

Operations Management

Operations and Productivity
Chapter 1

Outline

- ◆ PROFILE: HARD ROCK CAFE
- ◆ WHAT IS OPERATIONS MANAGEMENT?
- ◆ ORGANIZING TO PRODUCE GOODS AND SERVICES
- ◆ WHY STUDY OM?
- ◆ WHAT OPERATIONS MANAGERS DO
 - ◆ How This Book Is Organized
- ◆ WHERE ARE THE OM JOBS?

Outline - Continued

- ◆ THE HERITAGE OF OPERATIONS MANAGEMENT
- ◆ OPERATIONS IN THE SERVICE SECTOR
- ◆ EXCITING NEW TRENDS IN OPERATIONS MANAGEMENT
- ◆ THE PRODUCTIVITY CHALLENGE
- ