

Advanis White Paper Series: Number 2 – Choice
Modeling

Customer Decision Analysis



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The analysis of consumers' choice behavior in the marketplace is one of the most fundamental tasks in market research. It is the foundation of all marketing action, since the products and services offered to consumers must meet their needs and provide the benefits sought.

Yet, only in the past two decades has a coherent, theoretically sound approach to consumer choice modeling been developed. Several past and present principals of Advanis have been instrumental in the development of this theory and the details of its implementation. Thus, Advanis is able not only to perform choice-centered marketing studies, but is able to bring to bear an arsenal of innovation and thought that can handle the twists and turns imposed by the real market.

The consumer choice behavior measurement approach (or Experimental Choice Analysis as it is sometimes called in the literature) used by Advanis is known as Customer Decision Analysis (CDA). CDA has been applied in a broad range of industries from telecommunications to technology, transportation, tourism, consumer packaged products, investment banking and others.

The output of a CDA is useful for:

- Product design optimization
- Analysis of competitors' actions
- Analysis of product line-ups
- Brand and brand alliance evaluation
- Formulation of marketing strategies

The results of the CDA are delivered in a computerized simulator that becomes a virtual laboratory of the market in question.

THE BEHAVIORAL BASIS FOR MODELING CONSUMER CHOICE

CDA is based on a rigorous and well-tested theory of consumer choice behavior, known as random utility theory (see, for example, Ben-Akiva and Lerman, 1985; Hensher and Johnson, 1981; McFadden, 1981, et al).

As shown in Figure 1, this theory postulates that consumers attach utility (a latent measure of preference) to each product in the marketplace as a function of the product's attributes and their perceptions of the extent to which each brand meets these needs and benefits sought.

