Subject – Operations Management

Unit-2 : Products
Module-1

Mrs. Anjali Upadhyay
Mechanical Engineering Dept.
SoET, VU, Ujjain (M.P)

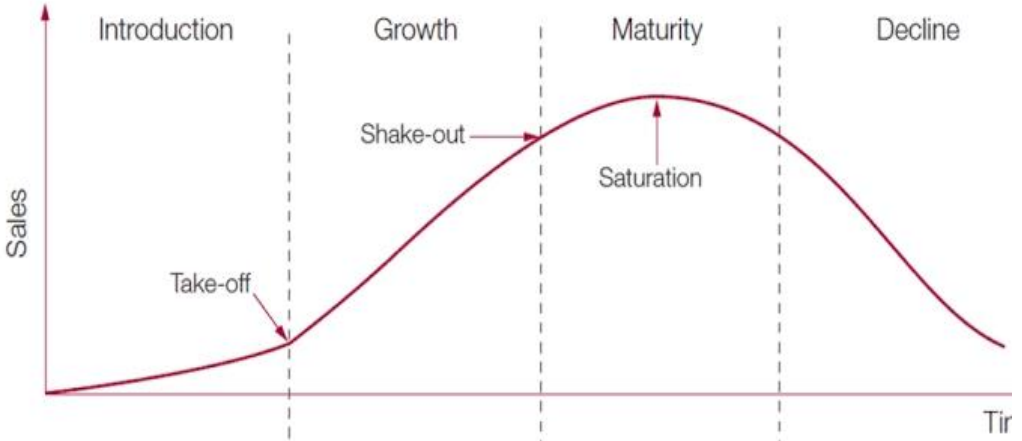
Contents

- Product life cycle
- Product life cycle management (PLM)
- Design process
- Morphology of design
- Evolution and innovation in design
- Concurrent Engineering
- Form and functional design
- Simplification and Standardization
- Product Differentiation
- Mass Customization
- Modular design

Product Life Cycle

- The product life cycle is the process a product goes through from when it is first introduced into the market until it declines or is removed from the market.
- The life cycle has four stages –
  1. Introduction
  2. Growth
  3. Maturity
  4. Decline

