**Module B – Linear Programming Applications in Operations Management**

**Case Study #4: Planning an Advertising Campaign**

The Flamingo Grill is an upscale restaurant located in St. Petersburg, Florida. To help plan an advertising campaign for the coming season, Flamingo’s management team hired the advertising firm of Haskell and Johnson (HJ). The management team requested HJ’s recommendation concerning how the advertising budget should be distributed across television, radio, and internet advertisements. The budget has been set at $279,000.

In a meeting with Flamingo’s management team, HJ consultants provided the following information about the industry exposure effectiveness rating per ad, their estimate of the number of potential new customers reached per ad, and the cost for each ad:

|  |  |  |  |
| --- | --- | --- | --- |
| Advertising Media | Exposure Rating per Ad | New Customers per Ad | Cost per Ad |
| Television | 90 | 4,000 | $10,000 |
| Radio | 25 | 2,000 | $3,000 |
| Internet | 10 | 1,000 | $1,000 |

The exposure rating is viewed as a measure of the value of the ad to both existing customers and potential new customers. It is a function of such things as image, message recall, visual and audio appeal, and so on. As expected, the more expensive television advertisement has the highest exposure effectiveness rating along with the greatest potential for reaching new customers.

At this point, the HJ consultants pointed out that the data concerning exposure and reach were only applicable to the first few ads in each medium. For television, HJ stated that the exposure rating of 90 and the 4000 new customers reached per ad were reliable for the first 10 television ads. After 10 ads, the benefit is expected to decline. For planning purposes, HJ recommended reducing the exposure rating to 55 and the estimate of the potential new customers reached to 1500 for any television ads beyond 10. For radio ads, the preceding data are reliable up to a maximum of 15 ads. Beyond 15 ads, the exposure rating declines to 20 and the number of new customers reached declines to 1200 per ad. Similarly, for internet ads, the preceding data are reliable up to a maximum of 20; the exposure rating declines to 5 and the potential number of new customers reached declines to 800 for additional ads.

Flamingo’s management team accepted maximizing the total exposure rating across all media as the objective of the advertising campaign. Because of the management’s concern with attracting new customers, management stated that the advertising campaign must reach at least 100,000 new customers. To balance the advertising campaign and make use of all the advertising media. Flamingo’s management team also adopted the following guidelines:

* Use at least twice as many radio advertisements as television advertisements
* Use no more than 20 television advertisements
* The television budget should be at least $140,000
* The radio advertising budget is restricted to a maximum of $99,000
* The internet budget is to be at least $30,000

HJ agreed to work with these guidelines and provide a recommendation as to how the $279,000 advertising budget should be allocated among television, radio and internet advertising.

**Managerial Report B** (Two files required; Word document with the report and an *Excel* file with your **working** model solved to optimality)

Develop a **model** in *Excel* that can be used to determine the advertising budget allocation for the Flamingo Grill. Include, as a minimum, the following items in your report:

1. [20 pts] The linear optimization model that you implemented in *Excel* when you solved this advertising campaign to optimality.
   1. Be sure to include in your accompanying spreadsheet file the sensitivity report that you used to answer the additional budget allocation of $10,000.
2. [10 pts] A **schedule** showing the recommended number of television, radio and internet advertisements and the budget allocation for each medium. Show the total exposure and indicate the total number of potential new customers reach.
3. [10 pts] A **discussion** of how the total exposure would change if an additional $10,000 were added to the advertising budget.
4. Provide the following information in your report …
   1. Title Page
   2. Executive Summary (the bottom-line up front)
   3. Introduction/Assumptions
   4. Presentation
      1. Include your math optimization model, spelling out your decision variables, objective function and constraints
   5. Outcomes (any tables, graphs, visuals to enhance your assertions)
      1. Include your working spreadsheet model
         1. Spreadsheet model can be using the Solver routine in Excel, or
         2. The Production Operations Management (POM) software, v 5.3, by Pearson to complete the linear programming
   6. Conclusions (make sure you answer all the question(s))