

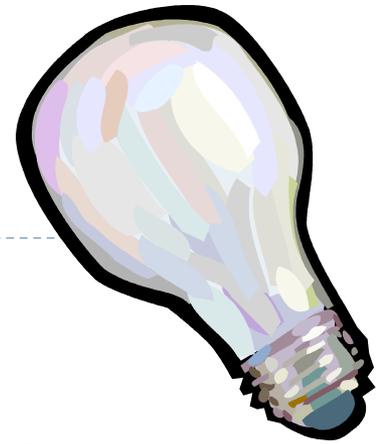
Integrated Manufacturing System (IMS : 535312, 435303)

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Chapter 1

Introduction to Operations Management

Chapter 1: Learning Objectives



- You should be able to:
 1. Define the term *operations management*
 2. Identify the three major functional areas of organizations and describe how they interrelate
 3. Identify similarities and differences between production and service operations
 4. Describe the operations function and the nature of the operations manager's job
 5. Summarize the two major aspects of process management
 6. Explain the key aspects of operations management decision making
 7. Briefly describe the historical evolution of operations management
 8. Characterize current trends in business that impact operations management

Operations Management

- ▶ **What is operations?**
 - ▶ The part of a business organization that is responsible for producing goods or services
- ▶ **How can we define operations management?**
 - ▶ The management of systems or processes that create goods and/or provide services

Product or Service?

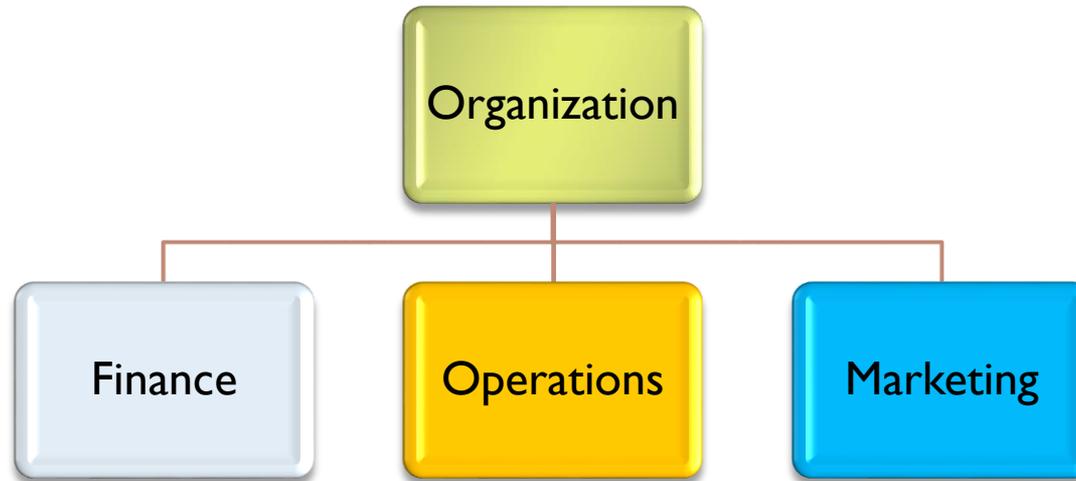
Products (Goods) are physical items that include raw materials, parts, subassemblies, and final products.

- Automobile
- Computer
- Oven
- Shampoo

Services are activities that provide some combination of time, location, form or psychological value.

