

Solutions

Product Line Optimization

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Developing the most profitable line of products/services to offer customers is an important task for the marketing manager. If a line is too narrow, significant opportunities can be lost for growing the business. If the line is too broad, products/services often cannibalize each other's sales. Either way, the bottom-line is adversely affected.

At Savitz Research Solutions, we have a model for uncovering the most profitable line to offer. Our model will tell you whether to add or delete specific products, as well as how to price each product in the line to maximize profit. Even if you have the right mix of products, our model will also provide an optimal pricing schedule, leading to a bigger bottom line.

By dropping the least expensive model out of the line and optimizing the pricing schedule, the client could increase profits by 45%!

TABLE A

Current Line of Mixers Offered

Model	Retail Price	Unit Profit
Sunbeam Hand Mixer	\$12.82	\$2.57
Hamilton Beach 5-speed	19.97	4.63
Black & Decker Spatula	21.92	3.93
Sunbeam Burst of Power	22.97	4.22
Sunbeam Professional	39.97	7.97
Kitchen Aid 3-speed	44.97	8.97
Kitchen Aid 5-speed Ultra	54.97	13.97

Case History

To understand the model, let's look at a case history. A well-known national department store chain sold a line of seven different mixers shown in [Table A](#) along with retail prices and unit profit margins for each model.

Data Collection

A random sample of the chain's customers who indicated they were likely to buy a mixer in the next year were pre-recruited to central locations. Respondents were shown a display of

the mixers, similar to what they would see in the store, complete with descriptions but without any prices. They were asked to examine the line of mixers as if they were in the store shopping.

The respondents were next shown a series of eight sample cards (similar to [Exhibit 1](#)). They were told that each card listed the mixers with particular prices. (We tested prices within $\pm 10\%$ of the retail price.) Their task was to indicate how likely they would be to buy each model on each card so that their answers added to 100%.

EXHIBIT 1

Sample Card

Model	Retail Price	Likelihood to Buy
Sunbeam Hand Mixer	\$12.82	____%
Hamilton Beach 5-speed	19.97	____%
Black & Decker Spatula	<i>Model Not Available</i>	<i>N/A</i> %
Sunbeam Burst of Power	25.27	____%
Sunbeam Professional	35.97	____%
Kitchen Aid 3-speed	49.47	____%
Kitchen Aid 5-speed Ultra	60.47	____%
Would Purchase Mixer Elsewhere		____%
		= 100%

They always had the option of choosing not to buy any of the models by assigning 100% to the slot “Would Purchase Mixer Elsewhere.” In addition, they were told that some of the cards had one or more mixers marked “Model Not Available,” which meant that model had been discontinued and they could not indicate any likelihood of buying it.

*By simply optimizing
the price, the client
could increase
the bottom-line by 33%*

Current Line, Current Price

The Line Optimization Model uses a special form of conjoint analysis (discrete choice) to determine the demand for each mixer, for any set of prices. Our first application of the model is to examine the demand and profit curves under the current pricing strategy.

After calibrating the model to match actual sales statistics, we found that 9.6% of the respondents would not buy any of the models and that the average profit was \$4.87 per shopper (Table B).

TABLE B

Current vs. Optimal Price

Model	Current Price		Optimal Price			
	Price	Unit Profit	Price	% Increase in Price	Unit Profit	% Increase in Profit
Sunbeam Hand Mixer	\$12.82	\$2.57	\$14.10	10.0%	\$3.85	49.8%
Hamilton Beach 5-speed	19.97	4.63	21.97	10.0	6.63	43.1
Black & Decker Spatula	21.92	3.93	24.12	10.0	6.13	56.0
Sunbeam Burst of Power	22.97	4.22	25.27	10.0	6.52	54.5
Sunbeam Professional	39.97	7.97	43.97	10.0	11.97	50.1
Kitchen Aid 3-speed	44.97	8.97	48.29	7.3	12.29	37.0
Kitchen Aid 5-speed Ultra	54.97	13.97	58.83	7.0	17.83	27.6
Buy Elsewhere		9.6%			11.1%	
PROFIT PER SHOPPER		\$4.87			\$6.50	33.3%

*Raising prices
7% to 10% leads to
virtually no additional
customer loss.*

Current Line, Optimal Price

We were also able to derive the optimal pricing strategy for the entire line of mixers; that is, the set of prices that would maximize profit across the entire line (Table B). We found that by increasing the prices 7% to 10%, the profit per shopper could be increased from \$4.87 to \$6.50 with little increase in the percentage who wouldn't buy (9.6% up to 11.1%). This represents an increase of 33% on the bottom line!

