Question for the Class:

When do you use marketing research?

Marketing Research & Technology Product/Service Development

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Marketing Research and Detailed Investigation

Adapted from the Stage Gate process by Robert J. Cooper

Stage I: Preliminary Investigation
- Idea Generation
- Market Analysis
- Competitive Analysis
- User Needs & Wants Study
- Customer Wish List: Product Rqmts
- Technical Assessment: Translation
- Technically Feasible Concept(s)
- Mfg Costs/Production Needs

Stage II: Detailed Investigation
- Project Plan: Development, Test, Marketing & Production
- Financial Analysis
- Expected Sales
- Concept Test: Purchase Intent
- Financial Justification: Financial, Risk, Business Justification
- Product Definition: Target Market, Concept, Position & Benefits Requirements & Specs

Key Activities in Product Development
Identify User Needs & Wants

- **Gather raw data**
  - Interviews
  - Focus Groups
  - Observation
- **Interpret raw data**
  - Affinity Diagram
  - Needs Statements
- **Organize needs & establish importance**
  - Surveys
  - Conjoint Analysis

Karl T. Ulrich and Steven D. Eppinger

Gather Raw Data - Interview Segmentation

Non-Traditional Segmentation

<table>
<thead>
<tr>
<th>Traditional Demographic Segmentation</th>
<th>Non-Traditional Segmentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unhappy Customers</td>
<td>Happy Customers</td>
</tr>
<tr>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Children</td>
<td></td>
</tr>
</tbody>
</table>

Mark Martin,
Acting Assistant Professor
Stanford University, 2000.
Which Marketing Data Collection Method To Use?

- Surveys
- Interviews
- Focus Groups

Interviews vs. Focus Groups

Surveys come later and are actually somewhat easier.

Interpret Raw Data:
Screwdrivers Example
Affinity Diagram (a.k.a. KJ diagram)

- Organizes subjective information

Example: Group the following CR’s

- “ease of handling”
- “number readability”
- “load handling”
- “portability”
- “dose metering”
- “ease of use”

Five Guidelines for Writing Needs Statements

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Customer Statement</th>
<th>Need Statement-Wrong</th>
<th>Need Statement-Right</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What Not How</strong></td>
<td>“Why don’t you put protective shields around the battery contacts?”</td>
<td>The screwdriver battery contacts are covered by a plastic sliding door.</td>
<td>The screwdriver battery is protected from accidental shorting.</td>
</tr>
<tr>
<td><strong>Specificity</strong></td>
<td>“I drop my screwdriver all the time.”</td>
<td>The screwdriver is rugged.</td>
<td>The screwdriver operates normally after repeated dropping.</td>
</tr>
<tr>
<td><strong>Positive Not Negative</strong></td>
<td>“It doesn’t matter if it’s raining, I still need to work outside on Saturdays.”</td>
<td>The screwdriver is not disabled by the rain.</td>
<td>The screwdriver operates normally in the rain.</td>
</tr>
<tr>
<td><strong>Attribute of the Product</strong></td>
<td>“I’d like to charge my battery from my cigarette lighter.”</td>
<td>An automobile cigarette lighter adapter can charge the screwdriver battery.</td>
<td>The screwdriver battery can be charged from an automobile cigarette lighter.</td>
</tr>
<tr>
<td><strong>Avoid “Must” and “Should”</strong></td>
<td>“I hate it when I don’t know how much juice is left in the batteries of my cordless tools.”</td>
<td>The screwdriver should provide an indication of the energy level of the battery.</td>
<td>The screwdriver provides an indication of the energy level of the battery.</td>
</tr>
</tbody>
</table>
**Things to Remember**

- Capture “What, Not How”
- Collect visual, verbal, and textual data
- Props will stimulate customer responses
- Interviews are more efficient than focus groups
- Interview all stakeholders and lead users
- Develop an organized list of need statements
- Look for latent needs
- Survey to quantify tradeoffs

