MARKETING RESEARCH

MARKETING ENGINEERING APPLICATIONS

Perceptual Map (Dim I : Dim II)

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To my love and best friend,
Dorothy, for sharing her time
with one more book.
-Gary

To Ann for her love and support,
and Cara for providing the
needed distraction.
-Arvind

PREFACE

Rapid changes in the marketplace, in data, and in the computing environment are transforming the structure and content of the marketing manager's job. As a profession, marketing is evolving so that it is no longer based primarily on conceptual content. While many view traditional marketing as an art and some view it as a science, the new marketing increasingly looks like engineering (that is, combining art and science to solve specific problems).

There will always be a role for marketing concepts. Indeed, to make use of the powerful information tools now available requires sound conceptual grounding. But marketers need more than concepts to fully exploit the resources available to them. They need to move beyond conceptual marketing toward what we call marketing engineering: the use of interactive computer decision models to help support marketing decisions. While such needs are evident throughout the field of marketing, they are central to effective marketing research.

This package of materials is designed to supplement a course in Marketing Research. It includes selections from our book, *Marketing Engineering* (Addison Wesley Longman, 1998) that are appropriate for such courses. Those selections are designed to make the corresponding course material come alive with hands-on exercises and cases.

Although each piece of software included here has associated with it a corresponding case or problem, all of the software (except the Promotional Spending Analysis spreadsheet) is independent of those cases and can be used separately on other case-problems or on real problems. Two of the software programs—TreeÅge and Scan/US—are supplied as student versions of commercial packages, whereas we developed the other five pieces of software.

We have selected seven tools and applications that have broad relevance in marketing research courses:

1. **Needs-based Segmentation Using Cluster Analysis**: This general software tool performs cluster analysis, factor analysis and discriminant analysis. The accompanying case addresses how to segment the market on the basis of needs for a sample of prospective buyers for a new personal digital assistant. The case raises issues such as: (1) How many segments should the firm consider (and how do those segments differ)? (2) Which of those segments should the firm target? (3) How many different products should the firms offer? (4) How should the new product be positioned? (See Positioning Analysis, below.)

2. **Targeting: Using Regression and Multinomial Logit Analysis:** This software tool allows the user to apply both regression and logit analysis to a customer targeting application: developing a direct mail campaign that targets the best/most responsive customers. In

its application to the Bookbinders' Book Club case, it allows the student to compare a "judgmental" targeting approach with the results of a regression based as well as a logit-model approach.

3. **Product Positioning Using Perceptual Mapping**: This software tool takes customer perceptions and preferences for products and produces a two or three dimensional map that allows the user to view alternative product positions and consider the strategic implications of changes in that positioning. The accompanying case looks at positioning the Infiniti G20 in 1990: given customer perceptions and preferences for new cars in 1990, how should Infiniti position this car in the market. (We also include a data set that is related to the PDA segmentation case.)

4. **Product Design Using Conjoint Analysis**: This software implements the full-profile version of conjoint analysis. The program allows users to: (1) Construct the conjoint design by specifying new product attributes and options. (2) Obtain data from customers for the chosen design. (3) Conduct market simulations using data from customers to determine the product design(s) that will generate the highest market share(s). We include a hotel design exercise for forte Hotels to illustrate the use of conjoint analysis.

5. **Making Decisions Under Uncertainty Using Decision Trees (TreeÅge)**: The software permits easy implementation of decision trees to isolate the factors that have the most influence on decisions that have uncertain consequences. The software also allows the student to determine the value of marketing research that may reduce the decision uncertainty. We include a case: ICI America's Product Selection case, where the concepts and tools can be applied.

6. **Retail Site Location Using Geodemographic Data and Models (ScanUs)**: Geodemographic data, in conjunction with a gravity model can be used to determine the relative attractiveness and market potential of different retail sites. The associated case—J&J Video Store location—illustrates how this important new data source and related computer tools can be used.

7. **Promotional Analysis Using Scanner Panel Data and Multinomial Logit Analysis**: Scanner panel data—an increasingly pervasive data source—can be used in conjunction with a modeling framework like logit analysis to evaluate promotional effectiveness and develop promotional plans for packaged goods. The associated case, MassMart Inc, demonstrates how these concepts and tools can be applied to improve the profitability of promotional plans.

