12. Customer Modeling

8 October 2008

Bob Glushko

Plan for ISSD Lecture #12

Understanding customer preferences

Models of "employees"

Models of "citizens" and "public sector customers"
One Minute MBA Moment -- Customer Preferences

"What business thinks it produces is not of first importance. What the customer thinks he is buying, what he considers value, is decisive. And what the customer buys and considers value is never a product. It is always utility, that is, what a product does for him" (Peter Drucker, "Management: Tasks, Responsibilities, Practice" [1974])

"Differentiation that does not drive customer preference is a liability" (Geoffrey Moore, "Darwin and the Demon: Innovation within Established Enterprises" [2004])

Why Model Preferences?

We want to design, build, deploy what people want

Different people or types of people want different things, or put different priorities on them

We can't do everything at once, so we must prioritize, and our priorities should reflect the priorities of our most important/valuable/influential customers
Learning About Customer Preferences

- Direct observation... ethnography
- Experimentation
- Transaction data
- Interviews
- Focus groups
- Surveys

Experimentation

In the "old days" and with tangible products, companies create different versions of a design and conduct experiments with customers to study preferences, usability, etc.

With web pages and "software as a service," it is qualitatively easier to run online experiments, and many firms run "continuous experiments"

- Show a different page layout to every hundredth visitor and determine in a few days whether the new design increases sales
- Try out a new search or ad placement algorithm and discover in a few hours whether results or ad "click-throughs" increase
Transaction Data

The "revolutionary" barcode technology, invented around 1950, was applied to library checkout starting in 1971 and grocery stores starting in 1974.

Transaction data reveals "co-purchasing" patterns for products/services.

When the customer can be identified, transaction data reveals preferences of buyers for particular products, enabling targeting to specific buyers or buyer categories.

How easy it is to identify the customer depends on the context (online or offline) and on the customer's willingness to self-identify.

Businesses use many techniques to identify the customer (some of which the customer might not know about or approve of).

Customer Surveys

Surveys are sometimes described as “structured conversations between strangers”.

Businesses routinely ask customers about their preferences, and this is occasionally so they can provide better service or improve their products.

Lots of methodology and lore about conducting surveys, but a very common technique is to ask people questions about their preferences for particular product/service features or dimensions.
A Warning About Surveys

Questions can be misheard... and responses can be designed, consciously or unconsciously, to “solve” the cognitive tasks that the questions apparently pose ...

...to please or to impress the interviewer

...to support and to justify the self-image of the respondent

... to minimize effort and to hasten conclusion of the interview

...or to provide a forum for opinions and grievances


Survey Question Example

Please indicate how much you agree or disagree with each of these statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The president is doing a good job.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The Congress is doing a good job.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The Secretary of Defense is doing a good job.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
**Likert Scales**

The Likert Scale is very commonly used in survey questions to elicit preferences or evaluations.

Typically use 5 or 7 level scale, usually with "symmetrical" labels.

The choice of labels can bias the results, which are often "overinterpreted" as interval-level data when they are almost just ordinal data.

- Ordinal data: Bar charts, mode, median
- Interval data: Mean, standard deviation

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**Poor Survey Question Design**

How often do you smoke cigarettes?

1. Never
2. Once in a while
3. 1-5 per day
4. More than 5 per day.
"Magnitude Estimation" in Surveys

The President is doing a good job:

0  

The Congress is doing a good job:

0  

The Secretary of Defense is doing a good job:

0  

Using "Magnitude Estimation" to Improve Data Quality

Asking people to make direct "magnitude estimates" on scales can improve survey data quality.

This technique eliminates a substantial source of bias (that any ISchool student had better be able to explain...)

This technique yields metric data that can be analyzed with far more statistical rigor than is justified for traditional Likert-type surveys.
Limitations of Unidimensional Preference Judgments [1]

Any survey technique that asks people to evaluate product or service dimensions has significant limitations.

Why? Because these dimensions are bundled or combined in the actual products or services.

The importance of any dimension depends on the values on other dimensions.

Typical Dimensions of Multidimensional Preferences

- Price
- Features
- Quality
- Performance
- Brand
- Distribution Channel
- Safety
- Usability
- ...
But Every Design Context Has Additional Dimensions

What criteria or dimensions are considered when choosing:

- Courses to take next semester?
- Restaurant(s) to patronize?
- Restaurant(s) to patronize in an airport terminal?
- A personal physician?
- Someone to cut your hair?
- Where to go on vacation?
- A president?

Limitations of Unidimensional Preference Judgments [2]

When people are asked about one dimension at a time, they implicitly consider it in the context of a "bundle" in which all other values are acceptable.

So they don't consider the tradeoffs that might be required, and their preferences tend to be overestimated.

