# Using the Contribution Margin Aspect of Menu Engineering to Enhance Financial Results

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Managing food service operations to achieve a specific food cost percentage has long been a fundamental principle of the restaurant business. Management bonuses and other rewards are often based on achieving these predetermined goals. Available tools such as menu engineering and contribution margin, although sound in theory, are not frequently used. This article demonstrates the use of menu engineering and contribution margin concepts in terms of customers served. It is concluded that the goal of any restaurant should be to apply marketing techniques based on menu engineering and contribution margin concepts in order to achieve the highest possible financial results.

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## Introduction

Technology has provided management with the opportunity to become more efficient in operating and controlling food service operations. However, the hospitality industry has traditionally lagged behind manufacturing relative to the analysis of costs, and has been slow in implementing technology. According to Chervenak (1995), other industries are far ahead of the hotel sector in using technology such as video conferencing. Chervenak points out that between 1975 and 1990 fewer than 500 companies had private video conferencing but 25,000 will have them by the year 2000. The hotel sector is not reacting as quickly to implement this technology. Perhaps the reason for technological avoidance are differences between manufacturing and the hospitality industry on issues such as variability of demand and pricing methodologies. In many manufacturing environments, often only a single product is produced with a production quantity firmly established. These finite situations provide opportunities for cost analysis to aid in management decision making. Hospitality operations, on the other hand, must contend with the variability of demand for each menu item, different selling prices for every product produced, and different variable cost percentages for each menu selection.

For food service managers to use tools of cost analysis, such as menu engineering and contribution margin to aid in decision making, each menu item's selling price, food cost and quantity sold must be known. This data collection process was tedious without the use of technological contributions to the industry, such as mechanized point of sale cash collection devices. Even with data collection hardware and software readily available and in use in many operations, use of menu engineering and contribution margin applications is not the standard. This article relates these two concepts to customer count, and shows how, with the use of marketing techniques, the financial goals of a food service operation can be reached at lower customer count levels.

## Menu Engineering

Kasavana and Smith (1990) are recognized as the developers of menu engineering. Menu engineering is an analysis tool that labels menu items within a competing menu group using their respective popularity and contribution margin to place them in a category. LeBruto et al. (1995) expanded the menu engineering model by adding a labor component. Kasavana and Smith (1990) classified each menu item into one of four categories as determined by a two by two matrix of high and low popularity and above or below average contribution margin. The LeBruto et al. (1995) model changed the matrix to a three by two model by adding the classification of each menu item as high or low in labor effort, relative to the entire section of the menu being engineered.

The menu engineering classification guideline for popularity is when an item's selection rate (or percentage of overall sales mix) exceeds 70 per cent of the average popularity for the group (100 per cent divided by the number of menu items in the group). If the demand for a particular item was less than 70 per cent of the average popularity, then the menu item is classified "not popular." Table I shows a sample menu of 16 items (entrees) with popularity labels.

Kasavana and Smith's (1990) second dimension, contribution margin, compares the contribution margin of each menu item in the group (selling price minus food cost) to the weighted average contribution margin of all menu items within the group of menu items being analyzed. The menu items that have an individual contribution margin greater than the menu's weighted average contribution margin, receive a classification of "high contribution margin." Those that do not equal the menu's weighted average contribution margin are labeled "low contribution margin." Table II shows a sample menu of 16 items (entrées) showing the computation of each item's contribution margin and the weighted average contribution margin for the entrees.

Pavesic (1985) introduced the use of a profit factor, which is the individual menu item's contribution margin expressed as a percentage of the weighted average contribution margin of the menu. An item with a profit factor of 100 per cent or higher would represent the menu items that the operator would probably want to sell and, correspondingly, these menu items carry a contribution margin label of "high." The benefit of computing the profit factor is that it allows for another dimension of analysis, rather than relying on only "high" or "low" profitability la-

**Table I**

Menu engineering popularity worksheet

| Menu item | Weekly number sold | Sales mix percentage | Popularity label |
|---|---|---|---|
| Prime rib of beef, au jus | 600 | 12.99 | High |
| Choice filet mignon | 500 | 10.82 | High |
| Charcoal broiled beef en brochette | 250 | 5.41 | High |
| Grilled centre cut pork chops | 200 | 4.33 | Low |
| Long Island roast duckling | 150 | 3.25 | Low |
| Southern fried half spring chicken | 200 | 4.33 | Low |
| Boneless breast of chicken parmesan | 400 | 8.66 | High |
| Stuffed jumbo shrimp | 450 | 9.74 | High |
| Select bay scallops | 480 | 10.39 | High |
| Saute frog legs | 100 | 2.16 | Low |
| Fresh water catfish | 160 | 3.46 | Low |
| Steamed Alaskan king crab legs | 250 | 5.41 | High |
| Lazy lobster | 350 | 7.58 | High |
| Chicken cordon bleu | 200 | 4.33 | Low |
| BBQ ribs | 150 | 3.25 | Low |
| Veal oskar | 180 | 3.90 | Low |
| Total | 4620 | 100.00 | |
| Popularity threshold (100%/16* 70%) | | 4.38 | |

**Table II**

Menu engineering contribution margin worksheet

| Menu Item | Weekly number sold | Item selling price | Item variable cost | Item contribution margin | Total item revenue | Total item cost | Total item contribution margin |
|---|---|---|---|---|---|---|---|
| Prime rib of beef, au jus | 600 | 13.95 | 6.14 | 7.81 | 8370.00 | 3684.00 | 4686.00 |
| Choice filet mignon | 500 | 15.95 | 6.38 | 9.57 | 7975.00 | 3190.00 | 4785.00 |
| Charcoal broiled beef en brochette | 250 | 12.95 | 3.38 | 9.57 | 3237.50 | 845.00 | 2392.50 |
| Grilled centre cut pork chops | 200 | 8.95 | 3.22 | 5.73 | 1790.00 | 644.00 | 1146.00 |
| Long Island roast duckling | 150 | 13.90 | 3.14 | 10.76 | 2085.00 | 471.00 | 1614.00 |
| Southern fried half spring chicken | 200 | 11.95 | 2.09 | 9.86 | 2390.00 | 418.00 | 1972.00 |
| Boneless breast of chicken parmesan | 400 | 7.25 | 2.47 | 4.78 | 2900.00 | 988.00 | 1912.00 |
| Stuffed jumbo shrimp | 450 | 10.95 | 4.60 | 6.35 | 4927.50 | 2070.00 | 2857.50 |
| Select bay scallops | 480 | 10.50 | 4.62 | 5.88 | 5040.00 | 2217.60 | 2822.40 |
| Saute frog legs | 100 | 9.25 | 3.52 | 5.73 | 925.00 | 352.00 | 573.00 |
| Fresh water catfish | 160 | 7.75 | 2.25 | 5.50 | 1240.00 | 360.00 | 880.00 |
| Steamed Alaskan king crab legs | 250 | 13.50 | 5.83 | 7.67 | 3375.00 | 1457.50 | 1917.50 |
| Lazy lobster | 350 | 12.50 | 6.08 | 6.42 | 4375.00 | 2128.00 | 2247.00 |
| Chicken cordon bleu | 200 | 10.95 | 3.61 | 7.34 | 2190.00 | 722.00 | 1468.00 |
| BBQ ribs | 150 | 9.95 | 3.98 | 5.97 | 1492.50 | 597.00 | 895.50 |
| Veal oskar | 180 | 12.95 | 5.44 | 7.51 | 2331.00 | 979.20 | 1351.80 |
| Totals | 4620 | | | | 54643.50 | 21123.30 | 33520.00 |
| Weighted average contribution margin (Total contribution margin/total items sold) (33,520.20 / 4,620) | | | | 7.26 | | | |

bels. It informs the operation of how much the contribution margin exceeds or falls short of the weighted average contribution margin as a percentage. Table III shows the computation of each of the menu item's profit factor, and its label as either high or low for contribution margin.

LeBruto et al. (1995) designated labor as either high or low in the menu engineering worksheet, and incorporated this label into the existing model. Ranking the labor effort required for each menu item relative to the other menu items in the grouping resulted in a label of "high' labor cost for the menu items in the top one half of the rankings and a "low" labor cost label to each menu item in the lower one half of the group. LeBruto et al. (1995) stated that rankings and labeling of a high and a low labor classification should be a judgment call made by professional food managers or through employing the technique of a jury of executive opinion, which is a method commonly utilized in qualitative forecasting models (Schmidgall, 1990). Since there is variability of demand for any particular menu item on any particular day, and labor will be planned without knowledge of this variability of demand even though we use historical data to schedule labor, any quantitative method to determine the variable labor component of a menu item is suspect. Table IV is a summary of labor effort rankings and the appropriate label for these 16 menu items, using a jury of executive opinion. The top eight items were classified as high in labor and the bottom eight menu items were classified as low in labor.

The results of a menu engineering exercise will produce a three by two matrix with eight possibilities (LeBruto et al., 1995). Table V summarizes this menu engineering worksheet. Operators of food service establishments can then use this information to make management decisions relative to the menu. Obviously, the goal is to produce a menu with items high in popularity, high in contribution margin, and low in labor items—of the 16 items analyzed only two fit into this category. Management should promote these two items. Dougan (1994) recognized the importance of using menu engineering as a management tool, and contributed a spreadsheet example to help facilitate operators in the use of menu analysis. But menu engineering by itself is not enough to produce the desired results effectively. Contribution margin as an element of cost volume profit analysis must be considered. It is after all, dollars that are deposited in the bank, not percentages. The contribution margin reflects dollars available to pay for fixed costs.

**Table III**

Menu engineering profit factor and contribution margin worksheet

| Menu item | Item contribution margin | Item profit factor (%) | Item contribution margin label |
|---|---|---|---|
| Prime rib of beef, au jus | 7.81 | 107.58 | High |
| Choice filet mignon | 9.57 | 131.82 | High |
| Charcoal broiled beef en brochette | 9.57 | 131.82 | High |
| Grilled centre cut pork chops | 5.73 | 78.93 | Low |
| Long Island roast duckling | 10.76 | 148.21 | High |
| Southern fried half spring chicken | 9.86 | 135.81 | High |
| Boneless breast of chicken parmesan | 4.78 | 65.84 | Low |
| Stuffed jumbo shrimp | 6.35 | 87.47 | Low |
| Select bay scallops | 5.88 | 80.99 | Low |
| Saute frog legs | 5.73 | 78.93 | Low |
| Fresh water catfish | 5.5 | 75.76 | Low |
| Steamed Alaskan king crab legs | 7.67 | 105.65 | High |
| Lazy lobster | 6.42 | 88.43 | Low |
| Chicken cordon bleu | 7.34 | 101.10 | High |
| BBQ ribs | 5.97 | 82.23 | Low |
| Veal oskar | 7.51 | 103.44 | High |
| Weighted average contribution margin | 7.26 | | |

**Table IV**

Menu engineering labor rankings and labor label worksheet

| Menu item | Labor ranking | Item labor label |
|---|---|---|
| Prime rib of beef, au jus | 13 | Low |
| Choice filet mignon | 16 | Low |
| Charcoal broiled beef en brochette | 1 | High |
| Grilled centre cut pork chops | 8 | High |
| Long Island roast duckling | 5 | High |
| Southern fried half spring chicken | 4 | High |
| Boneless breast of chicken parmesan | 14 | Low |
| Stuffed jumbo shrimp | 7 | High |
| Select bay scallops | 9 | Low |
| Saute frog legs | 10 | Low |
| Fresh water catfish | 11 | Low |
| Steamed Alaskan king crab legs | 2 | High |
| Lazy lobster | 3 | High |
| Chicken cordon bleu | 15 | Low |
| BBQ ribs | 6 | High |
| Veal oskar | 12 | Low |

## Contribution Margin and Food Cost Percentage

Menu engineering as a standalone analysis tool offers some direction and assistance to an operator, but it does not stress the importance of contribution on the financial results. Most menu engineering worksheets compute a food cost percentage (cost of food divided by food sales). The conventional thinking is the lower the

food cost percentage the more profitable the operation.

However, it is dollars that are deposited in the bank, not percentages. Contribution margin (selling price minus variable costs) reflects dollars available to pay for the fixed costs. This assumes that all costs can be identified as fixed or variable costs. (Regression analysis is the most common method of segregating mixed costs—costs with a fixed and a variable component into fixed and variable costs.)

**Table V**

Menu engineering labor rankings and labor label worksheet

| Menu item | Popularity label | Contribution margin label | Labor label |
|---|---|---|---|
| Prime rib of beef, au jus | High | High | Low |
| Choice filet mignon | High | High | Low |
| Charcoal broiled beef en brochette | High | High | High |
| Grilled centre cut pork chops | Low | Low | High |
| Long Island roast duckling | Low | High | High |
| Southern fried half spring chicken | Low | High | High |
| Boneless breast of chicken parmesan | High | Low | Low |
| Stuffed jumbo shrimp | High | Low | High |
| Select bay scallops | High | Low | Low |
| Saute frog legs | Low | Low | Low |
| Fresh water catfish | Low | Low | Low |
| Steamed Alaskan king crab legs | High | High | High |
| Lazy lobster | High | Low | High |
| Chicken cordon bleu | Low | High | Low |
| BBQ ribs | Low | Low | High |
| Veal oskar | Low | High | Low |

Table VI is a summary of each menu item's individual food cost percentage, and a weighted average food cost of the entire menu section being analyzed.

This particular menu section, and the sales mix that is generated, yields a 38.66 per cent food cost, and a contribution margin of US$33,520.20 (US$54,643.50 - US$21,123.30), or US$7.2555 (US$33,520.20/4,620) per customer served. It is interesting to note that due to various pricing methodologies employed, each menu item has a different food cost percentage, and a different individual contribution margin. If we were to assume that this restaurant has annual fixed costs of US$1,600,000, including profit, 220,522 customers have to be served to reach the financial goal (US$1,600,000 / (7.2555)). Since 240,240 customers are projected to be served (4,602 * 52), the financial goals are exceeded by 19,718 guests. If our budget required a 39 per cent food cost, we would be meeting our goal. Could we have met our goal with a lower customer count?

## When the Sales Mix Changes

What if the sales mix were changed? Use of the menu engineering worksheet with the profit factor element can give us clues as to which items we should attempt to focus our efforts on, and which items we should consider eliminating or changing.