Product Life Cycle



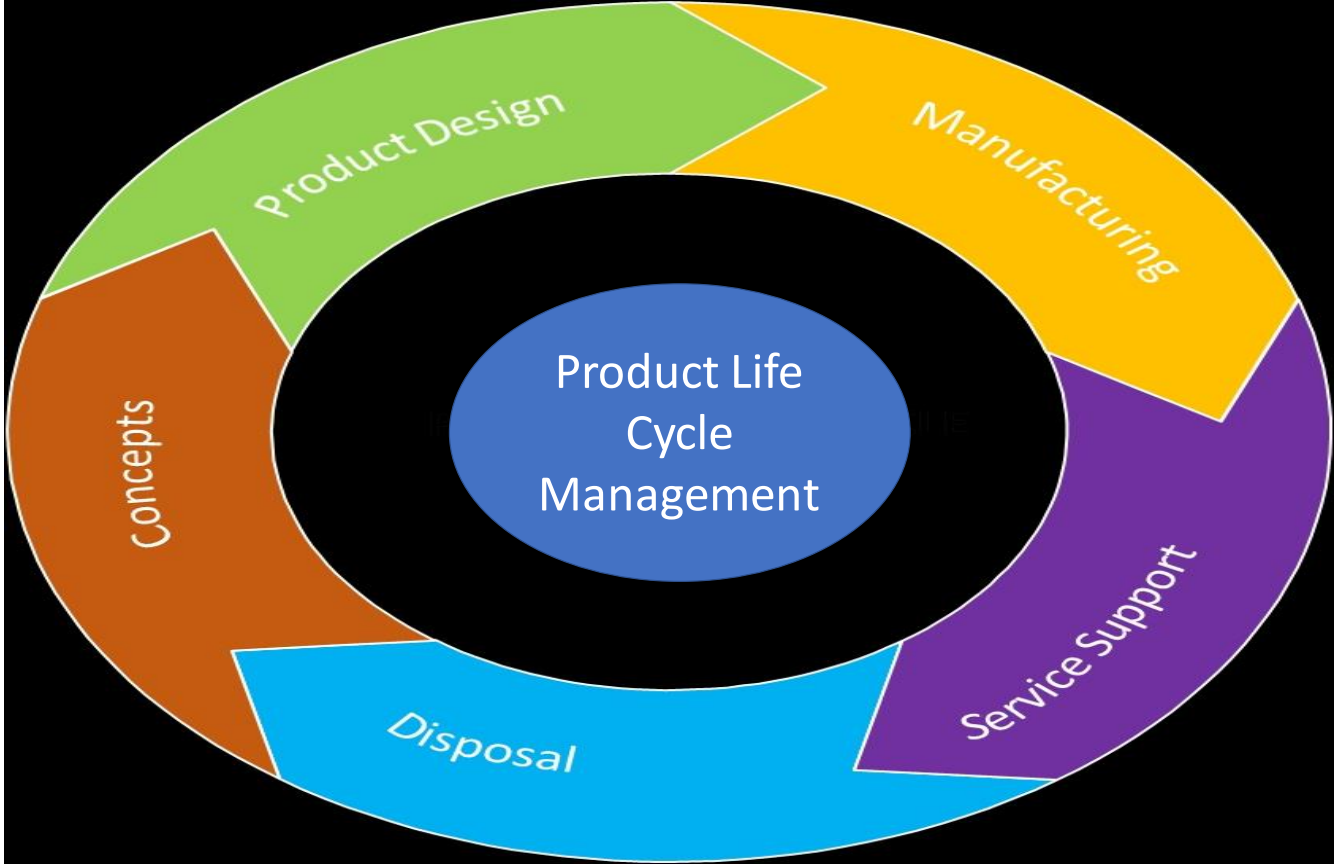
- Sales
- Cost per customer
- Profit /loss
- Customers
- Competitors

Introduction	Growth	Maturity	Decline
• Low sales • High cost per customer • Financial losses • Innovative customers • Few (if any) competitors	• Increasing sales • Cost per customer falls • Profits rise • Increasing No. of customers • More competitors	• Peak sales • Cost per customer lowest • Profits high • Mass market • Stable number of competitors	• Falling sales • Cost per customer lo • Profits fall • Customer base contra • Number of competito fall