The pedagogic philosophy here involves two main principles: learning by doing and end-user modeling. What this means is that the way you will learn these concepts best is to try to apply the software to the prob-

lem and make some specific recommendations based on your experience. Thus you learn the concept by doing it yourself—not merely by studying the concept or by assigning the analysis to some staff member or consultant.

This volume contains both software tutorials (step by step instructions on how to use the software) as well as the problem sets or cases that are keyed to the concept. *We strongly recommend that you go through each tutorial (making sure you can reproduce the results there) before attempting to "solve" the case.* Our experience is that well over 90% of the difficulties users have running the software are solved by simply reproducing the screens in the respective tutorial.

Also, read the first section of this tutorial carefully—it not only tells you how to install the software, but it provides a number of other general hints about using the software.

To get other software hints and updates, please visit our website: *http://hepg.awl.com/lilien-rangaswamy/mktgeng/*. You can also send us your comments and suggestions about the software by using the e-mail facility available at this site.

Acknowledgments

This book grew out of the multi-year effort that we have termed *Marketing Engineering* and represents an evolution of our vision to put marketing modeling concepts and tools into more general use. We gratefully acknowledge the support of the companies that sponsor Penn State's Institute for the Study of Business Markets, whose generous support made this entire effort possible. We also thank Mike Roche at Addison Wesley Longman and series editor Joel Steckel at New York University who helped us shape the final product.

While we wrote portions of the software, we were involved more in the design and testing of the actual implementation of the codes. Key software were implemented by Louis Jia, Animesh Karna, Jean-François Latour, John Lin, Andrew "Nuke" Stollak, and Jianan Wu. Our students, Lakshmi Anand, Tolga Gurkin, Katrin Starke, Selva Vaidiyanathan, and David Wu, provided additional, essential support.

The entire manuscript was produced by Mary Wyckoff. In addition to her manuscript preparation, Mary managed the entire process and kept us relaxed and cheerfully on schedule. We are deeply grateful for her dedication to this effort!

We also thank the many early adopters of *Marketing Engineering* whose unwavering support and gentle prods to correct software glitches have helped us to continuously improve this product. Thanks to all!

Gary L. Lilien
Arvind Rangaswamy
June 1998

CONTENTS

INTRODUCTION

MARKETING RESEARCH SOFTWARE (VERSION 1.0)

Installing Marketing Research: Marketing Engineering Applications

Installing the software onto your computer's hard disk is an easy process, but you should still read through the entire installation instructions before you start.

A. This software is supplied to you on a CD-ROM. Before you start, make sure that you have the proper hardware and operating system:

Minimum configuration: IBM-compatible PCs running the 486 processor (33 MHz), 16 MB RAM, 15 MB available hard disk space, and a CD-ROM drive.

Recommended configuration: IBM-compatible PCs running the Pentium or equivalent processor (133 MHz or better), 32MB RAM, 15 MB available hard disk space, and a CD-ROM drive.

Operating system: Windows 95 and Windows NT.

Microsoft Excel: Parts of this software require the availability of Microsoft Excel 7 or higher. If you have not installed Excel on your system, you may still be able to use the non-Excel models included in this package.

B. *Installing the software*

1. Start Windows.

2. Insert the Marketing Engineering CD-ROM into your CD-ROM drive.

3. Run the setup.exe application in drive x:\, where x is the letter of your CD-ROM drive.

4. Follow the instructions on the screen to complete the installation. We recommend that you install this program in the default directory C:\Program Files\MktgEng, although it will work on any non-network (local) drive.
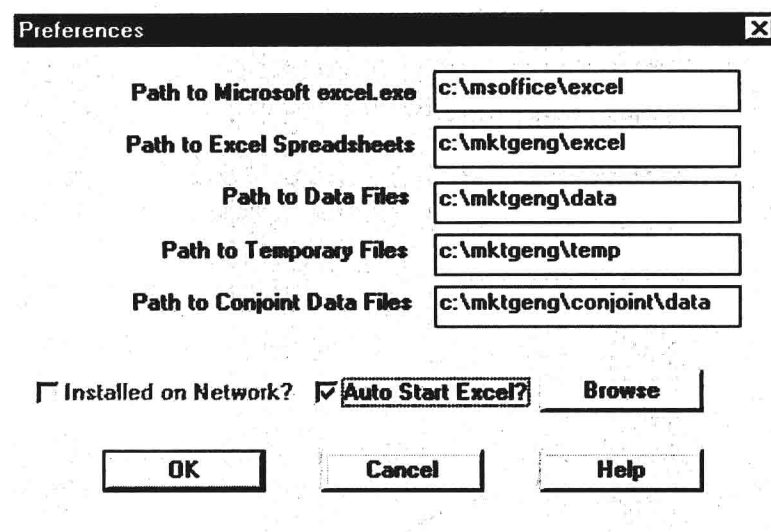
C. ***Uninstalling the software***

