Chapter 4: Identifying Customer Needs

Product Design and Development
Fourth Edition
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Last time we discussed these phases of the product development process using the various examples. We also defined some terms: market pull, technology push, platform products, process intensive products, customized products, high-risk products, quick build products, and complex products. Finally we defined market segmentation.
By the end of ME470, your team will have a prototype of YOUR design. You will effectively get through the test product concepts phase of concept development.
Customer Needs Process

- Define the Scope
  - Mission Statement
- Gather Raw Data
  - Interviews
  - Focus Groups
  - Observation
- Interpret Raw Data
  - Need Statements
- Organize the Needs
  - Hierarchy
- Establish Importance
  - Surveys
  - Quantified Needs
- Reflect on the Process
  - Continuous Improvement
Customer Needs Example: Cordless Screwdrivers
# Mission Statement

## Example: Screwdriver Project

<table>
<thead>
<tr>
<th>Product Description</th>
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<tbody>
<tr>
<td>A hand-held, power-assisted device for installing threaded fasteners</td>
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<table>
<thead>
<tr>
<th>Key Business Goals</th>
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<tbody>
<tr>
<td>Product introduced in 4th Q of 2000</td>
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<tr>
<td>50% gross margin</td>
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<tr>
<td>10% share of cordless screwdriver market by 2004</td>
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<table>
<thead>
<tr>
<th>Primary Market</th>
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<tbody>
<tr>
<td>Do-it-yourself consumer</td>
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<table>
<thead>
<tr>
<th>Secondary Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casual consumer</td>
</tr>
<tr>
<td>Light-duty professional</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Assumptions</th>
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</thead>
<tbody>
<tr>
<td>Hand-held</td>
</tr>
<tr>
<td>Power assisted</td>
</tr>
<tr>
<td>Nickel-metal-hydride rechargeable battery technology</td>
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<table>
<thead>
<tr>
<th>Stakeholders</th>
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<tbody>
<tr>
<td>User</td>
</tr>
<tr>
<td>Retailer</td>
</tr>
<tr>
<td>Sales force</td>
</tr>
<tr>
<td>Service center</td>
</tr>
<tr>
<td>Production</td>
</tr>
<tr>
<td>Legal department</td>
</tr>
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</table>
How Many Customers?


![Graph showing the percent of needs identified vs. the number of respondents or groups for One-on-One Interviews and Focus Groups.](image)
Caveats

• Capture “What, Not How”.
• Meet customers in the use environment.
• 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.
• Make a video (or ppt) to communicate results.
Gather Raw Data: Interviews

Visit Definition

Determine Which Customers to Visit

Develop Discussion Guide

Visit Customers

Develop “Picture” of Customer’s Environment and Needs
Visit Definition

• Why are we going?
  – Develop a common image of the farm customer in order to create a shared language for the new program team to describe, in customer terms, what is important to the customer.

• What do we want to learn?
  – Better understand our farm customers’ workflow as we improve efficiency in field preparation.
  – Obtain first hand customer observation and input relative to understanding various elements impacting field preparation such as soil conditions (clay, sand, rocks, etc.), obstructions.
  – Explore appropriate Cummins responses so as to protect and enhance our position in this market by differentiation from John Deere such as consistent plowing speed, and overall time to complete field preparation.
Determine Which Customers to Visit

• Create a “what do we want to learn” statement
  – To explore_______ in order to_______
  – To discover_______ in order to_______
  – To learn_________ in order to_______

• Examples of customers
  – Distributors and dealers, end users
  – Lead/visionary customers
  – Lost customers, Unhappy customers
  – Customers using competitive products
  – External/Internal customers
  – Customers with non-US headquarters or focus
  – Good current customers
  – Customers who buy multiple products, or from multiple divisions
There must be a better way….

- Assume you are charged with developing a better book bag.
  - Who are your customers? (List at least 5)
  - Why would you go and visit these customers?
  - What would you hope to learn?
  - Talk to a neighbor for 5 minutes.
Creating a Discussion Guide

• Tell the customer why you are there
  – “We are here to discuss our senior design project. Thank you for agreeing to work with us.”

• 6-10 Key Topics
  – Based on what we want to learn
  – Open-ended
  – Subtopics as needed
  – It is a guide, not a script or questionnaire
  – Evoke images of experiences and needs
Guidelines for Creating Discussion Questions

• Scenes or images
  – Customer’s use environment
• Perceptions of weaknesses/problems
  – Past experiences
• Current considerations
  – Competitive comparison
• Future enhancements
  – “Delighters”
Question Formats to Avoid

• “Would you like a system that could….?”
• “Wouldn’t you agree that if we could produce a system that could…”
Question Formats to Encourage

• What- tend to focus conversation on events.
  “What problems have you experienced?”
  Your text has several helpful questions.