**Table VI**

Menu item food cost percentage worksheet

| Menu item | Weekly number sold | Item selling price | Item food cost | Total item revenue | Total item cost | Total item food cost % |
|---|---|---|---|---|---|---|
| Prime rib of beef, au jus | 600 | 13.95 | 6.14 | 8370.00 | 3684.00 | 44.01 |
| Choice filet mignon | 500 | 15.95 | 6.38 | 7975.00 | 3190.00 | 40.00 |
| Charcoal broiled beef en brochette | 250 | 12.95 | 3.38 | 3237.50 | 845.00 | 26.10 |
| Grilled centre cut pork chops | 200 | 8.95 | 3.22 | 1790.00 | 644.00 | 35.98 |
| Long Island roast duckling | 150 | 13.90 | 3.14 | 2085.00 | 471.00 | 22.59 |
| Southern fried half spring chicken | 200 | 11.95 | 2.09 | 2390.00 | 418.00 | 17.49 |
| Boneless breast of chicken parmesan | 400 | 7.25 | 2.47 | 2900.00 | 988.00 | 34.07 |
| Stuffed jumbo shrimp | 450 | 10.95 | 4.60 | 4927.50 | 2070.00 | 42.01 |
| Select bay scallops | 480 | 10.50 | 4.62 | 5040.00 | 2217.60 | 44.00 |
| Saute frog legs | 100 | 9.25 | 3.52 | 925.00 | 352.00 | 38.05 |
| Fresh water catfish | 160 | 7.75 | 2.25 | 1240.00 | 360.00 | 29.03 |
| Steamed Alaskan king crab legs | 250 | 13.50 | 5.83 | 3375.00 | 1457.50 | 43.19 |
| Lazy lobster | 350 | 12.50 | 6.08 | 4375.00 | 2128.00 | 48.64 |
| Chicken cordon bleu | 200 | 10.95 | 3.61 | 2190.00 | 722.00 | 32.97 |
| BBQ ribs | 150 | 9.95 | 3.98 | 1492.50 | 597.00 | 40.00 |
| Veal oskar | 180 | 12.95 | 5.44 | 2331.00 | 979.20 | 42.01 |
| Totals | 4620 | | | 54643.50 | 21123.30 | 38.66 |
| Weighted Average Food Cost % (Total food cost/total revenue) 21,123.30 / 54643.50) | | | | | | |

Tables VII, VIII and IX show three scenarios where the sales mix has been changed, by management action, without changes in total customers served. These examples change the total weighted average food cost percentage and contribution margin. Fixed costs remain the same, as they should. What changes is the total number of customers required to be served to meet the financial goals of the restaurant. In the first scenario (Table VII), management identified three items that were unpopular, but had individual food cost percentages less than the weighted average food cost of the menu. Each of these items was increased in number of sales, and others equally reduced. In the second example (Table VIII), management chose to market its two most popular entrees, which also had high contribution margins, and increased the sales of each one, while reducing all others. The third scenario (Table IX), applies principles of menu engineering and contribution margin together to reposition customer selection.

**Table VII**

Effect of sales mix changes -- increasing sales of unpopular items with low food cost

| Scenario 1 | Weekly number sold | Sales mix percentage | Menu selling price | Item food cost | Item contribution margin | Total revenue | Total cost | Total contribution margin | Variable cost percentage |
|---|---|---|---|---|---|---|---|---|---|
| Prime rib of beef, au jus | 500 | 10.82 | 13.95 | 6.14 | 7.81 | 6975.00 | 3070.00 | 3905.00 | 44.01 |
| Choice filet mignon | 400 | 8.66 | 15.95 | 6.38 | 9.57 | 6380.00 | 2552.00 | 3828.00 | 40.00 |
| Charcoal broiled beef en brochette | 150 | 3.25 | 12.95 | 3.38 | 9.57 | 1942.50 | 507.00 | 1435.50 | 26.10 |
| Grilled centre cut pork chops | 633 | 13.70 | 8.95 | 3.22 | 5.73 | 5665.35 | 2038.26 | 3627.09 | 35.98 |
| Long Island roast duckling | 50 | 1.08 | 13.90 | 3.14 | 10.76 | 695.00 | 157.00 | 538.00 | 22.59 |
| Southern fried half spring chicken | 100 | 2.16 | 11.95 | 2.09 | 9.86 | 1195.00 | 209.00 | 986.00 | 17.49 |
| Boneless breast of chicken parmesan | 300 | 6.49 | 7.25 | 2.47 | 4.78 | 2175.00 | 741.00 | 1434.00 | 34.07 |
| Stuffed jumbo shrimp | 350 | 7.58 | 10.95 | 4.60 | 6.35 | 3832.50 | 1610.00 | 2222.50 | 42.01 |
| Select bay scallops | 380 | 8.23 | 10.50 | 4.62 | 5.88 | 3990.00 | 1755.60 | 2234.40 | 44.00 |
| Saute frog legs | 533 | 11.54 | 9.25 | 3.52 | 5.73 | 4930.25 | 1876.16 | 3054.09 | 38.05 |
| Fresh water catfish | 594 | 12.86 | 7.75 | 2.25 | 5.50 | 4603.50 | 1336.50 | 3267.00 | 29.03 |
| Steamed Alaskan king crab legs | 150 | 3.25 | 13.50 | 5.83 | 7.67 | 2025.00 | 874.50 | 1150.50 | 43.19 |
| Lazy lobster | 250 | 5.41 | 12.50 | 6.08 | 6.42 | 3125.00 | 1520.00 | 1605.00 | 48.64 |
| Chicken cordon bleu | 100 | 2.16 | 10.95 | 3.61 | 7.34 | 1095.00 | 361.00 | 734.00 | 32.97 |
| BBQ ribs | 50 | 1.08 | 9.95 | 3.98 | 5.97 | 497.50 | 199.00 | 298.50 | 40.00 |
| Veal oskar | 80 | 1.73 | 12.95 | 5.44 | 7.51 | 1036.00 | 435.20 | 600.80 | 42.01 |
| Totals | 4620 | 100.00 | | | | 50162.60 | 19242.22 | 30920.38 | 38.36 |

