

# Product Design & Development and New Products Management

- The following are based on the book “Product Design and Development” by K. T. Ulrich and S. D. Eppinger

# Introduction

- Definition of Product and Product Development (PD)
- Characteristics of a Successful Product Development
- Who design and develops products
- Duration and Cost of Product Development
- The Challenges of Product Development

# Definition of a Product and Product Development

- A Product is something sold by an enterprise to its customers
- Product Development is the set of activities beginning with the perception of a market opportunity and ending in the production, sale, and delivery of a product

# Why Is Product Development Important

- It is “big business”
- Hundred billion dollars
- New products answer to biggest problems
- A successful new product does more good for an organization than anything else
- It is great life; it is fun and exciting

# Who 'owns' the problem

- Marketing
- Design
- Manufacturing



# Characteristics of Successful Product Development

- Product quality
  - How good is the product resulting from development ?
  - Does it satisfy customer needs ?
  - Is it robust and reliable ?
  - Product quality is reflected in market share ?
- Product cost
  - What is the manufacturing cost ?
  - It includes capital equipment and tooling ?

# Characteristics of Successful Product Development

- Development time
  - How long did the PD effort take ?
- Development cost
  - How much spent in PD effort ?
- Development capabilities
  - Did the team/firm acquire any experience for future projects ?

# Who Designs and Develops Products

- Marketing
- Design
- Manufacturing

# Challenges

- Trade-offs
- Dynamics
- Details
- Time pressure
- Economics
- Creation
- Satisfaction of societal and individual needs
- Team diversity
- Team spirit

# Products vs. development effort



# Products vs. development effort

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	Stanley Tools Jobmaster Screwdriver	Rollerblade In-Line Skate	Hewlett-Packard DeskJet Printer	Volkswagen New Beetle Automobile	Boeing 777 Airplane
Annual production volume					
Sales lifetime					
Sales price					
Number of unique parts (part numbers)					
Development time					
Internal development team (peak size)					
External development team (peak size)					
Development cost					
Production investment					

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# Structured Methodologies

Structured methodologies are valid for three reasons:

- They make the decision-making process explicit
- They provide “checklists” to ensure that important issues are not forgotten
- They are readily documented in a structured way

# Approach

Assumes the core functions of a firm to be:

- Marketing
- Design
- Manufacturing

# Organizational realities

- Lack of empowerment of the team
- Functional allegiances transcending project goals
- Inadequate resources
- Lack of cross-functional representation on the project team