But some feature combinations just aren't feasible or affordable, and in reality they would need to make tradeoffs.
New Techniques for Modeling Customer Choices

Discrete choice modeling - infer weights on preference dimensions or drivers using sophisticated statistical models

Invented by Daniel McFadden, Berkeley economics professor who won the 2000 Nobel Prize

Requires specialized software for generating combinations and extracting the preferences (e.g., Sawtooth Software)

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DCA Methodology: Design

Identify relevant dimensions or "drivers" that influence preferences or buying decisions for a product or service

Determine the range or values on each dimension to be evaluated

Construct the items for "choice experiments" in which simulated "choice sets" are presented to representative participants (selected to reflect current or targeted customer segments)

Because of brilliant statistical and experimental design "black magic" the number of alternatives needed is a tiny fraction of the possible combinations
Constructing the Choice Sets: Existing Offerings

- **Existing Offerings**
  - Product / Service Descriptions: Detailed Description
  - Shopping Assistance: Typical Search Engine
  - Offline Customer Support: Limited #
  - Recommendations: No Recommendations
  - Loyalty Programs: Offers a % of money spent back at the end of the year
  - Payment Methods: Only accepts Credit Cards
  - Promotional / Reminders: High/Low email reminders
  - Money Back Guarantee: Unconditional money back, no questions asked

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Constructing the Choice Sets: Hypothetical Offerings

<table>
<thead>
<tr>
<th>OPTION A</th>
<th>OPTION B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online Customer Support</td>
<td>Audio Chat from computer (e.g. Skype) or MJM Instant Messaging</td>
</tr>
<tr>
<td>Product / Service Description</td>
<td>Brief Description &amp; HD pictures</td>
</tr>
<tr>
<td>Shopping Assistance</td>
<td>Enhanced Search Capabilities, retrieves items based on past purchases and current preferences</td>
</tr>
<tr>
<td>Offline Customer Support</td>
<td>Can be reached by email and 1-800 #</td>
</tr>
<tr>
<td>Recommendations</td>
<td>Customer Product/Service Ratings</td>
</tr>
<tr>
<td>Loyalty Programs</td>
<td>1 point for every $1 spent</td>
</tr>
<tr>
<td>Payment Methods</td>
<td>Accepts all payment types</td>
</tr>
<tr>
<td>Promotional / Reminders</td>
<td>Want list with email reminders</td>
</tr>
<tr>
<td>Money Back Guarantee</td>
<td>Subject to company policies (time constraints, warranties, partial refunds)</td>
</tr>
</tbody>
</table>
DCA Methodology: The Customer's Task

The customer evaluates the simulated product/service offerings and:

- Indicates a preference between two proposals, or says that neither is acceptable
- Or, indicates a preference between an offering that the customer currently has and one or more simulated ones
- Or, marks one offering as the worst and one as the best

Comparing Current with Possible Choices

<table>
<thead>
<tr>
<th>Plan Brand</th>
<th>Package A</th>
<th>Package B</th>
<th>Current Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone Brand</td>
<td>LG</td>
<td>Samsung</td>
<td>LG</td>
</tr>
<tr>
<td>Phone Size</td>
<td>It will fit in a jeans pocket, but it is too bulky to fit in a shirt pocket</td>
<td>Slot of an envelope credit card with 1/4 both thicknesses</td>
<td>It is small enough to fit in a typical shirt pocket</td>
</tr>
<tr>
<td>Phone Design</td>
<td>Slide</td>
<td>Smart</td>
<td>Monoblock</td>
</tr>
<tr>
<td>Phone Functions</td>
<td>E-mail, music, video, text messaging</td>
<td>Business productivity tools (e.g., email, calendar)</td>
<td>Metro TV (e.g., movies, music, TV)</td>
</tr>
<tr>
<td>Phone Price</td>
<td>$250 or more</td>
<td>Between $100 and $149</td>
<td>Between $100 and $149</td>
</tr>
</tbody>
</table>
| Wireless Carrier | Verizon Wireless | Nextel | Alternative carrier (e.g., metroPCS, Metro PC)
| Carrier Reliability | Can be used with any other carrier of my choice | Can only be used with this carrier | Can be used with any other carrier of my choice |
| Phone Usage | Can be used in U.S. only | Can be used around the globe | Can be used around the globe |
| Purchase Location | Internet store/exhibit | Department store (e.g., Macy’s, JCPenney) | Wireless carrier retail store (e.g., Verizon, Sprint) |
| Which device package will you choose? | | | |
DCA Methodology: Analysis

Analyze the preferences to determine the relative weight of the preference for each separate attribute.

Respondents with similar preferences can be identified, and the characteristics or profile of these respondents can suggest a label for each customer segment.

Demographic Segments x Choice Drivers [1]

Relative utilities for “burger” concept

<table>
<thead>
<tr>
<th>Attribute</th>
<th>English</th>
<th>Spanish</th>
<th>Japanese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Picture Display</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Wait</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wait to Order</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brand</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Demographic Segments x Choice Drivers [2]  

Relative utilities for “hot dog” concept

<table>
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<tr>
<th></th>
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(Derived) Segments x Choice Drivers
"Elasticity" of Preferences

How much does preference change when the value of some attribute changes?

This question is most often asked for the price dimension: how much do price changes affect a customer's willingness to buy something?

However, DCA techniques can assess the elasticity of preference on any dimension or driver used to generate alternatives.