1. Start Windows.

2. Open **Control Panel**.

3. Open **Add/Remove Programs**.

4. Select **Marketing Engineering**. Click **Add/Remove** button.

Required add-ins for running Excel applications

For Excel applications, you need the Solver tool. Solver is not part of the default configuration when you install Microsoft Excel. Under the **Tools** menu on your version of Excel, check the list of **Add-Ins** to see whether they are included. If not, run the Excel (or MS Office) setup procedure (with the original installation disks or CD) and select the appropriate options to install Solver.

Setting up Marketing Engineering after installation

Setting preferences: If you wish to customize the location of the files used by the program, go to the **Help** menu and select **Preferences**. In particular, make sure that the path to Excel.exe is correctly specified.

Preferences	☒
Path to Microsoft excel.exe	c:\msoffice\excel
Path to Excel Spreadsheets	c:\mktgeng\excel
Path to Data Files	c:\mktgeng\data
Path to Temporary Files	c:\mktgeng\temp
Path to Conjoint Data Files	c:\mktgeng\conjoint\data

☐ Installed on Network? ☑ **Auto Start Excel?** **Browse**

OK   **Cancel**   **Help**

You can install the software on a network only with the network version of Marketing Engineering. If you check **Auto Start Excel,** the program will automatically start Excel every time you open Marketing Engineering. If you turn off this option, you can still open Excel whenever you want to by going to the **File** menu and choosing **Open Excel**.

Opening applications: When you start Marketing Engineering, you will briefly see the following screen:
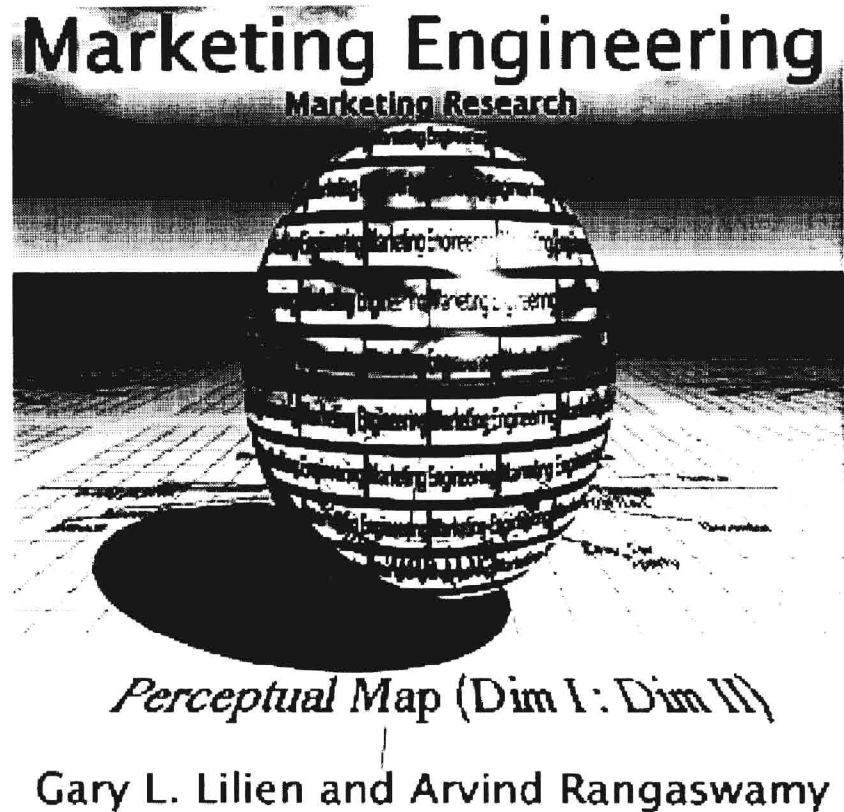
On the **Model** menu select a model, e.g., **Positioning Analysis**.