- Air travel
- Education
- Haircut
- Legal counsel

Basic functions of business organizations



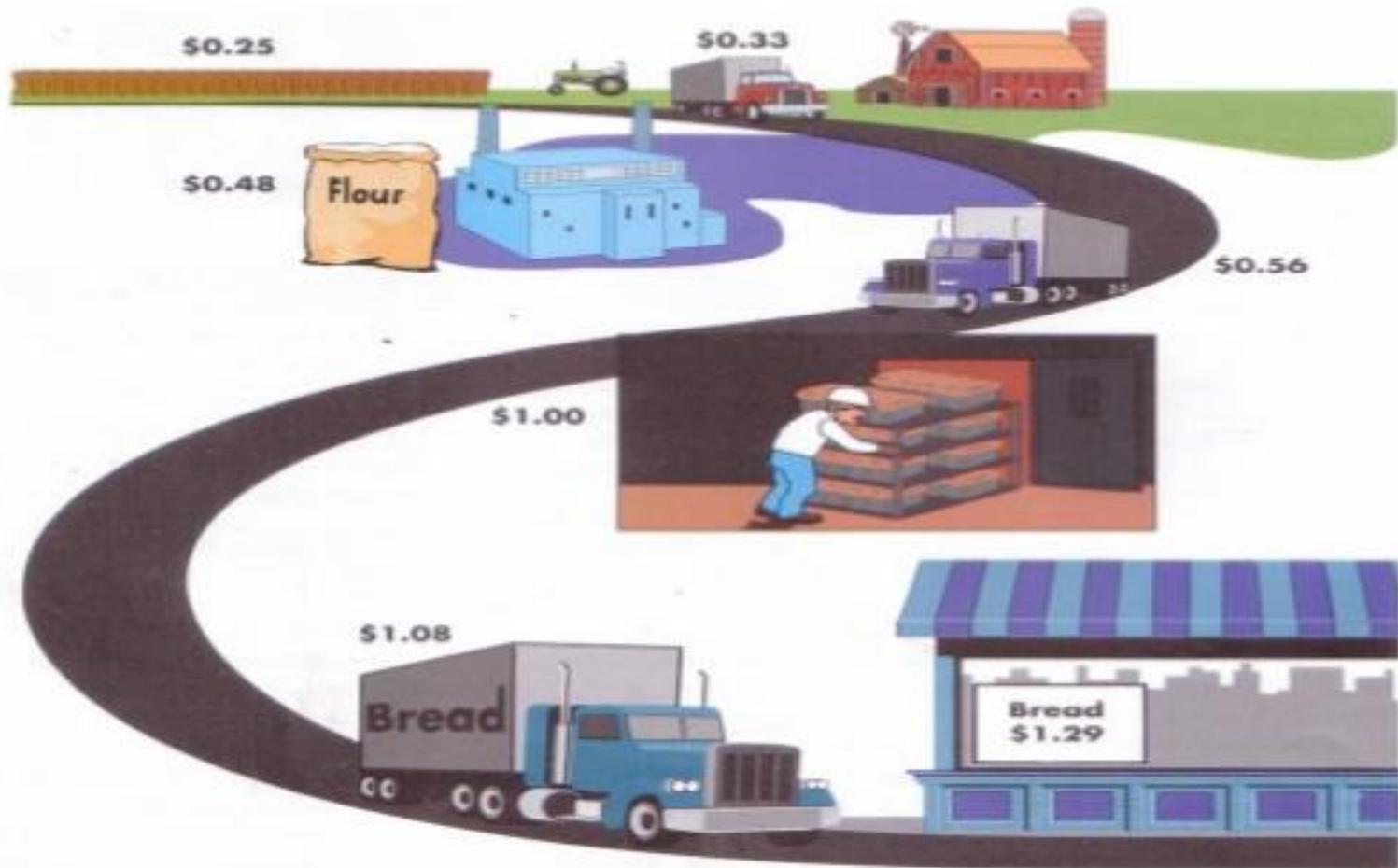
- ▶ **Finance**
 - ▶ Securing financial resources, budgeting, analyzing investment proposals and providing funds for operations.
- ▶ **Marketing**
 - ▶ Assessing consumer wants and needs, selling and promoting goods or services.
- ▶ **Operations**
 - ▶ Producing goods or providing services.