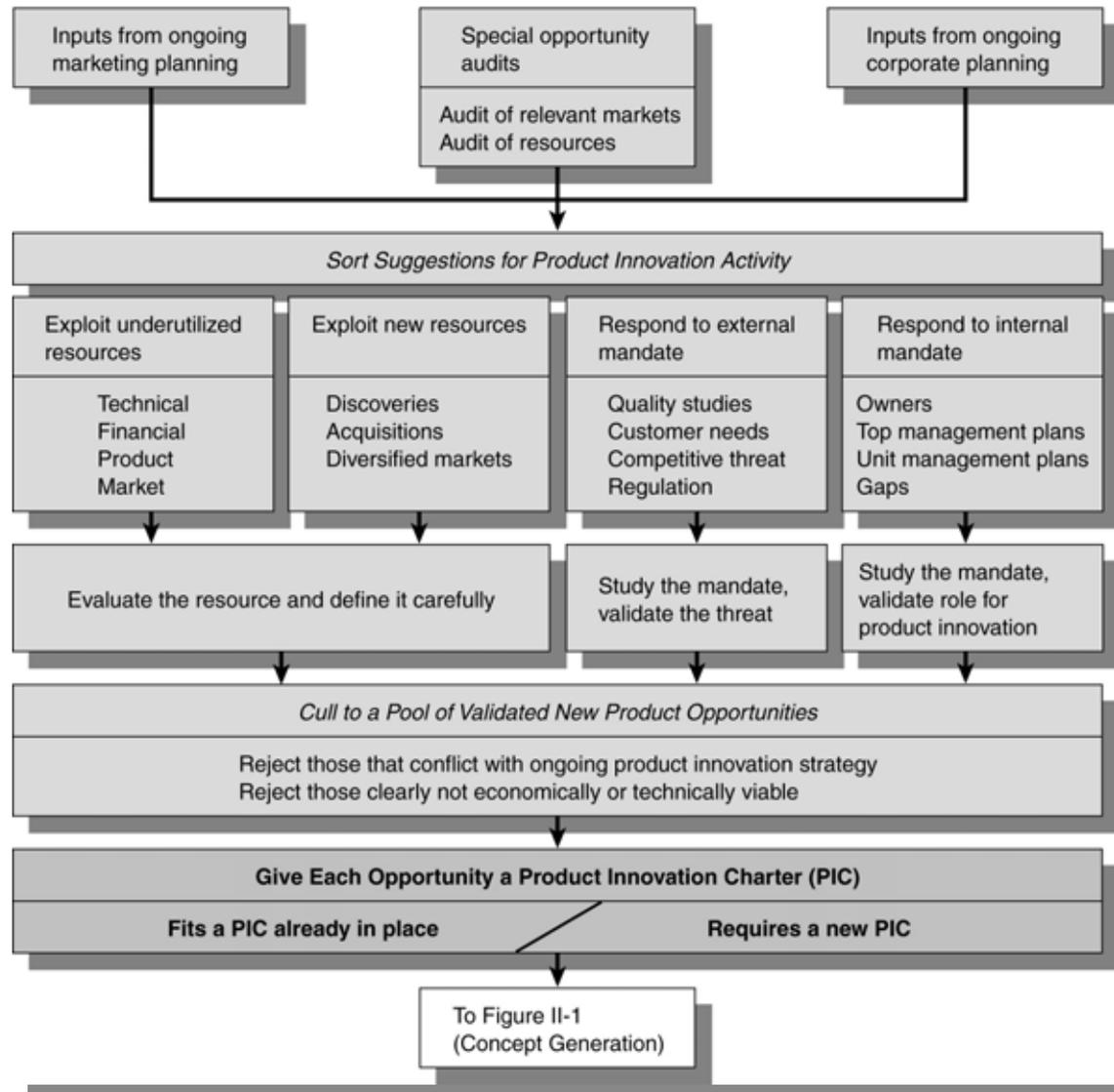
# Products that make companies successful



# New Products Management

- The following are based on the book by Merle Crawford and Anthony Di Benedetto

# Opportunity Identification and Selection



# Some Hot New Products

- Kawasaki Z1000 – a “naked” sport bike with a minimal plastic body designed to show off the inner workings.
- Trivection ovens – GE’s Profile and Monogram ovens use a combination of thermal, convection, and microwave technology.
- PalmOne Treo 6000 – A handheld PDA with phone, speakerphone, camera, music player, and keyboard.
- Clorox Bleach Pen – A gel pen that lets you put bleach where you want to, such as on mildew between shower tiles.
- Apple’s iTunes Music Store – Allows you to download hundreds of thousands of songs from the Internet to save or play on an Apple iPod.
- P&G’s Mr. Clean Magic Eraser – Melamine scouring pad with an eraser-like function: it wears down with use.
- Toyota Prius – Hybrid car with futuristic styling and 55 MPG gas mileage.

# Products of the Future

- Intelligent refrigerators will track food inventories, and will either provide a hard-copy shopping list or send an electronic list to a home-delivery service.
- Intelligent wallpaper will transform a wall to a television, a computer screen, works of art, etc.
- Robotic lawn mowers will tend the grass within any specified boundary.
- “Nanny-cams” hidden in teddy bears permit parents to watch their children at daycare; camera-surveillance systems will keep an eye on latchkey kids home alone.
- Holographic storage will be used to store and retrieve home videos.
- Lasers and decay-preventive gum and toothpastes will minimize the need for the dentist’s drill.
- Robots will dispense gasoline, and know your preferred grade.
- “Smart” heart pacemakers will be placed in the wrist.