Product Life Cycle Management

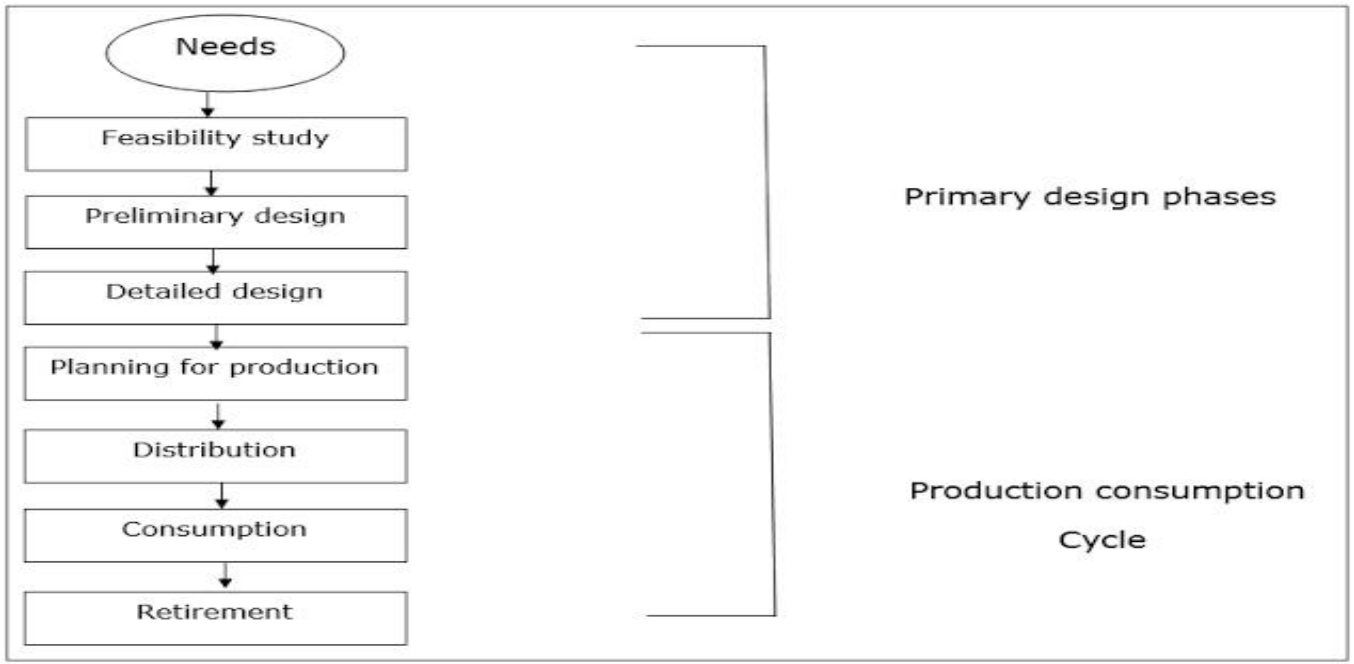
- Product life cycle management (PLM) is the integration of all aspects of a product, taking it from conception through the product life cycle (PLC) to the disposal of the product and components.
- PLM consists of mainly three phases-

1. Beginning of life phase – Conceptualization ,design to manufacturing
2. Middle of life phase- Post manufacturing, distribution, sales and service
3. End of life phase- Retirement, disposal, recycling, reuse etc.


Product Design
Manufacturing
Service Support
Disposal
Concepts
Product Life Cycle Management

Product Design Steps

Morphology of Design



Evolution in Design

- Design approach based on the observation that products typically go through a series of phases after their initial market introduction.
- Ex-motor vehicle, which started out as a horseless carriage fitted with a motor.

Innovation in Design

- Design approaches focussing on improving existing or developing completely new products.
- Ex-Robots, smartphones, smart bands