Supply Chain

Supply Chain – a sequence of activities and organizations involved in producing and delivering a good or service

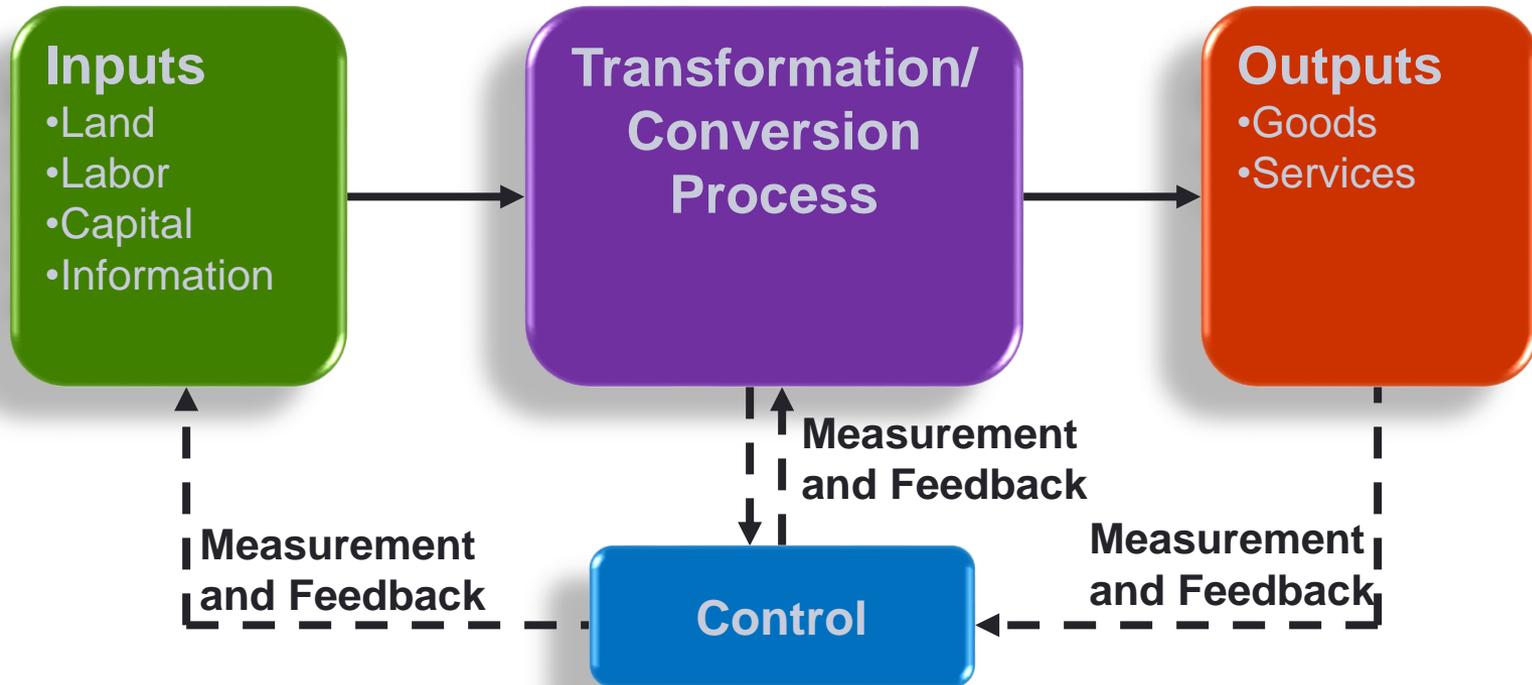


Supply Chain



The Transformation Process

Value-Added

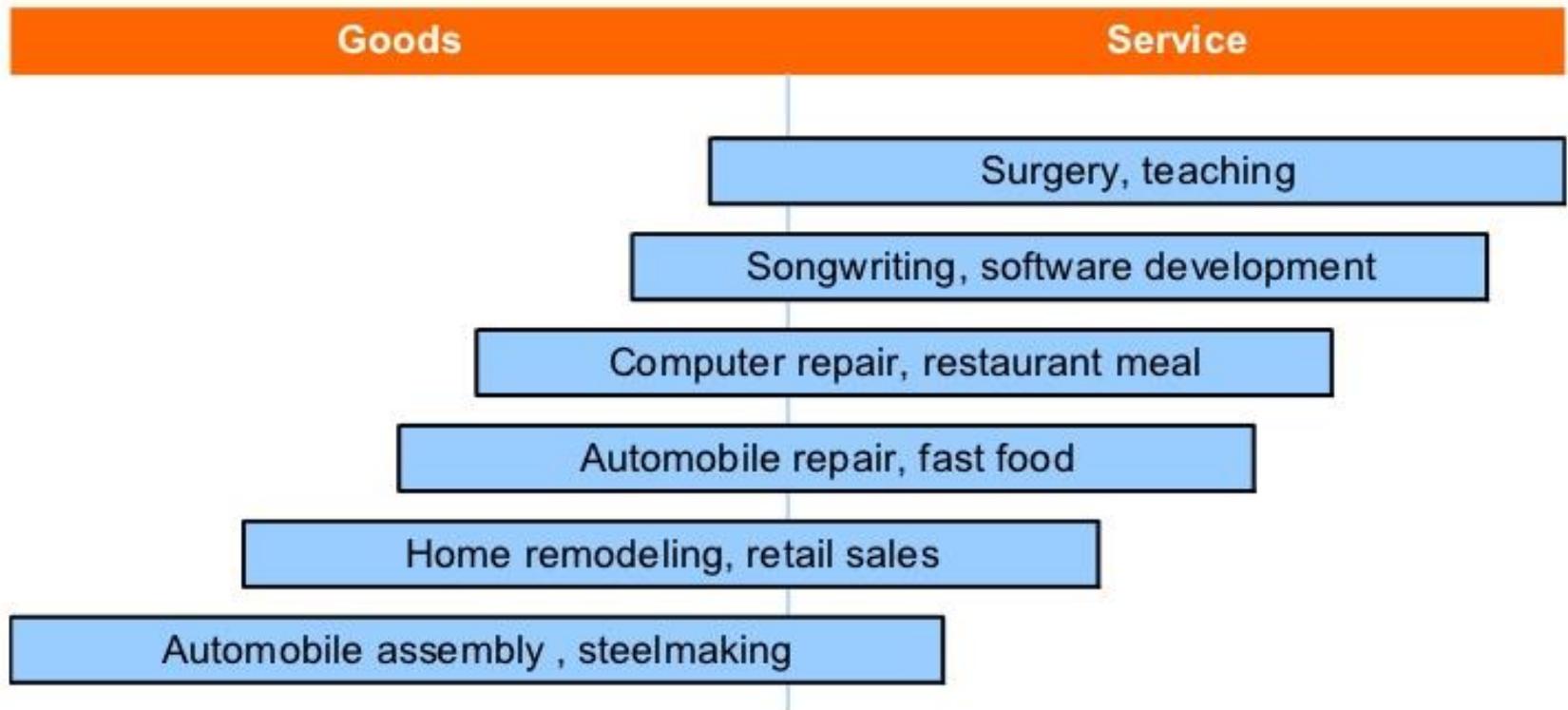


Feedback = measurements taken at various points in the transformation process

Control = The comparison of feedback against previously established standards to determine if corrective action is needed.

The Transformation Process

The goods – service continuum



Manufacturing vs. Service

| Characteristic | Goods | Services |
|---|----------|----------------|
| Customer contact | Low | High |
| Uniformity of input | High | Low |
| Labor content | Low | High |
| Uniformity of output | High | Low |
| Output | Tangible | Intangible |
| Measurement of productivity | Easy | Difficult |
| Opportunity to correct quality problems before delivery to customer | High | Low |
| Inventory | Much | Little |
| Evaluation | Easier | More difficult |
| Patentable | Usually | Not usually |

Scope of Operations Management

The scope of operations management ranges across the organization.

The operations function includes many interrelated activities such as:

- Forecasting
- Capacity planning
- Facilities and layout
- Scheduling
- Managing inventories
- Assuring quality
- Motivating employees
- Deciding where to locate facilities
- And more ...

Scope of Operations Management

Airline company



Service -oriented

- Forecasting → landing conditions, seat demand and growth of air travel
- Capacity planning → airplanes ?
- Facilities → effective use of workers and equipments
- Scheduling → flights and routine maintenance, pilots, flight attendants..
- Inventories → food & beverage, first aid, magazine, pillows...
- Assuring quality → safety, check in, service, reservation
- Motivating employees → all place of operations.
- Locating facilities → which cities to provide, where to locate major or minor hubs.

Scope of Operations Management

Bicycle factory:



Product -oriented

- Forecasting → customer demand, raw materials for assembly
- Capacity planning → do by itself for fabrication work , capacity of factory
- Facilities → effective use of workers and equipments
- Scheduling → production planning
- Inventories → raw materials, work in process and finished goods. Decide how many to order and when to order.
- Assuring quality → ensuring to meet standard.
- Motivating employees → all place of operations.
- Locating facilities → which equipments to provide, where to locate and when to do.

Role of the Operations Manager

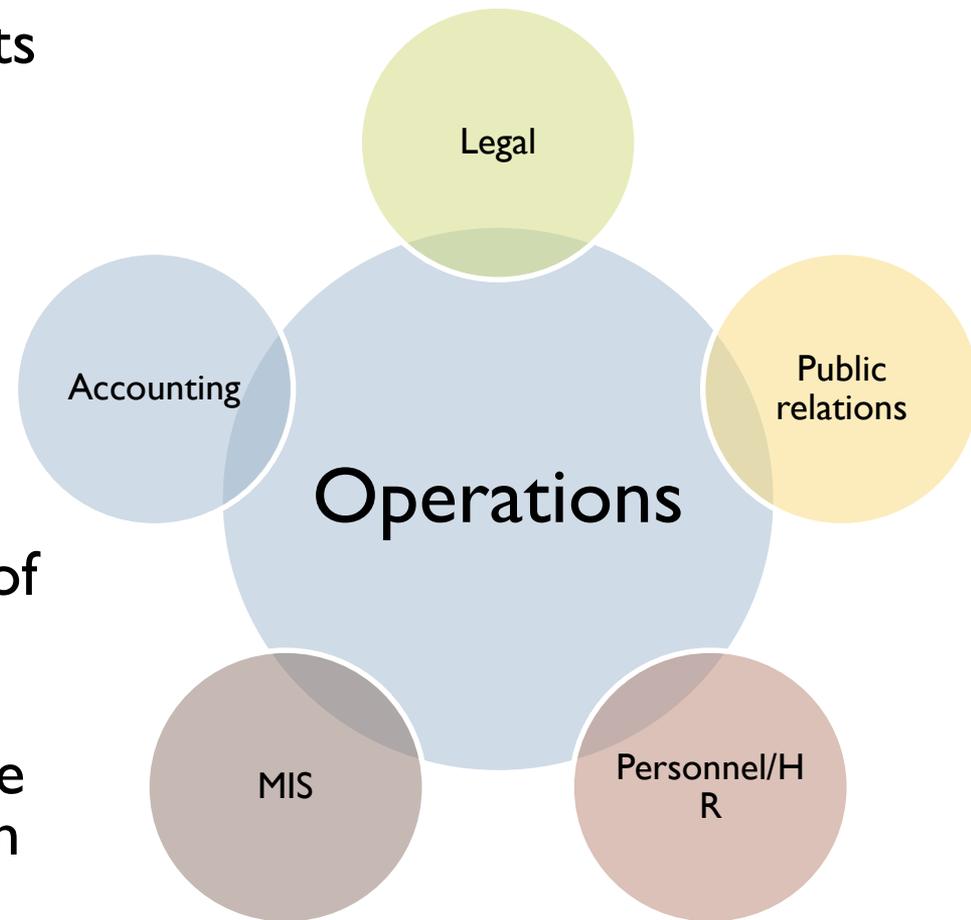
The Operations Function consists of all activities *directly* related to producing goods or providing services.

A primary function of the operations manager is to guide the system by decision making.