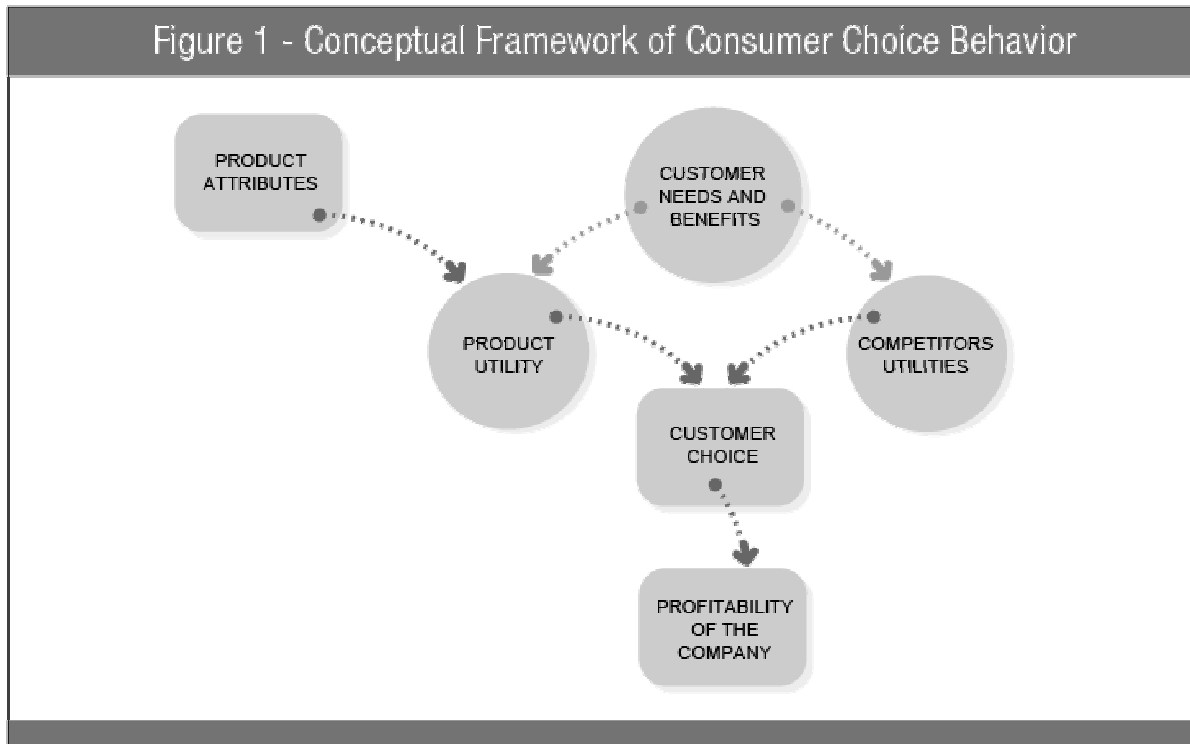





Figure 1: Conceptual Framework of Consumer Choice Behavior

Scenario 1		Device 1	Device 2	Device 3
Mobile Device				
Device	Type	Mobile Messaging Device  CLICK HERE	Phone II  CLICK HERE	Mobile Messaging Device  CLICK HERE
Features & Supported Services				
Voice	Device makes phone calls	Yes	Yes	No
	Additional phone services supported	None	Push to Talk	Not applicable
	Call management features	Advanced (e.g., automatic redial, voice dialing/commands)	Standard (e.g., call logs, speed dial, missed call identification)	Not applicable
Mobile Internet	Web browsing	Supported	Supported	Supported
Messaging	E-mail	"Always on" Enterprise or Web e-mail access	"Browser-based" Enterprise or Web e-mail access	"Always on" Enterprise or Web e-mail access
	E-mail attachments	Not supported	Supported	Not supported
	Text messaging	Basic Text Messaging	Multi-Media Messaging	Multi-Media Messaging
Software	Preloaded applications	Phone/Date Book, Calculator	Phone/Date Book, Calculator	Phone/Date Book, Calculator
	Downloadable applications to device	Cannot download applications	Palm-based applications	Windows-based applications
	Desktop software	Included	Included	Not supported
Entertainment & Fun	Ringtones	Polyphonic and monophonic ringtones included	Polyphonic and monophonic ringtones included	Not applicable
	Download ringtones and images	Supported	Supported	Not applicable
	MP3 player	Supported (but not included)	Supported (but not included)	Not supported
	Radio	Supported (but not included)	Supported (but not included)	Not supported
	Streaming video	Not supported	Not supported	Supported
	Preloaded games	Not included	Included	Included
	Download additional games	Not supported	Supported	Supported
Additional Specifications	Memory	4MB	Store up to 100 contacts, 50 calendar entries, 20 ringtones, 6 images	8MB
	Power use	5 hours active time, 10 days standby time	10 hours active time, 15 days standby time	2 hours active time, 4 days standby time
Pricing				
	Device cost	\$ 600	\$ 200	\$ 350
<p>Which of these devices would you purchase? (Please select only one)</p> <p style="text-align: center;"> <input type="radio"/> C <input type="radio"/> C <input type="radio"/> C <input type="radio"/> C </p>				
<p>*requires an active network connection, and may result in additional network service charges</p> <p style="text-align: center;">next</p>				

I would choose to stay with my current wireless situation. (I.e., I would not purchase a new wireless device if these were my only options.)

Figure 2: Hypothetical CDA Scenario

The customer's objective is hypothesized to be the maximization of utility. Thus, the product/service that is "best" for them is chosen, subject to what they know about competing options and whatever constraints (e.g., income) are operating on their choices.