Segments, Sensitivity, & Market Share

Market share

Overall market

Gourmet buyers

Bargain hunters

Tough sells

Level of service
Some dimensions of products/services are more important than others with respect to your competition.

Qualifiers are the minimum level on some dimension that your offering must reach for it to be considered a feasible candidate.

Winners are the dimension that is most important to your targeted customers - so you have to excel at this.

Qualifiers and winners are market and time-specific.
Winners and Qualifiers in the US Auto Industry

up to 1960s - order winner was price and length (big cars, reasonably priced)

1970s-80s - order winner became quality/reliability, and Japanese auto makers seized market share

1990s - US cars achieved (enough) quality/reliability for it to become qualifier and not winner, so US market share stabilized

2000s - new order winner appears to be fuel efficiency, US makers losing market share to Japanese

Order Winners and Qualifiers via DCA
Customer Segments and Brand Equity

Brand equity

Segment 3
Segment 2
Segment 1

Brand A

Segment 3
Segment 2
Segment 1

Brand B

Customer Segments and Switching Barriers

Switching barrier

Segment 1  Segment 2  Segment 3

Brand A

Brand B

http://www.apple.com/getamac/ads/
**Discussion: DCA {and, vs, or} Personas**

Personas are hypotheses about customer segments that are used to inspire and evaluate product/service features.

DCA techniques can identify customer segments with similar evaluations of product/service features.

"Rich" simulation of products/services in DCA experiments can enhance their validity.

DCA analysis can confirm, refine, or disconfirm the hypotheses embodied in personas.

Personas and their associated stories can suggest goals, motivations, or explanations for the preferences revealed by DCA.

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**Models of Employees**

<table>
<thead>
<tr>
<th>Models of Employees</th>
<th>Device availability</th>
<th>Employee mobility</th>
<th>Primary physical environment</th>
<th>Level of computer literacy</th>
<th>Alternative self-service channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop connected employees</td>
<td>At desktop</td>
<td>Low</td>
<td>Conductive to computer-related work</td>
<td>High</td>
<td>Personal computer access at home</td>
</tr>
<tr>
<td>Dispersed employees (e.g., convenience store)</td>
<td>Limited to point-of-sale (POS) systems or manager</td>
<td>Low</td>
<td>Shared space with customers</td>
<td>Varied</td>
<td>Fax machine; kiosk; personal computer access at home</td>
</tr>
<tr>
<td>Mobile employees (e.g., delivery personnel)</td>
<td>Personal computer usage limited to visits to home office/depot; access to mobile phones as part of the job</td>
<td>Constant movement between locations</td>
<td>Primarily in vehicle</td>
<td>Varied</td>
<td>Mobile telephone, personal computer access at home</td>
</tr>
<tr>
<td>Shop floor employees (e.g., assembly workers)</td>
<td>Personal computers may be available in home or break room; potential kiosk availability</td>
<td>Low</td>
<td>Production materials, noise and privacy issues may impact usage</td>
<td>Varied</td>
<td>Kiosk, personal computer access at home</td>
</tr>
</tbody>
</table>
John Shorter, Telecommunications Field Engineer for a big company

Description: John has worked for Company X as a field engineer for 10 years. He has an office, but never works there, as he’s always on the road for work, and rarely has access to a computer. When he does so, he needs to catch up with work, and doesn’t have time to do anything else, so he often takes care of personal business related to work from home. He is comfortable using technology at work and in his private life, but is concerned about security.

Goals:

- Access his employee profile (e.g. how many vacation days he has left, what’s his pension fund status, etc) in different ways, from different places
- See changes in his employee status as soon as they are available
- Avoid having to remember a different set of passwords for different HR services

Challenges & Limitations

- doesn’t have regular access to a networked PC at work
- is always on the road, so may not have prompt access to specific documents
- has regular access to his cell phone, but needs to be able to use SMS or voice depending on how much privacy he gets

Would like:

- to use his cell phone and home computer to access the company HR services
- asynchronous communication with HR, which leaves him time to react to the information he receives
"Field Engineer" Scenario 1

By using the text messaging feature on his phone, he types in “Vacation Status” and sends it to a corporate account. A few seconds later, he is prompted for a password, which he then supplies. Several seconds later, he receives a short message, detailing his available vacation days, carry-over days and the days that must be used by the end of the year.

"Field Engineer" Scenario 2

He is seeking a loan from his retirement account. He sends an e-mail message from a home account to an HR e-mail address.

- Use case A: An automatic e-mail response system routes his request to a service center employee, who sends him an SMS asking what is the best time to call him back to discuss the issue.

- Use case B: An automatic e-mail response system drafts an automatic response to his inquiry. In this response, he could be provided with a list of FAQs about loan procedures, the appropriate forms he would need to complete, or a link to guide him to the appropriate section of a Web site where he could complete his processing online.
Models of Citizens

let's brainstorm some personas

Readings for 13 October


Chris Voss & Leonieke Zomerdijk, “Innovation in Experiential Services: An empirical view” (pages 97-113)