- ▶ System Design Decisions → **Strategic decisions.**
 - ▶ System capacity, geographic location of facilities, arrangement of departments and placement of equipments.
- ▶ System Operation Decisions → **Tactical and operational decisions.**
 - ▶ Management of personnel, inventory planning and control, scheduling, project management, quality assurance.

Why Study Operations Management?

- ▶ Every aspect of business affects or is affected by operations
- ▶ Many service jobs are closely related to operations
 - ▶ Financial services
 - ▶ Marketing services
 - ▶ Accounting services
 - ▶ Information services
- ▶ There is a significant amount of interaction and collaboration amongst the functional areas
- ▶ It provides an excellent vehicle for understanding the world in which we live



Operations Management and Supply Chain Career Opportunities

- ▶ Operations manager
- ▶ Supply chain manager
- ▶ Production analyst
- ▶ Schedule coordinator
- ▶ Production manager
- ▶ Industrial engineer
- ▶ Purchasing manager
- ▶ Inventory manager
- ▶ Quality manager



Decision Making

- Most operations decisions involve many alternatives that can have quite different impacts on costs or profits
- Typical operations decisions include:
 - **What:** What resources are needed, and in what amounts?
 - **When:** When will each resource be needed? When should the work be scheduled? When should materials and other supplies be ordered?
 - **Where:** Where will the work be done?
 - **How:** How will the product or service be designed? How will the work be done? How will resources be allocated?
 - **Who:** Who will do the work?

Historical Evolution of Operations Management

- ▶ Industrial Revolution
- ▶ Scientific Management
- ▶ Human Relations Movement
- ▶ Decision Models and Management Science
- ▶ Influence of Japanese Manufacturers

Industrial Revolution

- ▶ Began 1770s in England and spread to the rest of Europe and to the United State during 19th century.
- ▶ “Craft production” used highly skilled workers by using simple, flexible tools produced goods.
- ▶ The development of standard gauging systems gave a major change to industrial revolution.

Scientific Management

- ▶ Frederick W. Taylor (father of scientific management) was invented “science of management” based on observation, measurement, analysis and improvement of work methods, and economic incentives.
- ▶ Frank Gilbreth (father of motion study)
- ▶ Henry Gantt (Gantt chart)
- ▶ Henry Ford employed scientific techniques in factories and introduced the moving assembly line which began of mass production.
- ▶ Taylor and Ford were despised by many workers, due to they held workers in low regard, expecting them to perform like robots. This paved the way for the human relations movement

The Human Relations Movement

- ▶ Lilian Gilbreth (wife of Frank Gilbreth) focused on the human factor in work
- ▶ Elton Mayo presented that worker motivation is critical for improving productivity.
- ▶ Abraham Maslow developed motivational theories.
- ▶ Douglas McGregor added Theory X and Theory Y. Theory X, on the negative approach, workers not like to work and have to be controlled and resulted in an adversarial environment. Theory Y, on the other approach, resulted in empowered workers and cooperative spirit.
- ▶ William Ouchi added Theory Z, combined the Japanese approach with such features and lifetime employment.

Decision Models and Management Science

- ▶ F. W. Harris developed one of the first model. Mathematical model for inventory management.
- ▶ H. F. Dodge, H. G. Roig and W. Shewhart developed statistical procedures for sampling and quality control.

The Influence of Japanese Manufacturers

- ▶ Emphasize quality and continual improvement, worker teams and empowerment and achieving customer satisfaction.
- ▶ Just-in-time production (JIT).

Key Issues for Operations Managers Today

- ▶ Economic conditions
- ▶ Innovating
- ▶ Quality problems
- ▶ Risk management
- ▶ Competing in a global economy

The Need for Supply Chain Management

- ▶ In the past, organizations did little to manage the supply chain beyond their own operations and immediate suppliers which led to numerous problems:
 - ▶ Oscillating inventory levels
 - ▶ Inventory stockouts
 - ▶ Late deliveries
 - ▶ Quality problems

The Need for Supply Chain Management

1. **The need to improve operations.**
 - ▶ Lean operation and TQM are adopted.
2. **Increasing levels of outsourcing.**
 - ▶ Buying goods or services instead of producing or providing themselves.
3. **Increasing transportation costs.**
 - ▶ Need to be careful managed.
4. **Competitive pressure.**
 - ▶ Due to increasing number of new products, shorter product development cycle, and increased demand for customization.
5. **Increasing globalization.**
 - ▶ Currency differences and monetary fluctuations, language and cultural differences.