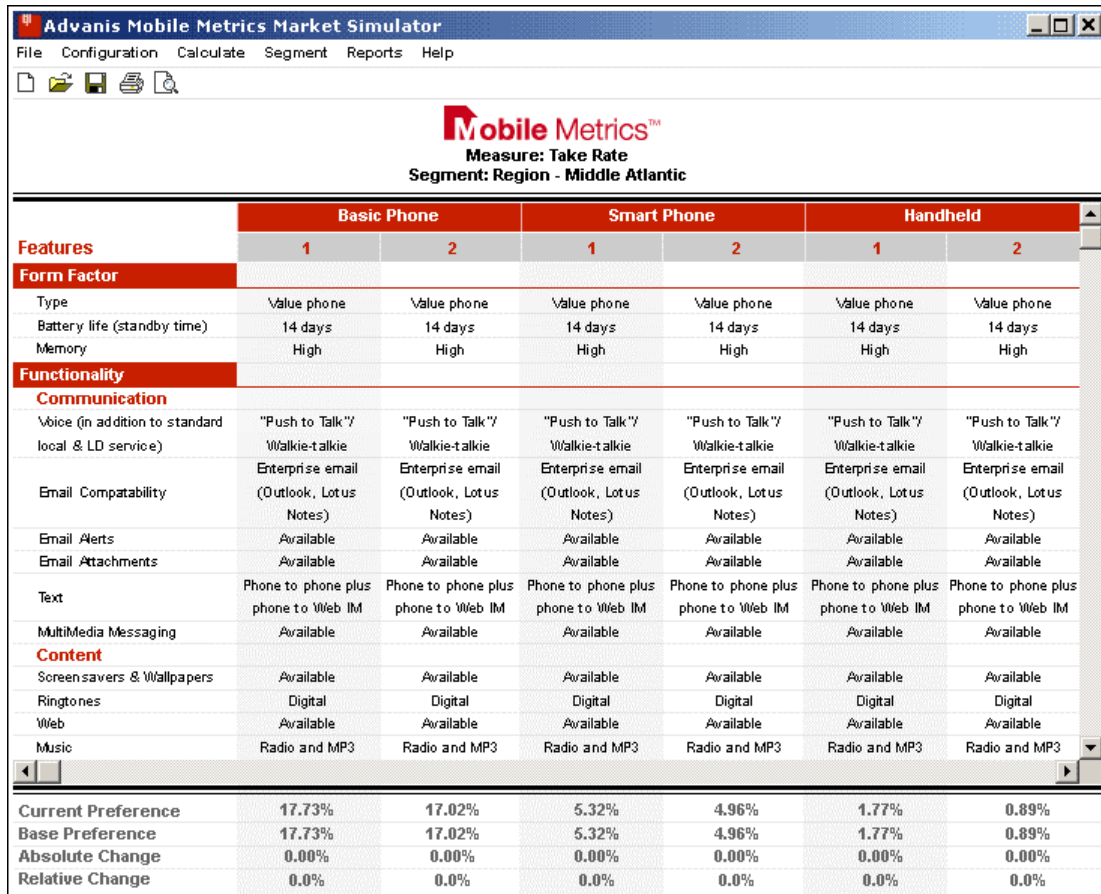
THE CDA EXTENSION

Because CDA is based on random utility theory, the statistical models it uses reflect its assumptions about human economic choice behavior; namely that decision-makers are

rational utility-maximizers, seeking to find the best option among those available in the market.

In addition, the theory recognizes that decision-makers operate under constraints (for example, income, or minimum reliability levels required in a piece of equipment) and that they differ in terms of the weight they attach to various components of the utility measure.

CDA takes this basic theory (see Louviere, 1988, and Louviere, Hensher and Swait 2000) and proceeds to the identification of the key

Figure 3: Example DSS Screen


Features	Basic Phone		Smart Phone		Handheld	
	1	2	1	2	1	2
Form Factor						
Type	Value phone	Value phone	Value phone	Value phone	Value phone	Value phone
Battery life (standby time)	14 days	14 days	14 days	14 days	14 days	14 days
Memory	High	High	High	High	High	High
Functionality						
Communication						
Voice (in addition to standard local & LD service)	"Push to Talk"Y Walkie-talkie	"Push to Talk"Y Walkie-talkie	"Push to Talk"Y Walkie-talkie	"Push to Talk"Y Walkie-talkie	"Push to Talk"Y Walkie-talkie	"Push to Talk"Y Walkie-talkie
Email Compatibility	Enterprise email (Outlook, Lotus Notes)	Enterprise email (Outlook, Lotus Notes)	Enterprise email (Outlook, Lotus Notes)	Enterprise email (Outlook, Lotus Notes)	Enterprise email (Outlook, Lotus Notes)	Enterprise email (Outlook, Lotus Notes)
Email Alerts	Available	Available	Available	Available	Available	Available
Email Attachments	Available	Available	Available	Available	Available	Available
Text	Phone to phone plus phone to Web IM	Phone to phone plus phone to Web IM	Phone to phone plus phone to Web IM	Phone to phone plus phone to Web IM	Phone to phone plus phone to Web IM	Phone to phone plus phone to Web IM
MultiMedia Messaging	Available	Available	Available	Available	Available	Available
Content						
Screensavers & Wallpapers	Available	Available	Available	Available	Available	Available
Ringtones	Digital	Digital	Digital	Digital	Digital	Digital
Web	Available	Available	Available	Available	Available	Available
Music	Radio and MP3	Radio and MP3	Radio and MP3	Radio and MP3	Radio and MP3	Radio and MP3
Current Preference	17.73%	17.02%	5.32%	4.96%	1.77%	0.89%
Base Preference	17.73%	17.02%	5.32%	4.96%	1.77%	0.89%
Absolute Change	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Relative Change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