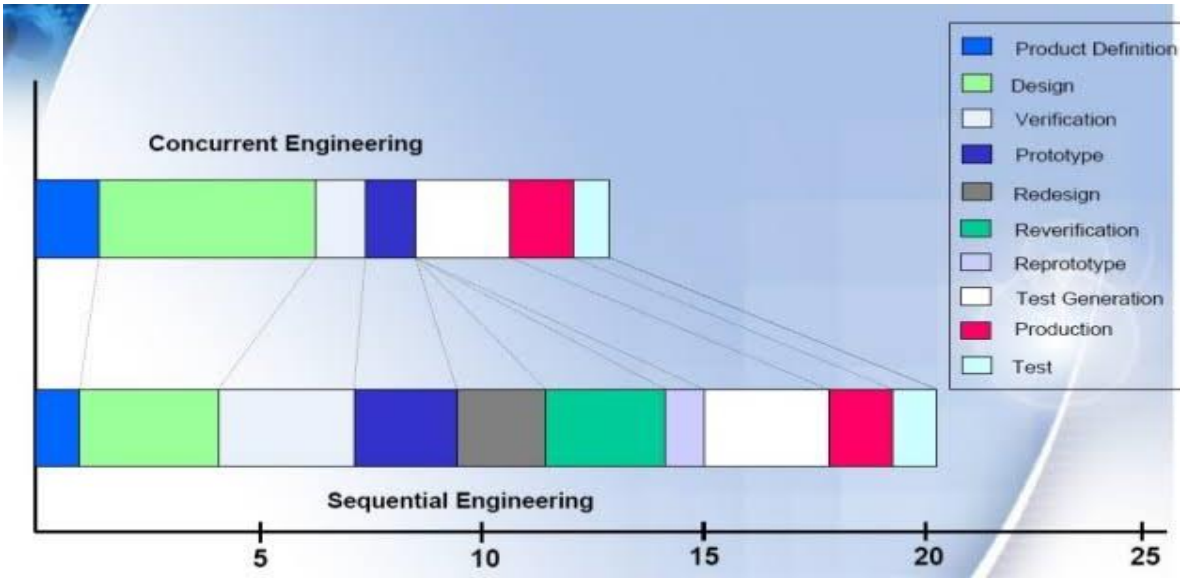
Concurrent Engineering

- Concurrent engineering, also known as simultaneous engineering.
- Concurrent engineering is a method of designing and developing products, in which the different stages run simultaneously, rather than consecutively.
- It decreases product development time and also the time to market, leading to improved productivity and reduced costs.

Traditional Engineering

- **Traditional engineering**, also known as **sequential engineering**.
- In traditional engineering the process of design, manufacturing, testing, production and marketing and each stage of the development process is carried out separately.
- Next stage cannot start until the previous stage is finished.
- The information flow is only in one direction.

Concurrent Engineering and Traditional Engineering



Form and Functional Design

Form Design- Associated with how product will look.

- Design
- Size and Shape
- Colour
- Texture

Functional Design- It is associated with the working or performance of the product

- Reliabitity
- Maintainability
- Usability

"FORM FOLLOWS FUNCTION"

Simplification and Standardisation

- Simplification- Simplification is the process of reducing the variety of products manufactured. Simplification is concerned with the reduction of product range, assemblies, parts, materials and design.

- Standerization-Standardization means producing maximum variety of products from the minimum variety of materials, parts, tools and processes. It is the process of establishing standards or units of measure by which extent, quality, quantity, value, performance etc., may be compared and measured.

Product Differentiation

- Process of distinguishing a good or service from others.
- Making a product or service to stand out.
- Companies do this to show their product's uniqueness and attributes to customers.
- This may include products within the company or of the same line.
- Rita Gunther McGrath and Ian MacMillan wrote: "Offering customers something they value that competitors don't have."
- Differentiation provides better value to customers at reasonable price,
- Creats win-win scenario
- Boost profitabitity and buisness viability.

Types of product differentiation

1. Horizontal differentiation- Not associated with product price or quality. It depends on customer's personal choice because this offers almost same thing at same price.Ex- Mineral water bottles, dishwash bars.

2. Vertical differentiation- Products with vertical differentiation highly dependent on price. High price denotes mark of luxury or quality. Ex.- Branded vs generics; Sonata vs Fossils etc.

3. Mixed differentiation (Simple differentiation)- Combination of vertical and horizontal differentiation. Ex-Vehicles of the same class and similar price points from two different manufacturers.