TABLE C

Effect of Eliminating One Model		
Model Eliminated	% Buying Elsewhere	Profit Per Shopper
Sunbeam Hand Mixer - <i>Optimal Price</i>	12.7%	\$7.07
Hamilton Beach 5-speed - <i>Optimal Price</i>	11.5	6.32
Black & Decker Spatula - <i>Optimal Price</i>	15.2	6.64
Sunbeam Burst of Power - <i>Optimal Price</i>	13.9	6.50
Sunbeam Professional - <i>Optimal Price</i>	12.4	6.05
Kitchen Aid 3-speed - <i>Optimal Price</i>	10.9	6.34
Kitchen Aid 5-speed Ultra - <i>Optimal Price</i>	11.1	5.87
None - <i>Current Price</i>	9.6	4.87
None - <i>Optimal Price</i>	11.1	6.50

Current Line Minus One Optimal Price

Using the same model we were able to determine the effect of dropping each one of the seven mixers out of the line, individually.

The average profit per shopper that would be realized as each mixer is dropped from the line is shown in

Table C. For example, if the most expensive Kitchen Aid 5-speed Ultra is discontinued, the average profit per shopper will be \$5.87

By discontinuing either the Black & Decker Spatula or the Sunbeam Hand mixer, and optimizing the prices of the six model line, the chain can achieve a higher profit than by maintaining the full line with optimal prices.

Clearly, the best strategy is to discontinue the cheapest model, the Sunbeam Hand Mixer, and the profit increases to \$7.07 under optimal pricing. This represents a 45% increase in profit over the full line of products at current prices.

Discontinued? Pick Again!

Indeed, **Table D** shows what happens when the Sunbeam Hand Mixer is discontinued. Since this is the cheapest model, one might expect those who would have bought this model if it were available, to buy the second cheapest model. **Table D** says otherwise. Apparently, people would switch to other Sunbeam models! Even though one of the three Sunbeam products is discontinued, Sunbeam's total share increased from 28.1% to 34.5%.

TABLE D

Current vs. Optimal Price and Line						
Model	Current Price & Line			Optimal Price & Line		
	Price	Share	Unit Profit	Price	Share	Unit Profit
Sunbeam Hand Mixer	\$12.82	12.0%	\$2.57	<i>DISCONTINUED</i>		
Hamilton Beach 5-speed	19.97	10.6	4.63	\$21.97	10.9%	\$6.63
Black & Decker Spatula	21.92	34.8	3.93	24.12	30.4	6.13
Sunbeam Burst of Power	22.97	11.3	4.22	25.27	24.1	6.52
Sunbeam Professional	39.97	4.8	7.97	43.97	10.4	11.97
Kitchen Aid 3-speed	44.97	10.3	8.97	47.92	3.6	11.92
Kitchen Aid 5-speed Ultra	54.97	6.6	13.97	56.75	7.9	15.75
BUY ELSEWHERE		9.6			12.7	
PER SHOPPER		100%	\$4.87		100%	\$7.07
Sunbeam's Share		28.1%		34.5%		

Current Line Minus Two

We could have taken the analysis further and examined the profitability when two or three of the models are dropped from the line. However, our client felt that regardless of any positive financial impact of discontinuing more than one model, it would be inconsistent with the image of a retailer that offers a wide variety of brand name merchandise to the public. Therefore, we never examined this possibility.

Summary

The Line Optimization Model determines the optimal line of products/services to offer to the marketplace at the optimal pricing schedule. In so doing, it tells the marketing manager what products to offer in the line and what prices to charge. In all the studies we completed using the model to date, we have found that significant profits are being missed because the firms carry the wrong mix of products in the line, or sell the items using a sub-optimal pricing schedule, or both!

If you would like to do research to determine the most profitable lines of products/services to offer, and/or the price that maximizes your profit, call us at Savitz Research Solutions. You, too, may be able to increase your bottom line 33% to 45%.

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