# Not All New Products Are Planned

- Microwave ovens
- Aspartame (NutraSweet)
- ScotchGard fabric protector
- Teflon
- Penicillin
- X-rays
- Dynamite

**In each case, an accidental discovery -- but someone knew they had something when they saw it!**

# What Is a New Product?

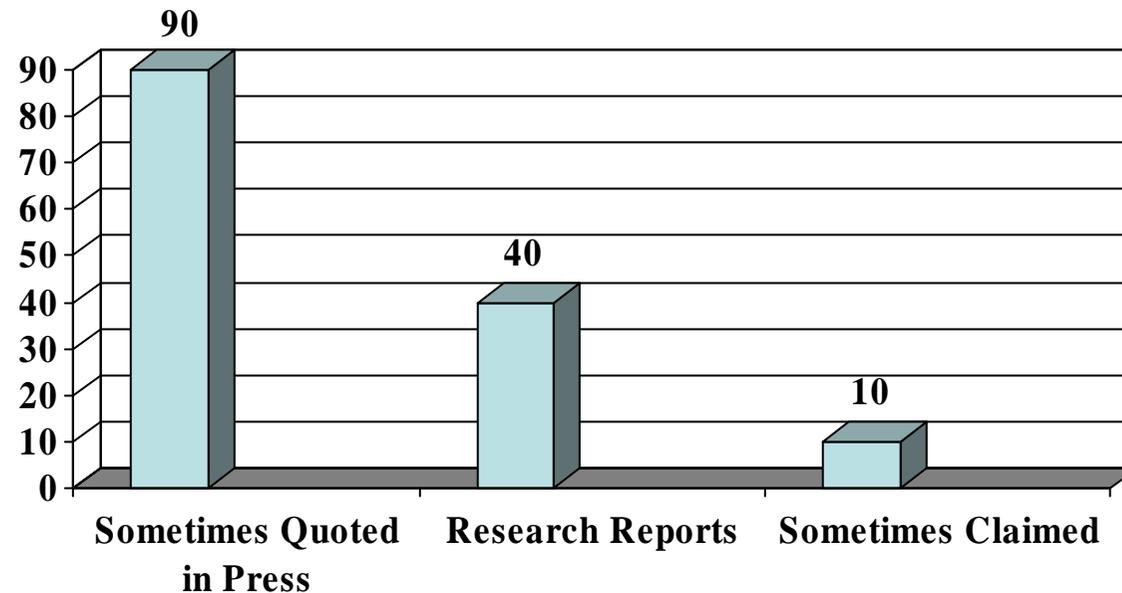
- *New-to-the-world (really-new) products (10% of new products):* Inventions that create a whole new market. Ex.: Polaroid camera, Sony Walkman, Palm Pilot, Rollerblade skates, P&G Febreze and Dryel.
- *New-to-the-firm products (20%):* Products that take a firm into a category new to it. Ex.: P&G brand shampoo or coffee, Hallmark gift items, AT&T Universal credit card, Canon laser printer.
- *Additions to existing product lines (26%):* Line extensions and flankers in current markets. Ex.: Tide Liquid, Bud Light, Apple's iMac, HP LaserJet 7P.
- *Improvements and revisions to existing products (26%):* Current products made better. Ex.: P&G's continuing improvements to Tide detergent, Ivory soap.
- *Repositionings (7%):* Products that are retargeted for a new use or application. Ex.: Arm & Hammer baking soda sold as a refrigerator deodorant; aspirin repositioned as a safeguard against heart attacks.
- *Cost reductions (11%):* New products that provide the customer similar performance but at a lower cost. May be more of a "new product" in terms of design or production.

# What About...

- New Services?
- New Business-to-Business Products?
- New International/Global Products?

# What Is a Successful New Product?

Percent of Products that Fail



Although you may hear much higher percentages, careful studies supported by research evidence suggest that about 40% of new products fail -- somewhat higher for consumer products, somewhat lower for business-to-business products.