**Translating CR’s into Technical Specs**

**Example:**
Portable Slide Projector

**Engineering Metrics**
- Brightness
- Weight
- Dimensions (girth + width)
- Time/Tasks required to start present.
- Distortion
- Distance from presenter
- Time to insert/pull-out slide
- Attractive product

**Customer Needs**
- Good image
- Easy to transport
- Keeps present flowing
- Image visible in bad conditions
- Minimizes unplanned interruptions
- Design makes the product attractive
- Device sets up quickly
- Works well for short present.
### Phase I - Portable Slide Projector

<table>
<thead>
<tr>
<th>Customer Requirements</th>
<th>Brightness</th>
<th>Weight</th>
<th>Dimensions (girth + width)</th>
<th>Time/Tasks required to start presentation</th>
<th>Distortion</th>
<th>Distance from presenter (with 3’ x 3’ projection)</th>
<th>Time to insert/pull-out slide</th>
<th>Attractive product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good image</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td></td>
<td>1</td>
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<tr>
<td>Easy to transport</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device sets up quickly</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Works well for short presentations</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Keeps present flowing</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image visible in bad conditions</td>
<td>3</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimizes unplanned interruptions</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>9</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design makes the product attractive</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Raw Score</strong></td>
<td><strong>108</strong></td>
<td><strong>117</strong></td>
<td><strong>108</strong></td>
<td><strong>114</strong></td>
<td><strong>81</strong></td>
<td><strong>80</strong></td>
<td><strong>72</strong></td>
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<tr>
<td><strong>Relative Weight</strong></td>
<td><strong>16%</strong></td>
<td><strong>17%</strong></td>
<td><strong>16%</strong></td>
<td><strong>17%</strong></td>
<td><strong>12%</strong></td>
<td><strong>8%</strong></td>
<td><strong>11%</strong></td>
<td><strong>4%</strong></td>
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</table>

### Phase II - Portable Slide Projector

<table>
<thead>
<tr>
<th>Engineering Metrics</th>
<th>Phase I Relative Weights</th>
<th>Top Case</th>
<th>Bottom Case</th>
<th>Lens</th>
<th>Condenser</th>
<th>Stand</th>
<th>Heat Sink</th>
<th>Lamp</th>
<th>% Worth of components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brightness</td>
<td>16%</td>
<td>9</td>
<td>9</td>
<td>1</td>
<td>9</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Weight</td>
<td>17%</td>
<td>9</td>
<td>9</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (girth + width)</td>
<td>16%</td>
<td>9</td>
<td>9</td>
<td>3</td>
<td>9</td>
<td>1</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td>Time/Tasks required to start presentation</td>
<td>16%</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
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<td>Distortion</td>
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<td>9</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance from presenter (with 3’ x 3’ projection)</td>
<td>8%</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time to insert/pull-out slide</td>
<td>10%</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attractive product</td>
<td>4%</td>
<td>9</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Raw Score</strong></td>
<td><strong>3.6</strong></td>
<td><strong>3.3</strong></td>
<td><strong>3.6</strong></td>
<td><strong>4.4</strong></td>
<td><strong>4.9</strong></td>
<td><strong>4.1</strong></td>
<td><strong>1.3</strong></td>
<td><strong>3.7</strong></td>
<td></td>
</tr>
<tr>
<td><strong>% Weight</strong></td>
<td><strong>17%</strong></td>
<td><strong>15%</strong></td>
<td><strong>21%</strong></td>
<td><strong>25%</strong></td>
<td><strong>5%</strong></td>
<td><strong>6%</strong></td>
<td><strong>13%</strong></td>
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<td></td>
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<tr>
<td><strong>Rank</strong></td>
<td><strong>3</strong></td>
<td><strong>4</strong></td>
<td><strong>2</strong></td>
<td><strong>1</strong></td>
<td><strong>7</strong></td>
<td><strong>6</strong></td>
<td><strong>5</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Generate Product Concepts

