Product and Service Design

Learning Objectives

- Understand
  - Product and Service Design Process
  - Ways to Improve Product Design
    - Concurrent engineering
    - Quality function deployment
      - House of Quality
    - Value engineering/value analysis

Importance of Product Design

- Good/effective design can provide a competitive edge

- Bad design can damage a company's reputation and ...
  - www.baddesigns.com
New Product Development Impacts
Key Measures of Business Performance

What Is Good Design?

- **Useful**: It works well and functions as promised
- **Usable**: It has appropriate ergonomics and user interface
- **Desirable**: It looks good!
- **Producible**: It should be capable of economical volume manufacture
- **Profitable**: It should result in sufficient business rewards
- **Differentiated**: It is different than existing products

Product Design Process

- Concept Development
- Product Planning
- Detailed Engineering
- Production Ramp-up
Benefits of Introducing New Products Faster

- Greater Market Share
- Price Premiums
- Quick Reaction to Competition
- Set Industry Standards

Improving Product Design

Concurrent Engineering

- Definition
  - cross-functional coordination, integration, and simultaneous development of product
- Benefits
  - reducing time to market
  - decreasing cost
  - improving quality and reliability

Traditional Design vs. Concurrent Design

Traditional design: walls between functional areas

Concurrent design: break down the walls between functional areas
First to Market vs. Best to Market

Which one is better?

Improving Product Design

Designing For Customer

User Centered Design

Donald A. Norman—2006 Benjamin Franklin Medal

Quality Function Deployment—House of Quality

Ideal Customer Product

Value Analysis/Value Engineering
Designing For The Customer

Quality Function Deployment

- Translate the "voice of the customer" into technical design requirements
- Use interfunctional teams from marketing, engineering, and manufacturing
- Basic tool--House of Quality

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Designing for the Customer

House Of Quality

5. Tradeoff Matrix
3. Product characteristics
1. Customer requirements
4. Relationship matrix
2. Competitive assessment
6. Technical assessment and target values

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House of Quality: An Example

1. Easy to close
2. Stays open on a hill
3. Easy to open
4. Doesn’t leak in rain
5. No road noise

Importance weighting
Target values
Technical evaluation

Correlation:
- Strong positive (9)
- Positive (3)
- Negative (1)
- Strong negative

Relationships:
- Strong = 9
- Medium = 3
- Small = 1

Evaluation (5 is best)
Designing for the Customer

Value Analysis/Value Engineering

- Achieve equivalent or better performance at a lower cost while maintaining all functional requirements specified by the customer
  - Does the item have any features that are not necessary?
  - Can two or more parts be combined into one?
  - How can we cut down the weight?
  - Are there nonstandard parts that can be eliminated?

Improving Product Design

Design for Manufacturing & Assembly

- Simplification of the product by reducing the number of separate parts

Guidelines

- Simplification (fewer parts)
- Standardization (more standard parts)
- Modular design (combining parts)

Product vs. Service Design

- Product design
  - defines appearance of product
  - sets standards for performance
  - specifies which materials are to be used
  - determines dimensions and tolerances

- Service design
  - specifies what physical items, sensual benefits, and psychological benefits customer is to receive from service
  - defines environment in which service will take place
Service Characteristics and Their Implications on Service Design

**Characteristics**
- intangible
- can not be inventoried
- high customer contact
- highly visible to consumers
- production concurrent with consumption
- labor intensive

**Implications**
- Focus on intangible factors
- Capacity planning, flexibility critical
- Less latitude to make mistake
- Problem prevention, process layout, and customer relations
- Location
- Employee treatment and training

Case: IKEA
- IKEA’s competitive priorities
- IKEA’s new product developing process
- Additional features beyond their design process that help create exceptional value for their customers
- Important criteria for selecting a site