Discrete-Choice Wizards

Microsoft Excel add-ins that facilitate discrete-choice projects

Discrete-Choice Models

In recent years, discrete-choice analysis has emerged as a powerful tool in the market-research arsenal. Based on consumers’ hypothetical or real-world choices, discrete-choice models help guide product managers’ critical tasks:

- Positioning products in a competitive marketplace
- Developing strategic and tactical pricing strategies
- Sizing markets for new products
- Determining the optimal mix of product features
- Isolating market segments based on product preferences
However, key factors limit adoption

- Complexity of available techniques, e.g.,
  - Nested specifications
  - Allowance for heterogeneity (mixed logit)
  - Latent-class choice
- Expense of typical projects - $100,000 +
- Need for specialists
- Time required to design and execute projects
  - Often 6-12 weeks
  - Longer if many constituents are involved

A Typical DCM Project Schedule

Key sources of time, cost and complexity
If you’re a market-research manager or practitioner, Would you like to:

- Make generating experimental designs EASY
- Make data setup EASY
- Make building a simulator EASY

while improving quality?

To be more precise, Would you like to:

- Produce an experimental design in minutes rather than hours?
- Eliminate the tedium in reformatting data to suit requirements of computer programs?
- Cut days out of the time it takes to implement a discrete-choice project?
- Automatically deliver an Excel-based simulator to your end-users?
If so, take a look at StatWizards®

- **Design Wizard** - An Excel add-in that takes a list of product attributes and generates an experimental design
- **Data Wizard** – A second add-in that takes a spreadsheet of respondent data and configures it for the most popular discrete-choice estimation packages
- **Simulator Wizard** - A third add-in that reads the output from a statistical package and builds a market simulator in Excel

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**Design Wizard**

An Excel add-in that generates an experimental design and choice sets based on a list of product attributes
Design Wizard Features

- Automatic selection of best design
- Designs are fully customizable
- Permits blocked and unblocked designs
- Supports up to 13 attribute levels
- Suggests values for choices per store
- Recommends blocking factor, if needed
- Uses Solver to maximize efficiency and minimize overlap
- Permits extremely complex designs
- Translates choice exercises into other languages
- Employs best-practice defaults at every step

Design Wizard Benefits

- Greatly reduced time in design construction
- High-quality, optimal designs
- Elimination of error
- Flexibility to meet most needs
- Facilitation of very complex designs
- Ease of learning and use
- Typically pays for itself in one project
Design Wizard Requirements

- A list of product attributes, e.g.,
  - Brand
  - Price
  - Key features
- A list of levels or level ranges for each attribute, e.g.,
  - $100 - $500
  - Bundled vs. unbundled
  - Sony, Motorola, Ericsson

Design Wizard Walkthrough - 1

1. Start with a simple list of product attributes and levels in Excel.

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Model</th>
<th>Brand</th>
<th>Meter shelf price</th>
<th>Mt. Rebate</th>
<th>Trade-in allowance</th>
<th>Glucose test strip quantity</th>
<th>Glucose test speed</th>
<th>Glucose test strip unit price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2In1</td>
<td>None</td>
<td>Ours</td>
<td>30 sec</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2In1</td>
<td>None</td>
<td>Ours</td>
<td>40 sec</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ExactlyRight</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OneDrop</td>
<td>Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TakeControl</td>
<td>Ours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LightTouch</td>
<td>Big</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Run the wizard from Excel’s Tools menu.
3. The wizard adds some information and directions to your workbook…

- Automatically generates variable names
- Comments provide help
- Directions are attached to the sheet

4. It spreads attribute ranges and assigns unique variable names…

- Calculates equal intervals for levels
- Renames duplicate variables
- Recommends number of stores and products per store
Design Wizard Walkthrough - 4

5. …then in seconds builds an experimental design, …

Design Wizard Walkthrough - 5

6. …complete with printer- or Web-ready shopping excursions, …
Design Wizard Walkthrough - 6

7. ... and a data set ready for export to most statistical packages.

Design Wizard Limitations

- 3-level designs are not supported
  - Must be converted to 4 levels, with some loss in balance
  - Often this is not a critical limitation
- Designs above $2^{11}$ support main effects only
  - In practice this is a good compromise between complexity and tractability
The Design Wizard

Turbo-charges the generation of efficient experimental designs, making the process EASY
An Excel add-in that converts a spreadsheet of participant responses into data sets and control files accepted by major statistical programs.