Clarify the Problem

Search Externally
• Existing Concepts

Search Internally
• New Concepts

Select Product Concept
• Concept Screening
• Concept Scoring

Reflect on the Process
• Continuous Improvement

Concept Development Funnel

Karl T. Ulrich and Steven D. Eppinger
Concept Generation Exercise: Vegetable Peelers

Vegetable Peeler Exercise: Voice of the Customer

- "Carrots and potatoes are very different."
- "I cut myself with this one."
- "I just leave the skin on."
- "I'm left-handed. I use a knife."
- "This one is fast, but it takes a lot off."
- "How do you peel a squash?"
- "Here's a rusty one."
Clarify the Problem: 
Key Customer Needs

1. The peeler can be used for a variety of produce.
2. The peeler can be used ambidextrously.
3. The peeler creates minimal waste.
4. The peeler saves time.
5. The peeler is durable.
6. The peeler is easy to clean.
7. The peeler is safe to use and store.
8. The peeler is comfortable to use.
9. The peeler stays sharp or can be easily sharpened.

External Search

- **Lead Users**
  - Benefit from improvement
  - Innovation source
- **Benchmarking**
  - Competitive products
- **Experts**
  - Technical experts
  - Experienced customers
- **Patents**
  - Search related inventions
- **Literature**
  - Technical journals
  - Trade literature
Internal Search

- Suspend judgment
- Generate a lot of ideas
- Infeasible ideas are welcome
- Use graphical and physical media
- Make analogies
- Use related stimuli
- Use unrelated stimuli
- Set quantitative goals
- Trade ideas in a group

Concept Selection Process

- Prepare the Matrix
  - Criteria
  - Reference Concept
  - Weightings
- Rate Concepts
  - Scale (+ - 0) or (1-5)
  - Compare to Reference Concept or Values
- Rank Concepts
  - Sum Weighted Scores
- Combine and Improve
  - Remove Bad Features
  - Combine Good Qualities
- Select Best Concept
  - May Be More than One or None
  - Beware of Average Concepts
### Example: Concept Screening

<table>
<thead>
<tr>
<th>CONCEPT VARIANTS</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>REF.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of Handling</td>
<td>0</td>
<td>0</td>
<td>–</td>
<td>0</td>
<td>0</td>
<td>–</td>
<td>–</td>
<td>0</td>
</tr>
<tr>
<td>Ease of Use</td>
<td>0</td>
<td>–</td>
<td>–</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Number Readability</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>Dose Metering</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Load Handling</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Manufacturing Ease</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>0</td>
<td>0</td>
<td>–</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Portability</td>
<td>+</td>
<td>+</td>
<td>–</td>
<td>0</td>
<td>–</td>
<td>–</td>
<td>0</td>
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<tr>
<td><strong>PLUSES</strong></td>
<td>3</td>
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<tr>
<td><strong>SAMES</strong></td>
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<td>3</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>3</td>
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<tr>
<td><strong>MINUSES</strong></td>
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<td>2</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>NET</strong></td>
<td>3</td>
<td>0</td>
<td>–2</td>
<td>0</td>
<td>2</td>
<td>–1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>RANK</strong></td>
<td>1</td>
<td>3</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>CONTINUE?</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

### Example: Concept Scoring

<table>
<thead>
<tr>
<th>Concepts</th>
<th>A (reference)</th>
<th>DF</th>
<th>E</th>
<th>G+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Master Cylinder</td>
<td>Lever Stop</td>
<td>Swash Ring</td>
<td>Dial Screw+</td>
</tr>
<tr>
<td>Selection Criteria</td>
<td>Weight</td>
<td>Rating</td>
<td>Weighted Score</td>
<td>Rating</td>
</tr>
<tr>
<td>Ease of Handling</td>
<td>5%</td>
<td>3</td>
<td>0.15</td>
<td>3</td>
</tr>
<tr>
<td>Ease of Use</td>
<td>15%</td>
<td>3</td>
<td>0.45</td>
<td>4</td>
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<td>Readability of Settings</td>
<td>10%</td>
<td>2</td>
<td>0.2</td>
<td>3</td>
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<tr>
<td>Dose Metering Accuracy</td>
<td>25%</td>
<td>3</td>
<td>0.75</td>
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<tr>
<td>Durability</td>
<td>15%</td>
<td>2</td>
<td>0.3</td>
<td>5</td>
</tr>
<tr>
<td>Ease of Manufacture</td>
<td>10%</td>
<td>3</td>
<td>0.6</td>
<td>3</td>
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<tr>
<td>Portability</td>
<td>10%</td>
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<td>0.3</td>
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<tr>
<td><strong>TOTAL SCORE</strong></td>
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<td>3.45</td>
<td>3.10</td>
<td>3.05</td>
</tr>
<tr>
<td><strong>RANK</strong></td>
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<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>CONTINUE?</strong></td>
<td>No</td>
<td>Develop</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Things to Remember