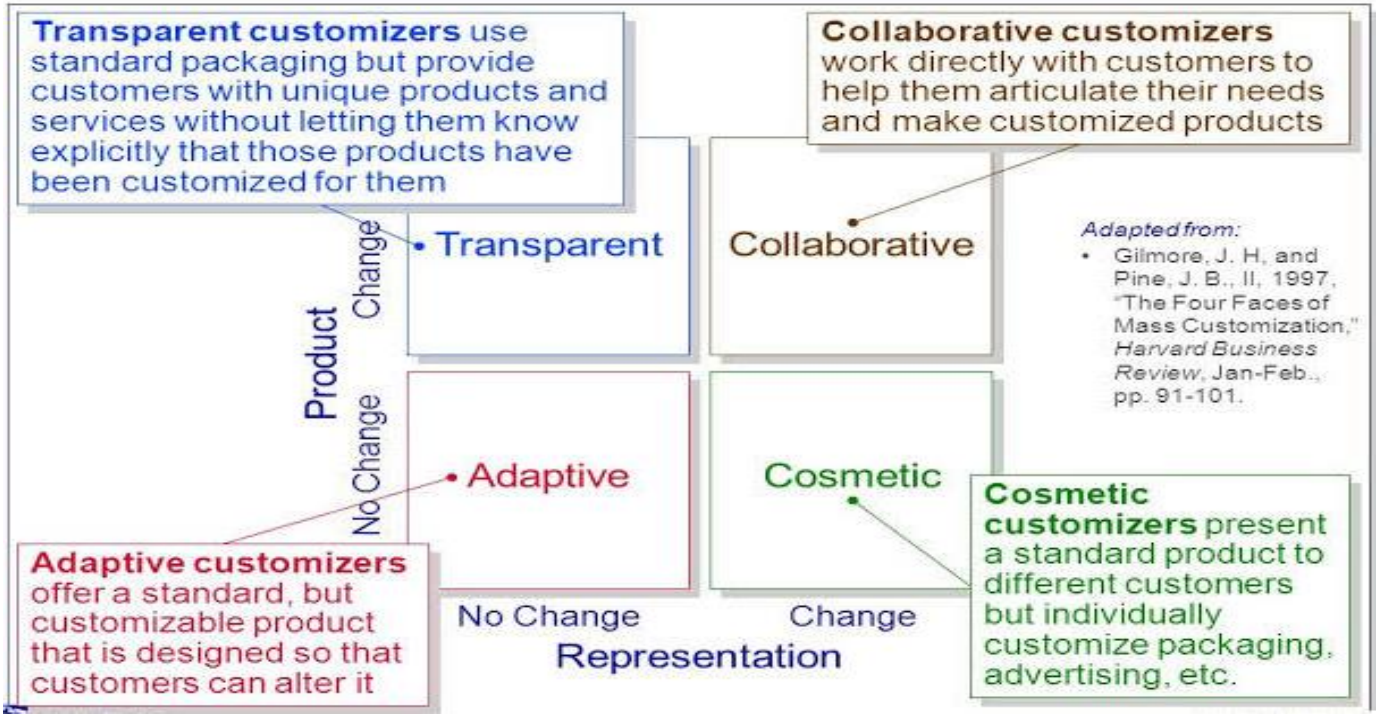
Factors of differentiation

- Form
- Feature
- Customization
- Durability
- Quality
- Price
- Style
- Reliability

Mass Customization

- Organization's ability to efficiently mass produce products that meet individual consumer wants and needs.
- Mass customization is a marketing and manufacturing technique which combines the flexibility and personalization of custom-made products with the low costs associated with mass production.
- People strives to be unique so a common way to carry out mass customization is to offer a basic package for a product and then offer customers a range of features they can add or subtract.
- That way, businesses can provide a certain set of options for modifying a product without the costs associated with making a unique product.

Four Types of Mass Customization



Mass Production v/s Mass customization

	Mass Production	Mass Customization
Focus	Efficiency through stability and control	Variety and customization through flexibility and quick responsiveness
Goal	Developing, producing, marketing, and delivering goods and services at prices low enough that nearly everyone can afford them	Developing, producing, marketing, and delivering affordable goods and services with enough variety and customization that nearly everyone finds what they want
Key Features	• Stable demand • Large, homogenous markets • Low-cost, consistent quailty, standardized goods and services • Long product development cycles • Long product life cycles	• Fragmented demand • Heterogeneous markets • Low cost, high quality, customized goods and services • Short product development cycles • Short product life cycles

Modular Design

- **Modular design** is a design theory and practice that subdivides a system into smaller parts called *modules*, which can be independently created, modified, replaced or exchanged between different systems.
- Combine customization with advantages of standardization.
- Advantages
  - Faster time to market
  - Reduced cost
  - Reduced resource requirement
  - Reduced risk and high safety
  - Quality fabrication or assembly
  - Simple changes
  - More organized