The Need for Supply Chain Management

6. Increasing important of e-business.
7. The complexity of supply chain.
 - ▶ Inaccurate forecasts, late deliveries, substandard quality, equipment breakdowns, and canceled or changed orders.
8. The need to manage inventories.
 - ▶ Inventory play a major role in the success or failure of a supply chain.
 - ▶ Shortage can severely disrupt the timely flow of work, while excess inventories add unnecessary costs.

Summary

- ▶ The operations function in business organizations is responsible for producing goods and providing services. It is core function of every business.
- ▶ Supply chain are the sequential system of suppliers and customers that begins with basic sources of inputs and ends with final customers of system.
- ▶ Operations and supply chain are interdependent.
- ▶ The focus of both operations management and supply chain management is on managing processes to meet demand in a cost-effective manner.

Summary

- ▶ Operations management involves system design and operating decisions related to product and service design, capacity planning, process selection, location selection, work management, inventory and supply management, production planning, quality assurance, scheduling, and project management.
- ▶ The historical evolution of operations management provides interesting background information on the continuing evolution of this core business function.

Case Study

Hazel

Hazel had worked for the same *Fortune* 500 company for almost 15 years. Although the company had gone through some tough times, things were starting to turn around. Customer orders were up, and quality and productivity had improved dramatically from what they had been only a few years earlier due to a companywide quality improvement program. So it came as a real shock to Hazel and about 400 of her coworkers when they were suddenly terminated following the new CEO's decision to downsize the company.

After recovering from the initial shock, Hazel tried to find employment elsewhere. Despite her efforts, after eight months of searching she was no closer to finding a job than the day she started. Her funds were being depleted and she was getting more discouraged. There was

Case Study



one bright spot, though: She was able to bring in a little money by mowing lawns for her neighbors. She got involved quite by chance when she heard one neighbor remark that now that his children were on their own, nobody was around to cut the grass. Almost jokingly, Hazel asked him how much he'd be willing to pay. Soon Hazel was mowing the lawns of five neighbors. Other neighbors wanted her to work on their lawns, but she didn't feel that she could spare any more time from her job search.

However, as the rejection letters began to pile up, Hazel knew she had to make a decision. On a sunny Tuesday morning, she decided, like many others in a similar situation, to go into business for herself—taking

Case Study

care of neighborhood lawns. She was relieved to give up the stress of job hunting, and she was excited about the prospect of being her own boss. But she was also fearful of being completely on her own. Nevertheless, Hazel was determined to make a go of it.

At first, business was a little slow, but once people realized Hazel was available, many asked her to take care of their lawns. Some people were simply glad to turn the work over to her; others switched from professional lawn care services. By the end of her first year in business, Hazel knew she could earn a living this way. She also performed other services such as fertilizing lawns, weeding gardens, and trimming shrubbery. Business became so good that Hazel hired two part-time workers to assist her and, even then, she believed she could expand further if she wanted to.

Case Study

Questions

1. Hazel is the operations manager of her business. Among her responsibilities are forecasting, inventory management, scheduling, quality assurance, and maintenance.
 - a. What kinds of things would likely requires forecasts?
 - b. What inventory items does Hazel probably have? List one inventory decision she has to make periodically.
 - c. What scheduling must she do? What things might occur to disrupt schedules and cause Hazel to reschedule?
 - d. How important is quality assurance to Hazel's business? Explain.
 - e. What kinds of maintenance must to be performed?

Case Study

Questions

2. All managers have to cope with variations.
 - a. What are the major sources of variation that Hazel has to contend with?
 - b. How might these sources of variation impact Hazel's ability to match supply and demand?
 - c. What are some ways she can cope with variation?