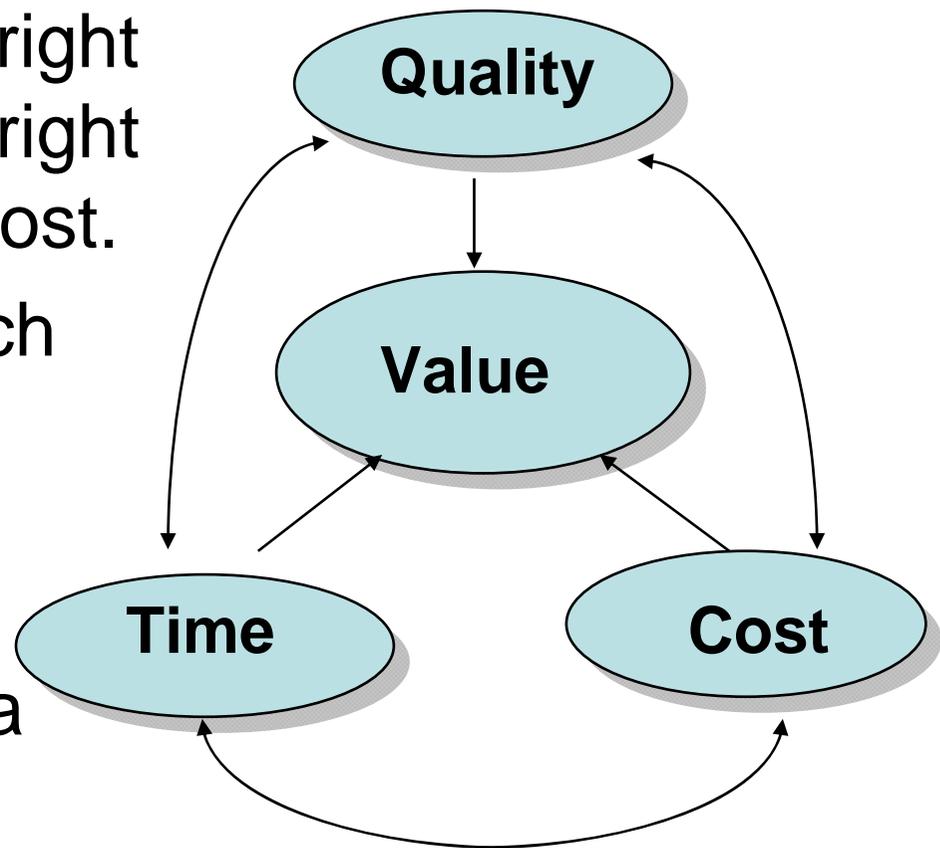
# Classic Brand Names

- Budweiser
- Ivory
- Coca-Cola
- Maxwell House
- Kodak
- General Electric
- Steinway
- Wrigley
- Kleenex
- Waterford
- L.L. Bean
- Ford
- John Deere
- Maytag
- JCPenney
- Sears
- Colgate
- Hershey
- Gillette
- Ticonderoga

**Which of these have the most value today as launch pads for new products?**

# The Conflicting Masters of New Products Management

- Three inputs to the new products process: the right quality product, at the right time, and at the right cost.
- These conflict with each other but may have synergies too.
- Issue: how to optimize these relationships in a new product situation.



# Breakthrough Innovations that Changed Our Lives

- Personal Computer
- Microwave Oven
- Photocopier
- Pocket Calculator
- Fax Machine
- Birth Control Pill
- Home VCR
- Communication satellite
- Bar coding
- Integrated Circuit
- Automatic Teller
- Answering Machine
- Velcro Fastener
- Touch-Tone Telephone
- Laser Surgery
- Apollo Lunar Spacecraft
- Computer Disk Drive
- Organ Transplanting
- Fiber-Optic Systems
- Disposable Diaper
- MS-DOS
- Magnetic Resonance Imaging