Chapter 1

Introduction

- Product: Something sold by an enterprise to its customers

- Product Development: The set of activities beginning with the perception of a market opportunity and ending in the production, sale, and delivery of a product

1.1 Characteristics of Successful Product Development

- Dimensions to assess performance:

    - Product Quality: The degree to which a product meets customer expectations
    - Product Cost: The total cost incurred in producing and delivering the product
    - Development Time: The time taken from the initial concept to the market launch
    - Development Cost: The total cost incurred in the product development process
    - Development Capability: The ability of the organization to develop products effectively and efficiently

1.2 Participants in Product Development

- Central participants:

    - Marketing: Identifies market opportunities and customer needs
    - Design: Creates the product concept and specifications
    - Manufacturing: Plans and executes the production process

- Project team: The collection of individuals developing a product

- Core team: A small group of individuals from different functions who work closely together throughout the project

- Extended team: Includes additional members from other functions who contribute at various stages of the project

1.3 Duration and Cost of Product Development

- Duration: 3 to 5 years for complex products

- Cost: $\propto$ people involved and time taken

1.4 Challenges in Product Development

- Challanges characteristics:

  - Trade-offs: Balancing quality, cost, time, and capability
  - Dynamics: Adapting to changing market conditions and technologies
  - Details: Managing the complexity of product specifications and requirements
  - Time Pressure: Meeting tight deadlines while maintaining quality
  - Economics: Ensuring the product is financially viable

- Intrinsic attributes that make product development attractive:

  - Creation
  - Satisfaction of societal and individual needs
  - Team diversity
  - Team spirit

Chapter 2

Product Development Process and Organization

2.1   Product Development Process

- Product development process: The sequence of steps or activities that an enterprise employs to conceive, design, and commercialize a product

- Advantages of having a well-defined process:

  - Quality assurance: Ensures that the product meets customer expectations
  - Coordination: Facilitates communication and collaboration among team members
  - Planning: Helps in resource allocation and scheduling
  - Management: Provides a framework for monitoring progress and making adjustments
  - Improvement: Enables learning from past projects to enhance future performance

- Six phases of the generic development process:

  0. Planning
  1. Concept Development
  2. System-Level Design
  3. Detail Design
  4. Testing and Refinement
  5. Production Ramp-Up

2.2   Concept Development: The Front-End Process

- Identifying customer needs

- Establishing target specifications

- Concept generation

- Concept selection

- Concept testing

- Setting final specifications

- Project planning

- Economic analysis

- Benchmarking of competitive products

- Modeling and prototyping

Chapter 3

Opportunity Identification

3.1 Opportunity

- Opportunity: An idea for a new product

Types of Opportunities

- Two dimensions:
  - Solution (Technology, Method, Process)
  - Need (Market, Customer, User)