**Table VIII**

Effect of sales mix changes -- increasing sales of two popular items with high profit

| Scenario 2 | Weekly number sold | Sales mix percentage | Menu selling price | Item food cost | Item contribution margin | Total revenue | Total cost | Total contribution margin | Variable cost percentage |
|---|---|---|---|---|---|---|---|---|---|
| Prime rib of beef, au jus | 1300 | 28.14 | 13.95 | 6.14 | 7.81 | 18135.00 | 7982.00 | 10153.00 | 44.01 |
| Choice filet mignon | 1200 | 25.97 | 15.95 | 6.38 | 9.57 | 19140.00 | 7656.00 | 11484.00 | 40.00 |
| Charcoal broiled beef en brochette | 150 | 3.25 | 12.95 | 3.38 | 9.57 | 1942.50 | 507.00 | 1435.50 | 26.10 |
| Grilled centre cut pork chops | 100 | 2.16 | 8.95 | 3.22 | 5.73 | 895.00 | 322.00 | 573.00 | 35.98 |
| Long Island roast duckling | 50 | 1.08 | 13.90 | 3.14 | 10.76 | 695.00 | 157.00 | 538.00 | 22.59 |
| Southern fried half spring chicken | 100 | 2.16 | 11.95 | 2.09 | 9.86 | 1195.00 | 209.00 | 986.00 | 17.49 |
| Boneless breast of chicken parmesan | 300 | 6.49 | 7.25 | 2.47 | 4.78 | 2175.00 | 741.00 | 1434.00 | 34.07 |
| Stuffed jumbo shrimp | 350 | 7.58 | 10.95 | 4.60 | 6.35 | 3832.50 | 1610.00 | 2222.50 | 42.01 |
| Select bay scallops | 380 | 8.23 | 10.50 | 4.62 | 5.88 | 3990.00 | 1755.60 | 2234.40 | 44.00 |
| Saute frog legs | 0 | 0.00 | 9.25 | 3.52 | 5.73 | 0.00 | 0.00 | 0.00 | |
| Fresh water catfish | 60 | 1.30 | 7.75 | 2.25 | 5.50 | 465.00 | 135.00 | 330.00 | 29.03 |
| Steamed Alaskan king crab legs | 150 | 3.25 | 13.50 | 5.83 | 7.67 | 2025.00 | 874.50 | 1150.50 | 43.19 |
| Lazy lobster | 250 | 5.41 | 12.50 | 6.08 | 6.42 | 3125.00 | 1520.00 | 1605.00 | 48.64 |
| Chicken cordon bleu | 100 | 2.16 | 10.95 | 3.61 | 7.34 | 1095.00 | 361.00 | 734.00 | 32.97 |
| BBQ ribs | 50 | 1.08 | 9.95 | 3.98 | 5.97 | 497.50 | 199.00 | 298.50 | 40.00 |
| Veal oskar | 80 | 1.73 | 12.95 | 5.44 | 7.51 | 1036.00 | 435.20 | 600.80 | 42.01 |
| Totals | 4620 | 100.00 | | | | 60243.50 | 24464.30 | 35779.20 | 40.61 |