decision criteria (or attributes) that customers use to evaluate and choose among competing alternatives, as well as desired ranges for their values (or levels). Within this framework, prior market research results, client knowledge of the market place, and qualitative market research efforts all contribute to the successful design of a CDA study.

Every product or service can be thought of as a 'bundle' of attributes (with particular values). These attributes are the criteria used by customers to make decisions when they are choosing a particular product or service. They would include the features of the product or service, as well as brand effects. We can delineate the universe of possible product or service offerings by enumerating all the possible combinations of values of attributes.

For illustrative purposes only, we show in Figure 2 (page 3) the layout of an entirely hypothetical CDA scenario in which the respondent must choose between three

cellular telephones, or may opt to reject all of them. Previous research will have shown that important decision criteria used by consumers to evaluate offerings in the market place include:

- Talk time
- Battery life
- On-board memory
- Presence or absence of camera
- Standby time
- Presence or absence of email and
- A wide range of other features

It is assumed there are a range of handsets in the market. In addition, there is the alternative of delaying or foregoing purchase altogether: respondents are faced with a choice akin to one they would face in the market.

By statistically designing scenarios similar to the one shown in Figure 2, Advanis is able to infer the relative importance of the various decision criteria. Additionally, if it is pertinent

to the objectives of the study, respondent characteristics that influence the decision process can be used in the modeling process to explain differences in choice behavior among respondents.

OTHER CHOICE MODELING TECHNIQUES

Other approaches are available for studying choice behavior. Perhaps the most well known of these is conjoint analysis, a technique widely employed in the market research field to analyze consumer preference structures. For a fuller treatment of these other approaches see Number 6 in Advanis' White Paper Series: *Conjoint Methods for Consumer Preference Measurement*.

MARKET SIMULATOR

The results of a CDA study are generally embodied in a computerized laboratory that we term a Market Simulator. The Market Simulator not only computes the direct model results (market shares as a function of product attributes, as determined in the CDA exercise), in aggregate and by segments of the population, but can go on to compute financial results that can serve as input to decision making. In fact, Advanis has built up extensive experience in the development of Market Simulators, and can today provide tools that are as simple or as complex and sophisticated as desired.

Suppose a study had been conducted using choice scenarios similar to those shown in Figure 2. Figure 3 (page 4) provides an example of the main screen of a Market Simulator for this decision problem, which has a layout quite similar to the original choice task. This Market Simulator models the market for cellphone handsets. This screen is showing the 'take rate' (or market share) of a range of different handsets in the Mid Atlantic census region of the US, but the results can be displayed by any measured demographic or behavioral segments desired.

The choice shares, which are the CDA's model estimate of the adoption shares between phones given the attributes shown, could be contrasted to the corresponding shares for a pre-defined Base Case, if one of the phone manufacturers was considering

adding new features to their handset, for example.

The Market Simulator becomes a laboratory in which marketing actions can be played out without the risk of making serious mistakes in the actual market. On the basis of the CDA model predictions, the Market Simulator can generate revenue and profitability forecasts for the scenario shown. These can be displayed graphically and/or in tabular form, as desired.

Even this very simple example illustrates what a Market Simulator can do to facilitate decision-making and help a marketing analyst gain insight into consumer preferences, competitive advantages and brand weaknesses, opportunities for product repositionings and so forth.

References

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