• How- tend to focus discussion on the process.
  “How do you use..?”

• Why – require an explanation which may be helpful, but may elicit a defensive reaction!!

• Could – are usually perceived as “gentle” and very open.
  “Could you give an example?”
Clarity

• Keep questions short
  – Break complex issues into a series of short questions

• Avoid technical jargon
  – Be sensitive that jargon is more pervasive than we first think (EE)

• Value of silence
  – Uncomfortable, but helpful
Customer Visit: How to do it

- Assign Roles
  - Better detail
  - Different perspectives

- Interviewer
  - Builds rapport
  - Asks most of the question and follows up
  - Manages the discussion, covering all key topics

- Scribe
  - Takes detailed notes – verbatim when possible
  - Backstop for interviewer

- Observer
  - Soaks up impressions
  - Listens “between the lines”
  - Backstop for the interviewer
Customer Needs Process

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## 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>
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</table>
Visual Information Example: Book Bag Design
Needs Translation Exercise:
Book Bag Design Example

“See how the leather on the bottom of the bag is all scratched; it’s ugly.”

“When I’m standing in line at the cashier trying to find my checkbook while balancing my bag on my knee, I feel like a stork.”

“This bag is my life; if I lose it I’m in big trouble.”

“There’s nothing worse than a banana that’s been squished by the edge of a textbook.”

“I never use both straps on my knapsack; I just sling it over one shoulder.”
Final Quiz Item

- With your partner, translate one of the given statements for the book bag into a need statement. Refer to the guidelines to ensure that it meets each one.
The SD provides plenty of power to drive screws.
* The SD maintains power for several hours of heavy use.
** The SD can drive screws into hardwood.
The SD drives sheet metal screws into metal ductwork.
*** The SD drives screws faster than by hand.

The SD makes it easy to start a screw.
* The SD retains the screw before it is driven.
! The SD can be used to create a pilot hole.

The SD works with a variety of screws.
** The SD can turn philips, torx, socket, and hex head screws.
** The SD can turn many sizes of screws.

The SD can access most screws.
The SD can be maneuvered in tight areas.
** The SD can access screws at the end of deep, narrow holes.

The SD turns screws that are in poor condition.
The SD can be used to remove grease and dirt from screws.
The SD allows the user to work with painted screws.

The SD feels good in the user's hand.
*** The SD is comfortable when the user pushes on it.
*** The SD is comfortable when the user resists twisting.
* The SD is balanced in the user's hand.
! The SD is equally easy to use in right or left hands.
The SD weight is just right.
The SD is warm to touch in cold weather.
The SD remains comfortable when left in the sun.

The SD is easy to control while turning screws.
*** The user can easily push on the SD.
*** The user can easily resist the SD twisting.
The SD can be locked "on."
!** The SD speed can be controlled by the user while turning a screw.
* The SD remains aligned with the screw head without slipping.
** The user can easily see where the screw is.
* The SD does not strip screw heads.
* The SD is easily reversible.

The SD is easy to set-up and use.
* The SD is easy to turn on.
* The SD prevents inadvertent switching off.
* The user can set the maximum torque of the SD.
!* The SD provides ready access to bits or accessories.
* The SD can be attached to the user for temporary storage.

The SD power is convenient.
* The SD is easy to recharge.
The SD can be used while recharging.
*** The SD recharges quickly.
The SD batteries are ready to use when new.
!** The user can apply torque manually to the SD to drive a screw.

The SD lasts a long time.
** The SD tip survives heavy use.
The SD can be hammered.
* The SD can be dropped from a ladder without damage.

The SD is easy to store.
* The SD fits in a toolbox easily.
** The SD can be charged while in storage.
The SD resists corrosion when left outside or in damp places.
! The SD maintains its charge after long periods of storage.
The SD maintains its charge when wet.

The SD prevents damage to the work.
* The SD prevents damage to the screw head.
The SD prevents scratching of finished surfaces.

The SD has a pleasant sound when in use.

The SD looks like a professional quality tool

The SD is safe.
The SD can be used on electrical devices.
*** The SD does not cut the user's hands.
This page contains the copy of the quiz that you should complete with your partner. (If there is an odd number of students in the class you can have 3 people.)

Name:_________________________________  CM:__________
Name:_________________________________  CM:__________
____________________________________________________________________________

1. Assume you are charged with developing a better book bag.
   Who are your customers? (List at least 5)

   Why would you go and visit these customers?

   What would you hope to learn?

2. With your partner, translate one of the given statements for the book bag into a need statement. Indicate which statement you are translating. Refer to the guidelines to ensure that your statement meets each one.