• What role does operations management play in a business?
• What are the responsibilities of operations managers?
• How has technology impacted operations management?
• Why is coordination an important part of operations management?
• What is the role of quality in operations management?
• Why is there a movement toward lean production?
Operations management – planning, organizing, leading and controlling all the activities in creating value by producing goods and services and distributing them to customers
**Effectiveness vs. Efficiency**

**Efficiency** – producing output or achieving a goal at the lowest cost

**Effectiveness** – completing tasks and producing products that create the greatest value

“There is nothing so useless as doing efficiently that which should not be done at all.”

- Peter Drucker
Goods are tangible products that you can see and touch. Durable and nondurable.

Services are intangible products, such as legal advice, entertainment, and medical care.
## Differences between Goods and Services

<table>
<thead>
<tr>
<th>Goods</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are tangible: They have a physical form and can be seen, touched, handled, etc.</td>
<td>Are intangible: They can be “experienced,” but they don’t have a physical form.</td>
</tr>
<tr>
<td>Can be stored in an inventory.</td>
<td>Must be consumed <em>when</em> they are produced.</td>
</tr>
<tr>
<td>Can be shipped.</td>
<td>Must be consumed <em>where</em> they are provided.</td>
</tr>
<tr>
<td>Are produced independently of the consumer.</td>
<td>Often require the customer to be actively involved in their production.</td>
</tr>
<tr>
<td>Can have at least <em>some</em> aspects of their quality determined objectively by measuring defects or deviations from desired values</td>
<td>Intangible nature means quality is based mainly on customer perceptions.</td>
</tr>
</tbody>
</table>
What Do Operations Managers Do?

- Facility Location
- Process Selection and Facility Layout
- Inventory Control
- Scheduling

Creating value is important. The value chain refers to the network of relationships that channels the flow of inputs, information, and financial resources.
## Factors That Affect Location Decisions

<table>
<thead>
<tr>
<th>General Location Factors</th>
<th>Examples of Specific Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequacy of utilities</td>
<td>Is the supply of electricity reliable?</td>
</tr>
<tr>
<td></td>
<td>Is clean water available?</td>
</tr>
<tr>
<td>Land</td>
<td>Is adequate land available for a facility?</td>
</tr>
<tr>
<td></td>
<td>How much does the land cost?</td>
</tr>
<tr>
<td>Labor market conditions</td>
<td>Are workers with the right skills available?</td>
</tr>
<tr>
<td></td>
<td>How expensive is labor?</td>
</tr>
<tr>
<td>Transportation factors</td>
<td>Is the location near customers and suppliers?</td>
</tr>
<tr>
<td></td>
<td>Is appropriate transportation nearby?</td>
</tr>
<tr>
<td>Quality of life factors</td>
<td>What is the climate like?</td>
</tr>
<tr>
<td></td>
<td>Are adequate health care facilities available?</td>
</tr>
<tr>
<td>Legal and political environment</td>
<td>Does the local government support new businesses?</td>
</tr>
<tr>
<td></td>
<td>What are the local taxes, fees, and regulations?</td>
</tr>
</tbody>
</table>
**Going Overseas**

- Low-wage labor is a key reason firms focus overseas but, low wages do not always translate into low cost.
- There are a variety of opportunities in rapidly growing foreign markets.
- Key to balance advantages with *drawbacks*:
  - Different laws and customs
  - Inadequate infrastructure
  - Inexperienced workers
  - Political instability
Flow Shops

- Produce Large Batches
- Standardized Products
- Specialized Machinery
- Standardized Tasks
- Assembly Line is a Flow Shop Process

Job Shops

- Produce Small Batches
- Variety of Products
- General-purpose Machinery
- Flexible Processes
Managing Projects

- Production of some products are *projects*
- Projects are usually complex and expensive
  - New House/Building
  - Filming a Movie
- Managers use *Gantt charts* and *critical path method* to manage projects
Special Characteristics of Service Processes

- Customers interact directly with service providers
- Each interaction is unique and challenging to manage
- A servicescape is the environment in which the customer and service provider interact.

The Bureau of Labor Statistics forecasts the U.S. service sector will generate **15.7 jobs** between 2006 and 2016, while employment in the goods producing sector will **decline** over the same period.
Why hold inventories…

• Smooth out production schedules
• Meet demand increases
• Reduce switching costs
• Compensate for forecast errors

Why not…

• Unsold inventory ties up funds
• Inventory must be warehoused and managed
• Risk of losses due to spoilage, obsolescence and pilferage
• Operations managers must manage and schedule projects

• Scheduling starts with identifying the required activities, the time required and the order in which they must happen

• *Immediate predecessors* are activities that must be completed before other activities begin

<table>
<thead>
<tr>
<th>Activity</th>
<th>Immediate Predecessor(s)</th>
<th>Time (Weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Survey of needs</td>
<td>None</td>
<td>2</td>
</tr>
<tr>
<td>B. Determine site for arena</td>
<td>A</td>
<td>5</td>
</tr>
<tr>
<td>C. Preliminary design developed</td>
<td>A</td>
<td>5</td>
</tr>
<tr>
<td>D. Obtain major donation for funding</td>
<td>C</td>
<td>4</td>
</tr>
<tr>
<td>E. Obtain board approval</td>
<td>B,D</td>
<td>4</td>
</tr>
<tr>
<td>F. Select architect</td>
<td>E</td>
<td>3</td>
</tr>
<tr>
<td>G. Establish budget</td>
<td>E</td>
<td>2</td>
</tr>
<tr>
<td>H. Obtain remaining financing</td>
<td>F, G</td>
<td>10</td>
</tr>
<tr>
<td>I. Finalize design</td>
<td>G</td>
<td>6</td>
</tr>
<tr>
<td>J. Hire contractor</td>
<td>H, I</td>
<td>6</td>
</tr>
</tbody>
</table>
Using a Gantt Chart to Get the Big Picture