NOTE: *Only models that appear as active menu items can be opened. The non-activated items are part of the full Marketing Engineering suite of programs.*
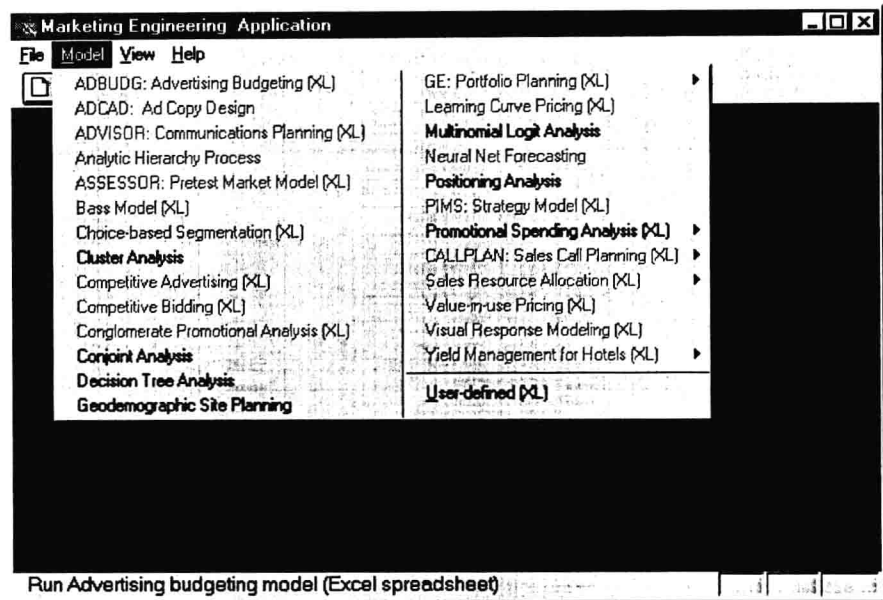
Tips for using the software

Marketing Engineering consists of three different types of software modules:

1. Windows-based programs that will run directly off the Marketing Engineering main menu:
    - Cluster Analysis
    - Multinomial Logit Analysis
    - Positioning Analysis

2. A spreadsheet model that will be loaded under Excel:
    - Promotional Spending Analysis

3. Stand-alone applications that are "loosely" connected to the main menu and are simply executed when invoked:
    - Conjoint Analysis
   - Decision Tree Analysis
    - Geodemographic Site Planning

    Select **Index** under the **Help** menu to get information about individual models and how to run them.

NOTE: *The following tips apply only to **Microsoft Excel applications** (Promotional Spending Analysis).*

Opening Excel models directly: You can open Excel models directly by clicking on *.xls files located in the (default) directory, C:\Program Files\MktgEng\Excel. This can be helpful if you have limited memory on

your computer system to load the full Marketing Engineering program. If you move the Excel files to a new directory, make sure that the file modgen97.ind is also located in the new directory.

Moving between the main Marketing Engineering window and an Excel application: To move back and forth between the Marketing Engineering main window and an Excel application you can use the ALT+TAB key combination. You can also get back to the Marketing Engineering main window from an Excel application by going to the **Model** menu and clicking **Back to Mktg. Eng.**

```
Model
  Main Menu
  Introduction
  Analysis Area
  Help

  Back to Mktg. Eng.
```
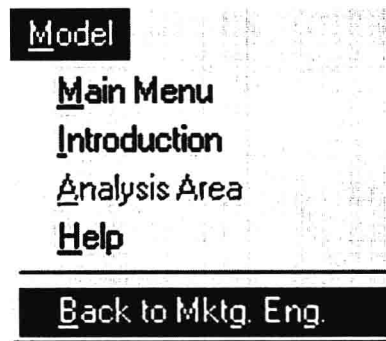
Entering data into a Excel spreadsheet: After you enter data in a cell, press the Enter key to ensure that the data gets registered within the spreadsheet.

