |
| Selling price = $31.50 | | | | | |
|  | | | | | |
| 300,000 | .40 | 120,000 |  |  |  |
| 250,000 | .50 | 125,000 |  |  |  |
| 200,000 | .10 | 20,000 |  |  |  |
|  | 1.00 | 265,000 | $23.50 | $6,227,500 | 1 |

(Note, in all cases for both market research and president’s data, CM is high enough to cover fixed overhead.)

From the preceding analysis, we arrive at two different optimum solutions. Using the market research data, setting the selling price slightly below the competition at $27.00 would yield the highest expected contribution. However, the president’s data indicate that it would be best to set the price above that of the competition, representing full cost plus 100 percent. Because the rankings are significantly different, we must examine other factors to determine the best pricing strategy.

**Case 4A-4** (continued)

**Factors to Consider**

1. Accuracy of data—One must examine the underlying assumptions on which the data are based. Although the market research data are based on “extensive” market testing, the manner in which the testing was conducted, the composition of the test market, the design of the test, etc., must be examined for their appropriateness. Key factors such as quality of product, warranties, etc., may exist which may not have been considered in the market test. Since the president has past experience to draw from and also has knowledge of factors other than price, his data may be more accurate. On the other hand, the president could be imposing personal biases and “wishful thinking” which could render his data to be overly optimistic.

2. Product life cycle and elasticity of demand—The market research data indicate that demand for this product is fairly elastic and the president’s data reflect a slightly less elastic demand. Both sets of data assume that demand would remain constant over a five-year period. This is highly unlikely. Since this is a relatively new product on the market, it is in the infant stage of its life cycle. Generally, appliance-type products would start with relatively few competitors and fairly inelastic demand. Therefore, a high-price/low-volume (skimming) strategy would be appropriate. Then, as the market begins to accept the product, volumes would increase as prices decline to a fairly stable level—also, at this point, more competitors would enter similar products into the market. Finally, as new substitute products enter the market, volumes and prices would drop. The volumes indicated in both the market research and president’s data would be useful only for the short term. The product cycle would drastically affect the price/volume behaviour in the long term. The fact that the product is now in the infant stage would lend some support to the president’s data for the short term. The market research data may possibly represent a long-term averaging which may better reflect market behaviour two or three years from now.

**Case 4A-4** (continued)

3. Reactions of competitors—One must examine whether BL has historically been a price leader or price follower. If it is generally a price leader, it may be safe to assume that competitors will follow whatever price BL decides to set, which may drastically influence the projected data. On the other hand, if BL is normally a price follower, competitors would probably have no reaction to BL pricing at a skimming price of $31.50.

However, if BL enters the market with a price of $27.00 or $24.00, competitors may react by undercutting BL, and starting a price war, especially if the competitors have cost structures similar to BL (i.e., relatively low variable costs resulting in high contribution margins).

4. Nature of the competitive market—BL must investigate whether the cordless curling irons sold by the competition are of better, worse, or same quality as BL’s iron and whether they offer special features or different warranties from those of BL. If BL offers better features, quality, and services, customers will be willing to pay a higher price.

5. Past relations with customers and competitive advantages—BL’s past relations and reputation with its customers would have a great impact on the success of the new product. Customers may be willing to pay more for BL’s product if, in the past, factors such as product and service quality, warranties, credit terms, flexibility, effectiveness of advertising, brand-name loyalties, etc., have resulted in customers favouring its products. Conversely, customer relations with competitors would also have an impact on the demand that BL can expect for its product. BL must consider how customers would perceive a low, middle, or high price (i.e., if priced at $24.00, would customers think the product is inferior or that it is a better buy?)

6. Opportunity costs and production constraints—BL currently has capacity to produce 500,000 units per year. Assuming that the maximum expected annual demand over the next 5 years is 500,000 units, we need only be concerned with the opportunity costs of producing cordless curling irons versus utilizing the same capacity by producing some other product. BL must examine whether there are more profitable options for utilizing this capacity in both the short term and the long term. Also, BL should consider if it can profitably utilize the excess capacity if it adopts a high- price/low-volume pricing strategy.

**Case 4A-4** (continued)

7. Sensitivity of the volume projections—The sensitivity of the volume projections should be examined to determine the safety margin in the case that the sales projections do not materialize.

|  |  |  |  |
| --- | --- | --- | --- |
| **Price** | **CM**/**Unit** | **Fixed Costs** | **Break-Even**  **Volume (Units)** |
| $24.00 | $16.00 | $2,712,500 | 169,532 |
| 27.00 | 19.00 | 2,712,500 | 142,764 |
| 31.50 | 23.50 | 2,712,500 | 115,426 |

From the analysis, it can be seen that there is a large margin of safety at each of the prices. Volumes can be considerably lower than the lowest projected volumes before BL would experience losses.

8. BL’s cost structure—The unit variable cost of $8.00 per unit is based on a volume of 350,000 units and the cost projection at this volume is likely based on engineered standards and production of prototypes. Actual unit variable costs may be somewhat higher at annual volumes less than 350,000 units or may be somewhat lower at annual volumes greater than 350,000 units. This is due to economies of scale and the learning curve. It would be reasonable to expect that unit variable costs would decrease over time as a result of the learning curve effect which would give BL additional pricing flexibility in the latter years of the product life cycle.

9. Alternative pricing policies—Variable-cost pricing generally determines the “floor” price that a company requires to cover its direct variable costs. This strategy is easy to develop; it offers easy insights into cost/volume/profit relationships and into short-term pricing decisions. Another advantage is that variable costs tend to be reliable and fairly accurate. One drawback is that it may lead to under-pricing because it does not consider fixed costs.

**Case 4A-4** (continued)

Full-cost pricing considers all costs in the pricing decision. However, determination of full costs requires an allocation of joint costs to products. Allocation bases are arbitrary, and very different cost structures can result depending on the allocation base. Also, this pricing strategy is circular. When products are price elastic, price determines volume and, in full-cost pricing, volume determines unit cost, and unit cost determines price. For example, using the president’s data, a $31.50 price for the new curling iron would result in an expected volume of say 265,000 units. Full cost per unit, therefore, would be $8.00 + $10.24 = $18.24. Full cost + 100 percent equals a selling price of $36.48. At this price, the expected volumes would certainly drop.

Other pricing policies that could be considered in the short term are market pricing, target gross margin, return on assets employed, standard costs plus, and pricing to achieve some target market share.

**RECOMMENDATION**

Assuming that the president’s data took into account some non-price competitive advantages which the market research data did not consider, I would recommend setting the price initially at $31.50 and consider lowering the price after one or two years once the product life has matured a bit and any economies of scale have been achieved. This strategy would allow BL to take advantage of its idle capacity for other opportunities. Consideration should be given to supporting the product introduction with an extensive advertising and promotional campaign.

Another valid recommendation could be to set the price initially at $27.00. This strategy would undercut the competition but would likely not cause a price war. With this strategy, BL would maintain its quality image by emphasizing to customers that it is letting them benefit from BL’s production efficiency and not allowing the competitors to skim the market.

(SMAC Solution, adapted)