- Activity
- Preliminary Survey
- Select Site
- Develop Design
- Locate Major Donor
- Get Board Approval
- Select Architect
- Establish Budget
- Obtain Final Financing
- Finalize Design
- Hire Contractor

Time (in Weeks)
Using the Critical Path Method to Focus Efforts

1. Site Selection (B)
2. Select Architect (F)
3. Obtain Final Financing (H)
4. Hire Contractor (J)
5. Board Approval (E)
6. Preliminary Survey (A)
7. Find Major Donor (D)
8. Establish Budget (G)
9. Preliminary Design (C)
10. Finalize Design (I)
**Automation** – replacing human operations and control of machinery and equipment with some form of programmed control

**Robot** – a programmable machine that is capable of manipulating materials in order to perform tasks
Doc Robot Is in the House

- Robots are revolutionizing the practice of medicine
- Doctors are using robots to check on patients who are unable to get to the hospital
- The “head” of the robot can talk to the patient
- When the robot rolls into the pediatric wing with a superhero cape; there is a roomful of giggles
- Robots (da Vinci) can perform surgeries with smaller incisions and steadier hands
The Technology of Operations: Software Technologies

- Computer-aided design (CAD)
- Computer-aided engineering (CAE)
- Computer-aided manufacturing (CAM)
- Computer-integrated manufacturing (CIM)
Independent functions are now highly coordinated systems to produce value:

- Supply Chain Management
- Enterprise Resource Planning
Supply chains can be complex

- Wide range of functions
- Involve many firms
- Heavy use of technology
- Internet has provided great tools for supply chain management
Vertical Integration

• Gain control over supply chain
• Begin producing its own parts
• Buying suppliers

Outsourcing

• Use outside firm for producing supplies
• Focus on key production areas
• Cost savings

The trend has been to rely more on outsourcing which has become a controversial issue.
How American Are “American” Cars?

• “Buy American” took on a new sense of urgency in 2008 as major American automakers struggled.

• The list of “American-made” cars compiled by Cars.com with 75% of parts of U.S. origin:
  - Toyota Tundra
  - Toyota Sienna
  - Honda Odyssey
  - *Dodge Ram pickup had a domestic part rating of 68%*
Enterprise Resource Planning: Creating One Big System

• The goal of ERP is to integrate the flow of information

• ERP systems can be costly and challenging to implement

• Most firms that complete implementation of ERP systems, report being satisfied with the results

• Over 75% of large and medium firms and over 60% of medium firms now use ERP systems
Focus on Quality

• Quality improves effectiveness and efficiency
• Quality helps achieve competitive advantage
• Lower costs, increases value
• Poor quality costs
W. Edwards Deming, viewed as the father of the quality movement, first proposed the relationship between quality and business in the early 1950s.
Total Quality Management

A broad concept of quality - Total Quality Management:

✓ Customer Focus

✓ Build quality throughout the organization

✓ Empowerment of employees

✓ Focus on prevention of errors

✓ Long-run commitment to continuous improvement

Key American firms had to make a real effort to change their ways like the Japanese a few decades earlier.
**Poká Yokes**

- **Japanese term for “mistake proofing”**

- **Procedures built into the production process that prevent workers from making mistakes**

- **…or catch and correct mistakes**
Six Sigma Belts Quality Concerns

- **Yellow Belts** – basic training in six sigma concepts
- **Green Belts** – have a higher level of training than yellow belts and work on six sigma projects
- **Black Belts** – have a high level of training and experience to take charge of a Six Sigma team
- **Master Black Belts** – have achieved the highest level of expertise in the methods, strategies, leadership and other techniques
The Baldridge National Quality Program

- Created by Congress in 1987 to encourage global competition
- Participating firms are extensively evaluated
- Detailed reports of company strengths and weaknesses
- The *Baldridge National Quality Program* receive benefits even if they don’t win the award
ISO 9000 Certification

✓ Generic quality standards
✓ Updated and modified, latest version is ISO 9000:2005
✓ Environmental management focused standards: ISO 14000

• The International Organization for Standardization (ISO) was founded in 1947
• Network of national standards institutes in 150 nations
• The standards were updated in 1987
Identifying Sources of Waste: Value Stream Mapping

A tool used to show the flows of materials and information in the production process to identify waste.
Produce goods and services to meet actual demand. *Minimize inventories* at all stages of the supply chain through coordination.
Lean Thinking in The Service Sector

- Standardize
- Minimize costs
- High utilization
- Simplified processes
• What role does operations management play in a business?
• What are the responsibilities of operations managers?
• How has technology impacted operations management?
• Why is coordination an important part of operations management?
• What is the role of quality in operations management?
• Why is there a movement toward lean production?