

ISM270 Homework #1

Goals

- become familiar with Excel, and the Excel solver
- solve a linear programming problem
- conduct a data envelopment analysis for a service business
- install the StrikeIron add-on to Excel, and retrieve census data to complete the DEA strategic matrix for the business's service units.

Tools needed

- Fitzsimmons, 5th edition
- access to Microsoft Excel with its basic solver installed, and with admin permission to load a third-party add-on. See the instructor for help if needed.

Background

You were recently the manager of a Peaberry Coffee store, one of a chain of fine coffee shops which originated in San Francisco. One day you received a surprise visit from the company president. It turns out that the company's South Bay stores have been underperforming, and she decided to promote a diligent and successful store manager (you) to become the new South Bay Regional Director. Your first task is to conduct a data envelopment analysis (DEA) of the company's eight South Bay locations. When it is complete all the stores will be placed in their proper quadrants of the DEA strategic matrix. See page 71 of the text for a description of the matrix. The goal is to classify the locations based on their efficiency and profitability: benchmark, potential, problem, or divest.

San Francisco headquarters will help you by sponsoring a marketing campaign in your new territory. They have developed a tested marketing strategy aimed at consumers in the 20-to-34 age group, which involves viral marketing, ads on internet sites, local cable and radio ads, and so on. Based on past experience, the response to the campaign should be about \$28 in increased annual profit per person among those in the age group that live within a store's zip code.

Peaberry Coffee currently has four stores clustered in Mountain View, zip code 94041, and four stores in North San Jose, zip code 95134. The stores are expected to divide the additional \$28 evenly within each zip code, for a gain of about \$7 each. Your job is to complete the H1Template worksheet in the H1.xls workbook: classify each store in its correct place in the DEA strategic matrix.

Part 1. Problem Setup

(a) Open the file H1.xls in your version of Excel, and look at the worksheet titled "DEAExamplePage68." Click on the yellow square, E16. Then click on the Tools menu and select Solver. (If the Solver is not present, select Add-ins from the Tools menu and load it.) E16 is the objective function for the linear program. The Solver Parameters window should show:

Set Target Cell: \$E\$16

Equal To: Max

By Changing Cells: \$C\$15 : \$E\$15

Subject to the Constraints: $\$G\$21 \leq \$I\21 ...and so on
If the solver parameter window is blank, you will need to enter all the information as we discussed in class. A snapshot of the window is given on page 68.

To compute the DEA efficiencies, substitute one by one the labor and material values as positive numbers in the Inputs line of the spreadsheet, D24 and E24. Then click Solve in the Solver Parameters window to compute the answer. Notice that after each computation the efficiency value in E16 was copied and pasted to the Results Table at the bottom. You can read more about this example problem on pages 66 to 70.

(b) Go to StrikeIron's web site at <http://www.strikeiron.com>, and get the SOA Express For Excel free download. There is a short registration process that is worth doing (25 uses instead of 5). When finished there will be a StrikeIron menu to the right of Help on the Excel toolbar. Then, go to the SOA Express™ for Excel Example Workbooks page, and download the Census Data workbook. We will use this workbook in Part 3.

Part 2. Efficiency Analysis

In H1.xls, open the H1Template worksheet. Cells in gray are more or less completed for you, and your task is to fill in the cells shaded yellow. Note that the relationships among cells are about the same as in the previous example worksheet. The efficiency for each location, or service unit, will show up in the cell with the dark border. When your constraints are entered, complete eight solver runs and fill in the Efficiency column of the Results Table.

Part 3. Profitability Analysis

Load the StrikeIron census data workbook. Conduct two queries: the first for zip code 94041 (Mountain View), and the second for 95134 (San Jose). Under Demographic Profile, find the cells corresponding to ages 20 through 34 and add them to find the total population in each zip code for that age bracket.

Now observe the Analysis of Profitability table below the Results Table in H1.xls.
In D51 to D58, enter the total population numbers you found above for the two zip codes. Column (ii) should change as you add the numbers.

The policy for assigning service units to categories is given below the table: high efficiency is defined as 90% or better of the top benchmark unit's efficiency, and high annual profit is \$75K. For each Peaberry Coffee store, check its efficiency value and column (i) value, and assign it the proper strategic category: benchmark, potential, problem, or divest. Enter its category in its corresponding cell within H52:H58.

Repeat the assessment using column (ii) data, and enter its (post-marketing) DEA category in the right location in I52:I58. Note that the entry for store 1 is done for you: it qualifies as a benchmark location both before and after the marketing campaign. Are any of the strategic conclusions expected to change after the marketing campaign is done?

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