The goal of concept selection is not to
- Select the best concept
The goal of concept selection is to
- Develop the best concept

So remember to combine and refine the concepts to develop better ones!

More to Remember

- Beware of the best "average" product
- Perform concept selection for each different customer group and compare results
- Check sensitivity of selection to the importance weightings and ratings
- May want to use all of detailed requirements in final stages of selection
- Note features which can be applied to other concepts
Concept Testing: When & How to Use Surveys

- Define the purpose of the test
- Choose a survey population
- Choose a survey format
- Communicate the concept
- Measure customer response
- Interpret the results
- Reflect on the results and the process

Concept Testing is Used for...

- Go/no-go decisions
- What market to be in
- Selecting among alternative concepts
- Confirming concept selection decision
- Benchmarking
- Soliciting improvement ideas
- Forecasting demand
- Ready to launch?
When To Use A Survey Format?

- What would you expect the price of the product or service to be?
- What concerns do you have about the product concept?
- Can you make any suggestions for improving the product/service concept?

Interpreting the Results: Forecasting Sales

\[ Q = N \times A \times P \]

- \( Q \) = sales (annual)
- \( N \) = number of (annual) purchases
- \( A \) = awareness x availability (fractions)
- \( P \) = probability of purchase (surveyed)

\[ = C_{\text{def}} \times F_{\text{def}} + C_{\text{prob}} \times F_{\text{prob}} \]

"top box"  "second box"
**Forecasting Example: College Student Market for Bikes**

- $N = \text{off-campus grad students (200,000)}$
- $A = 0.2$ (realistic) to 0.8 (every bike shop)
- $P = 0.4 \times \text{top-box} + 0.2 \times \text{second-box}$
- $Q = 200,000 \times 0.20 \times [0.4 \times 0.3 + 0.2 \times 0.2]$
  
  \[= 6400 \text{ units/yr}\]
- **Price point $795**
- **Revenue = 5 million dollars**

---

**Forecasting Example: Factory Transport Market**

- $N = \text{current bicycle and scooter sales to factories (150,000)}$
- $A = 0.25$ (single distributor’s share)
- $P = 0.4 \times \text{top-box} + 0.2 \times \text{second-box}$
- $Q = 150,000 \times 0.25 \times [0.4 \times 0.3 + 0.2 \times 0.2]$
  
  \[= 6000 \text{ units/yr}\]
- **Price point $1500**
- **Revenue = 9 million dollars**
Market Decision: Factory Transportation

Still walking?

Sources of Marketing Forecast Error

- Quality of Concept Description
- Quality of Testing Method
  - Concept testing v. conjoint analysis
- Pricing
- Level of Promotion
- Word-of-Mouth Effects
- Competition
Discussion

- How does early (qualitative) concept testing differ from later (quantitative) testing?
- Why do respondents typically overestimate purchase intent? Would they ever underestimate intent?
- How to use price in surveys?
- How much does the way the concept is communicated matter?
  - When shouldn’t a prototype model be shown?

Going to the next stage

- Does it fit with the corporate strategy?
- Does it offer a competitive advantage?
- Is the market attractive?
- Is it technically feasible?
- Is it financially attractive?
- Critical evaluation before Stage 3 - the “money stage”