Using Solver: In some cases the Solver runs in Excel will not converge. You may then have to provide Solver with new starting values. See Appendix at the end of the section of tips for using Solver.

Unprotecting locked cells: If you want to make changes to locked cells or if you want to unprotect the spreadsheet for certain Solver runs, go to the **Tools** menu, select **Protection**, and click **Unprotect**.

Saving Excel files: If you want to save any of the Excel spreadsheets that you modify, save it in the same directory (default: C:\Program Files\MktgEng\Excel) in which the other Excel files are located.

Non US Versions of Excel: Much of our code assumes that you will be using English/American conventions for numbers and currency. The most critical problem is the difference between the use of the "." and the "," to refer to decimals depending on the country you are in. You must use US conventions in your input and you must make the following system modifications to run the programs with a non-US version of Excel.
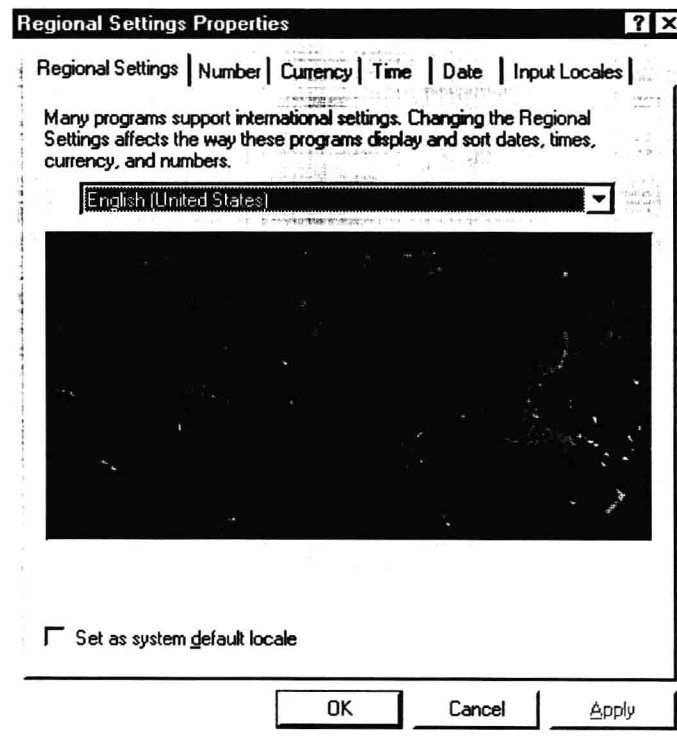
First, Close any open programs.

Next, Click the **Start Button**, point to **Settings**, click **Control Panel**.

Next, Double Click Regional Settings.
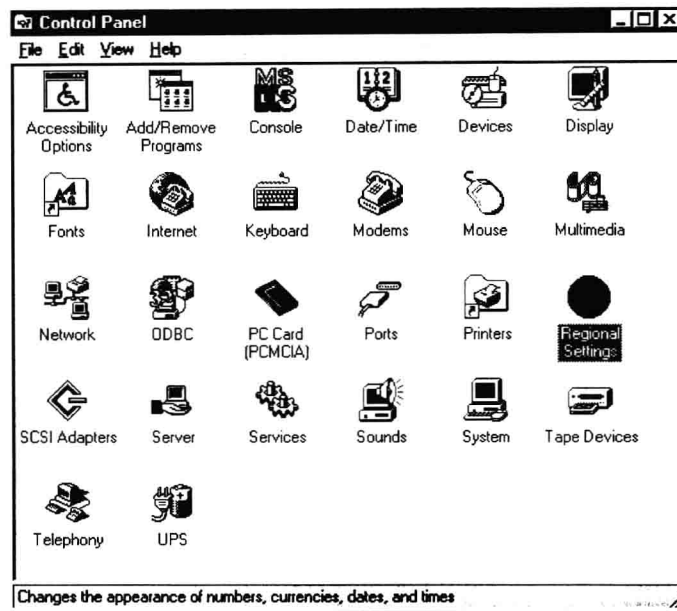
Select English (United States) as indicated below and first click **Apply** and then **OK**:

(You may be requested to insert the Windows CD at this time.)