Table X is a summary of the results of management action displayed in Tables VII, VIII and IX. In all situations, the financial objectives of this establishment will be met. However, when looking at popularity and food cost percentage alone, it can be seen that more customers are needed to be served before the financial objectives are met (scenario 1). When consideration is only given to stimulating the sales of popular items with high profit, although the number of customers required to be served is reduced, the food cost percentage is greater than under other situations (scenario 2). Only when considering both contribution margin and menu engineering is the restaurant successful in reducing its food cost percentage and serving fewer customers to meet its financial objectives (scenario 3).

## Marketing Techniques to Adjust Sales Mix

There are six marketing techniques and strategies that can be used to adjust sales mix incorporating the principles of menu engineering and contribution margin. These techniques and strategies are not designed necessarily to attract new customers and cost little or nothing to implement. They only shift customer preferences:

1. *Create a signature item*. Feature items that are both popular and high in contribution margin to increase total contribution margin. These are items that are well prepared and accepted by your customer base. Verbal suggestions from the service staff are perhaps the most appropriate marketing technique.

**Table IX**

Effect of sales mix changes -- applying menu engineering and contribution margin concepts

| Scenario 3 | Weekly number sold | Sales mix percentage | Menu selling price | Item food cost | Item contribution margin | Total revenue | Total cost | Total contribution margin | Variable cost percentage |
|---|---|---|---|---|---|---|---|---|---|
| Prime rib of beef, au jus | 500 | 10.82 | 13.95 | 6.14 | 7.81 | 6975.00 | 3070.00 | 3905.00 | 44.01 |
| Choice filet mignon | 800 | 17.32 | 15.95 | 6.38 | 9.57 | 12760.00 | 5104.00 | 7656.00 | 40.00 |
| Charcoal broiled beef en brochette | 550 | 11.90 | 12.95 | 3.38 | 9.57 | 7122.50 | 1859.00 | 5263.50 | 26.10 |
| Grilled centre cut pork chops | 100 | 2.16 | 8.95 | 3.22 | 5.73 | 895.00 | 322.00 | 573.00 | 35.98 |
| Long Island roast duckling | 450 | 9.74 | 13.90 | 3.14 | 10.76 | 6255.00 | 1413.00 | 4842.00 | 22.59 |
| Southern fried half spring chicken | 500 | 10.82 | 11.95 | 2.09 | 9.86 | 5975.00 | 1045.00 | 4930.00 | 17.49 |
| Boneless breast of chicken parmesan | 300 | 6.49 | 7.25 | 2.47 | 4.78 | 2175.00 | 741.00 | 1434.00 | 34.07 |
| Stuffed jumbo shrimp | 350 | 7.58 | 10.95 | 4.60 | 6.35 | 3832.50 | 1610.00 | 2222.50 | 42.01 |
| Select bay scallops | 380 | 8.23 | 10.50 | 4.62 | 5.88 | 3990.00 | 1755.60 | 2234.40 | 44.00 |
| Saute frog legs | 0 | 0.00 | 9.25 | 3.52 | 5.73 | 0.00 | 0.00 | 0.00 | |
| Fresh water catfish | 60 | 1.30 | 7.75 | 2.25 | 5.50 | 465.00 | 135.00 | 330.00 | 29.03 |
| Steamed Alaskan king crab legs | 150 | 3.25 | 13.50 | 5.83 | 7.67 | 2025.00 | 874.50 | 1150.50 | 43.19 |
| Lazy lobster | 250 | 5.41 | 12.50 | 6.08 | 6.42 | 3125.00 | 1520.00 | 1605.00 | 48.64 |
| Chicken cordon bleu | 100 | 2.16 | 10.95 | 3.61 | 7.34 | 1095.00 | 361.00 | 734.00 | 32.97 |
| BBQ ribs | 50 | 1.08 | 9.95 | 3.98 | 5.97 | 497.50 | 199.00 | 298.50 | 40.00 |
| Veal oskar | 80 | 1.73 | 12.95 | 5.44 | 7.51 | 1036.00 | 435.20 | 600.80 | 42.01 |
| Totals | 4620 | 100.00 | | | | 58233.50 | 20444.30 | 37779.20 | 35.11 |