Data Wizard Features

- Starts with a spreadsheet of responses – the simplest data form
- Automatically distinguishes between continuous, categorical, binary and choice variables.
- Handles both stated-preference (SP) and revealed-preference (RP) data
- Can incorporate design data from other spreadsheets
- Generates data sets and starting command files for most popular statistical estimation packages
  - Latent GOLD Choice
  - Limdep
  - R
  - Biogeme
  - Gauss (Kenneth Train’s mixed logit programs)
Data Wizard Benefits

- Eliminates the most tedious portion of a discrete-choice project: Data setup
- Removes a common source of error:
  - The lengthy customized data manipulation routines needed to sort and merge design and response data.
- Cuts at least a day off a discrete-choice project’s schedule
- Typically pays for itself in one project

Data Wizard Requirements

- A spreadsheet of response data, with respondents in rows and variables in columns
- Optional: a separate worksheet containing design elements
- A supported statistical package that can estimate discrete-choice models
  - Latent GOLD Choice
  - LIMDEP’s NLOGIT
  - R’s mlogit library
  - Biogeme
  - Gauss + Kenneth Train’s Mixed Logit routine
Data Wizard Walkthrough - 1

1. Start with a simple spreadsheet containing survey responses.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ID</td>
<td>Age</td>
<td>Education</td>
<td>Income</td>
<td>Gender</td>
<td>Sports</td>
<td>Exercise</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>25</td>
<td>12</td>
<td>50K</td>
<td>Male</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>30</td>
<td>16</td>
<td>60K</td>
<td>Female</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>35</td>
<td>8</td>
<td>40K</td>
<td>Male</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

2. Run the wizard from Excel's Tools menu.

Data Wizard Walkthrough - 2

3. The wizard adds some additional information to your workbook:

- Automatically determines variable type
- Automatically generates variable names

![Image of Data Wizard interface]
Data Wizard Walkthrough - 3

4. It recognizes discrete variables and sets up categories, ...

5. ... then allows the user to designate category names.
   (It will import any names in an SPSS file)

Data Wizard Walkthrough - 4

6. The wizard then reformats the data for export to most statistical packages.
7. Next, it asks the user to select from a number of statistical packages.

8. Finally, it combines socio-demographic with design data (e.g., from the Design Wizard) to produce a data set ready for input into the chosen statistics program.

9. …and generates a command file needed to load the data set.
Data Wizard Limitations

- Current release does not cover all estimation packages. Does not yet include:
  - SAS
  - S Plus
  - SYSTAT
  - Dan Steinberg’s LOGIT program
  - Kenneth Train’s Probit program in Gauss
- Support for these packages will be added on request

The Data Wizard

Makes organizing even large data sets for discrete-choice estimation **EASY**
Simulator Wizard

An Excel add-in that reads output files from statistical estimation programs (and StatWizards spreadsheets, if they exist), then builds a market simulator in Excel

Simulator Wizard Features

- Quickly translates statistical output to a powerful tool that product managers can use.
- Can be easily customized and extended. Examples:
  - Inclusion of production cost data
  - Calculation of contribution margins
- Users don’t have to deal with underlying statistics
- Easily handles individual-level coefficients
- Automatically generates presentation-ready charts
  - Price curves
  - Feature importance
  - Willingness to pay
Simulator Wizard Benefits

- Translates statistical output into a form that product managers can use to make critical decisions
- Gives managers a powerful tool for pricing and positioning their product or service in a competitive marketplace
- Use of Excel allows extensive customization to suit individual requirements
- Fast construction saves time
- Typically pays for itself in one project

Simulator Wizard Requirements

- Text file containing output from a discrete-choice estimation
  - Latent GOLD Choice
  - LIMDEP
  - R’s mlogit library
  - Biogeme
  - Gauss
- Optional: data spreadsheet created with the Data Setup Wizard
- Optional: design spreadsheet created with the Experimental Design Wizard
1. Start with output file from a program that estimates discrete-choice models.

![Image of output file]

2. Run the wizard from Excel’s Tools menu.

![Image of wizard interface]

Welcome to the DCM Simulator Wizard. Using output from a program that estimates discrete-choice models, this wizard creates a simulator you can use to develop a powerful marketing strategy.

**Step 1.** Safety requirements.

To use the wizard, you must have access to the following:

1. A text file containing the results from a discrete-choice statistical estimation.
2. An Excel workbook containing the raw data. This should have been created using the Data Setup Wizard.

If these files are accessible to your computer, either from your hard disk or from a network, press the Next button to continue. If not, press Cancel.
3. The Wizard prompts for some additional information, …

4. … links the originating data and design sheets, …
5. … and builds a market simulator, …

Enter assumptions for features and price, …

… and see the impact on market share.

…complete with a diffusion model …
Simulator Wizard Limitations

- Does not yet handle dynamic discrete-choice models, where parameters vary over time.
  - This is a future release
- Requires calibration to be effective.
  - Revealed preference data can be used here
  - Let a market expert apply factor adjustments
  - The program includes reasonable defaults for calibration
- Some complex specifications may require manual intervention.
The StatWizards® Discrete-Choice Suite

Suite Features

- Each wizard can stand alone, yet benefits from the other wizards
  - The Data Wizard can automatically incorporate designs produced by the Design Wizard
  - The Simulator Wizard can automatically incorporate information from both Data and Design Wizards
- Common look and feel resemble Microsoft wizards, making them easy to learn and use.
- Payback is immediate
  - Cost savings from just one project can exceed the cost of the entire suite
Summary

- StatWizards® are Excel add-ins that facilitate the execution of discrete-choice projects.
- Each wizard can either stand alone or integrate with others.
- Combined, the suite cuts days off projects, reduces costs, and improves the accuracy of the results.
- Return on investment is immediate.

Conclusion

If you do serious market research, the StatWizards® modules,
- Design Wizard
- Data Wizard
- Simulator Wizard

will improve the quality of your staff’s work and make your life EASY
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