Select the Number and Currency tabs and check to see that the US conventions are now applied.

Regional Settings Properties [?] [X]

Regional Settings | **Number** | Currency | Time | Date | Input Locales |

Appearance samples
Positive: 123,456,789.00   Negative: -123,456,789.00

Decimal symbol: .
No. of digits after decimal: 2
Digit grouping symbol: ,
No. of digits in group: 3

Negative sign symbol: -
Negative number format: -1.1
Display leading zeros: 0.7
Measurement system: U.S.
List separator:

OK   Cancel   Apply

Regional Settings Properties [?] [X]

Regional Settings | Number | **Currency** | Time | Date | Input Locales |

Appearance samples
Positive: $123,456,789.00   Negative: ($123,456,789.00)

¤ = Universal currency symbol

Currency symbol: $
Positive currency format: ¤1.1
Negative currency format: (¤1.1)

Decimal symbol: .
No. of digits after decimal: 2

Digit grouping symbol: ,
No. of digits in group: 3

OK   Cancel   Apply

After you have completed these changes, Click the **Start Button** again, then click **Shut Down** and Click **Restart the Computer** and finally Click **OK**.

This procedure will allow you to run our software.

Be sure to reset to your local conventions when you are done using our software!

NOTE: *The following tips apply only to software modules that run directly off the main menu, namely, Cluster Analysis, Multinomial Logit Analysis, and Positioning Analysis.*

Incorporating your own data sets: There are three ways to create new data sets for Cluster Analysis, Multinomial Logit Analysis, and Positioning Analysis.

1. **Load an ASCII file containing the data in the appropriate format**: Use a standard word processing program to generate a text file that can be directly read by the Marketing Engineering program. The format for the file follows:

Perceptual Mapping	Line 1
3 4	Line 2
5.6 6.0 4.6 3.6	Section 1
4.4 3.6 5.2 2.2	
2.9 6.4 2.7 2.6	
Sprint	Section 2
MCI	
AT&T	
Other	
Value	Section 3
Service	
Special Programs	

   Line 1: Enter title of data set
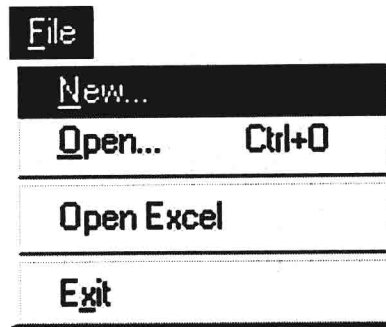   Line 2: Enter the number of rows and the number of columns of data
   Section 1: Enter the data (separate by comma or space)
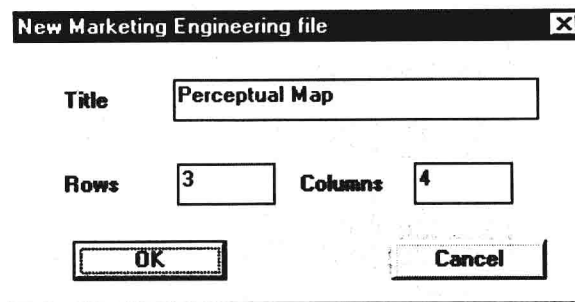   Section 2: Enter column headings
   Section 3: Enter row headings

   You can load this file into Marketing Engineering by selecting **File**, followed by **Open**. You will be prompted for the file name.

2. **Import data from Excel**: First, open the Marketing Engineering program. From the **File** menu, select **New**.

Enter a file name and click **OK** to see the following screen.

Enter a title for the data and the number of rows and columns. Click **OK.**

Next, separately enter or import a data set into Excel (just the data, no labels) as shown below:

You can now import the data from Excel into Marketing Engineering in one of the following two ways:

Copy and paste the data directly into Marketing Engineering. In Excel, select the data range you want to import into Marketing Engineering. From the **Edit** menu use **Copy** or **Cut** to paste the data to Windows clipboard. Use the ALT+TAB key combination to get to the Marketing Engineering window. Place the cursor on the first row and first column of the blank spreadsheet and paste the data from Excel onto the Marketing Engineering worksheet. If you want to override the default column and row headings,