**Table 10**

Summary of menu sales mix changes

| Scenario | Total annual fixed costs and profit | Customers expected | Average contribution margin per customer | Customers required | Food cost percentage |
|---|---|---|---|---|---|
| Current | $1,600,000.00 | 240240 | $7.26 | 220522 | 38.66 |
| Scenario 1 | $1,600,000.00 | 240240 | $6.69 | 239066 | 38.36 |
| Scenario 2 | $1,600,000.00 | 240240 | $7.74 | 206600 | 40.61 |
| Scenario 3 | $1,600,000.00 | 240240 | $8.18 | 195663 | 35.11 |

2. *Train the staff on the principles of contribution margin*. Direct the service staff to suggest menu items that are "good" for the house. Explain that the higher the contribution margin, the higher the profit and perhaps the check average, and the server's pay. Guests frequently ask servers what is good. Everything is good (or it would not be offered for sale), so why not suggest the items that are most profitable for the establishment.

3. *Provide periodic tasting*. Have a monthly wine and food tasting to introduce your customers to items on the menu that are not high in popularity, but have a good contribution margin. These items can be packaged with appropriate wines in an effort to sell from the entire menu.

4. *Use internal marketing tools*. There are many inexpensive marketing tools that can be used to stimulate sales such as table tents, chalkboards, and menu inserts. All the operator has to do is present menu items clearly, simply, and in a tantalizing manner. The customer will do the rest.

5. *Re-evaluate your pricing strategies*. Maybe some items are simply the wrong price. Use your data collected on popularity and contribution margin to adjust prices and measure the change.

6. *Consider profitability when printing menus*. The best items should be put into closures (highlighted boxes) or placed on the menu in the one, two, or last position in a column to allow for customer recognition and purchase. Remember the laws of primacy, they work all the time.

## Conclusion

Menu engineering has been available as a management tool for analysis for quite some time, as have been the principles of cost volume profit analysis and contribution margin. The food service sector has traditionally been measured by food cost percentage attained, leaving little interest in these concepts. Using these two management tools of analysis together, and translating the information into terms of customer count, perhaps some interest will be generated.

The six marketing techniques presented require no additional significant expense, and most can be implemented immediately. Only when the staff are working together with management's direction can a food service establishment achieve its financial goals while serving the least amount of customers.

## References


Chervenak, L. (1995 “No Place to Hide Technology as Hitec Time,” *The Bottom Line*, Vol. 10 No. 4, pp. 17-21.

Dougan, J. (1994, “Menu Engineering with Electronic Spreadsheets,” *The Bottom Line*, December 1993/January 1994, pp. 15-17.

Kasavana, M. and Smith, D. (1990, *Menu Engineering - A Practical Guide to Menu Analysis*, revised edition, Hospitality Publications, Inc., Okemos, MI.

LeBruto, S., Ashley, R. and Quain, W. (1995, “Menu Engineering: A Model Including Labor", *FIU Hospitality Review*, Vol. 13 No. 1, pp. 41-50.

Pavesic, D. (1985, “Prime numbers: Finding Your Menu's Strengths,” *The Cornell Hotel and Restaurant Quarterly*, pp. 71-7.

Schmidgall, R. (1990, *Hospitality Industry Managerial Accounting*, third edition, Educational Institute, American Hotel & Motel Association, East Lansing, MI, p. 302..