Product Design & Development

Concept Testing
Concept Development Process

Mission Statement → Identify Customer Needs → Establish Target Specifications → Generate Product Concepts → Select Product Concept(s) → Test Product Concept(s) → Set Final Specifications → Plan Downstream Development → Development Plan

- Perform Economic Analysis
- Benchmark Competitive Products
- Build and Test Models and Prototypes
Concepts

• Define the purpose of the concept 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: What is it?

Concept testing is:

• closely related to concept selection

• different from concept selection in that it is based on data gathered directly from potential customers and relies to a lesser degree on judgments made by the development team.
Concept Testing: What 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?
A seven-step method

Step 1: Define purpose
Step 2: Choose a survey population
Step 3: Choose a survey format
Step 4: Communicate the concept
Step 5: Measure customer response
Step 6: Interpret results
Step 7: Reflect on results and process
Define purpose of concept test

- Write down the questions the team wishes to answer with the test:
  - Which of several alternative concepts should be pursued?
  - How can the concept be improved to better meet customer needs?
  - Approximately how many units are likely to be sold?
  - Should development be continued?
  - ...
Choose a survey population

- The underlying assumption is that the survey population reflects the target market.
  - Ex.: emPower scooter has two main markets:
    - urban consumer
    - college students
Choose a survey format

• Face-to-face interaction
  – Stopping people at the street

• Telephone
  – May be targeted to specific individuals

• Postal mail
  – Somewhat slower than other methods, often poor response
Choose a survey format

• E-mail:
  – Similar to postal mail except respondents seem slightly more likely to reply than via postal mail

• Internet
  – A team may create a Web site for virtual concept testing
Communicate the concept

- Written or verbal description
- Sketch
- Photos and renderings
- Storyboards
- Video
- Simulation
- Interactive multimedia
- Physical appearance models
- Working prototypes
Verbal description

• The product is a lightweight electric scooter that can be easily folded and taken with you inside a building or on public transportation.
• The scooter weighs about 12 kg. It travels at speeds of up to 25 kilometers per hour and can go about 20 kilometers on a single charge.
• The scooter can be recharged in about two hours from a standard electric outlet.
• The scooter is easy to ride and has simple controls — just an accelerator button and a brake.
Price

• Include price in concept description?
Measure customer response

- Definitely would buy
- Probably would buy
- Might or might not buy
- Probably would not buy
- Definitely would not buy
Concept Testing

Example: Electric Scooter
Sketch
Rendering
3D Solid CAD model
Appearance model
Storyboard
Resemblance to marketing...
Working Prototype
Beta Prototype
Production Product
emPower’s Market Decision: Factory Transportation
Survey Format

• **PART 1, Qualification**
  – How far do you live from campus?
    • <If not 2-4 kilometers, thank the customer and end interview.>
  – How do you currently get to campus from home?
  – How do you currently get around campus?

• **PART 2, Product Description**
  – <Present the concept description>
Survey Format

• PART 3, Purchase Intent
  – If the product were priced according to your expectations, how likely would you be to purchase the scooter within the next year?

<table>
<thead>
<tr>
<th>I would definitely not purchase the scooter.</th>
<th>I would probably not purchase the scooter.</th>
<th>I might or might not purchase the scooter.</th>
<th>I would probably purchase the scooter.</th>
<th>I would definitely purchase the scooter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;second box&quot;</td>
<td></td>
<td></td>
<td>&quot;top box&quot;</td>
<td></td>
</tr>
</tbody>
</table>
Survey Format

• PART 4, Comments
  – What would you expect the price of the scooter to be?
  – What concerns do you have about the product concept?
  – Can you make any suggestions for improving the product concept?

• Thank you.
Interpreting the Results: Forecasting Sales

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

- \( Q \) = sales (annual)
- \( N \) = number of (annual) purchases
- \( A \) = awareness \( \times \) 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

- N = off-campus grad students (200,000)
- A = 0.2 (realistic) to 0.8 (every bike shop)
- P = 0.4 x top-box + 0.2 x second-box
- Q =
Forecasting Example: Factory Transport Market

- N = current bicycle and scooter sales to factories (150,000)
- A = 0.25 (single distributor’s share)
- P = 0.4 x *top-box* + 0.2 x *second-box*
- Q = 150,000 x 0.25 x [0.4 x 0.3 + 0.2 x 0.2] = 6000 units/yr
- Price point $1500
Sources of Forecast Error

- Word-of-Mouth Effects
- Fidelity of Concept Description
- Pricing
- Level of Promotion
- Competition
Discussion

• Why do respondents typically overestimate purchase intent?
  – Might 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?

• How do you increase sales?

• Price: to include or not to include?

• What is the importance of quality of the description?
Discussion (cont)

• Is there a situation where the team should just “go for it” without any formal concept test?
Population of the world
Population of Europe
Population of Asia
Population of North America
Population of South America
Population of Africa
Population of Oceania

Population of the United States
Annual births in the United States
Adults in the United States age 18-24
Higher-education students in the US
Households in the US
US households with income >US$ 50 m
US households with income >US$ 75 m
US households with income >US$ 100 m

(Source: U.S. Government Statistics.)
Comercial airplane
Electronic manufacturing equipment
Medical imaging equipment
Cut-and-sew fabric product like a backpack
Mountain bike
Gadgets sold through specialty retailers
Luxury sedan
Hand tool
Cordless drill
Sport utility vehicle
Toys
Desktop computers
Cofeemaker
Inkjet printer
Single-use medical device
Flu vaccine
Videocassette
Inexpensive ballpoint pens
Razor blade cartridge
Summary

• Concept testing can verify that customer needs have been adequately met by the product concept, assess the sales potential of a product concept, and/or gather customer information for refining the product concept.

• Concept testing is appropriate at several points in the development process.
Summary

- Seven step method of testing is recommended:
  - Define the purpose of the concept test
  - Choose a survey problem
  - Choose a survey format
  - Communicate the concept
  - Measure customer response
  - Interpret the results
  - Reflect on the results and the process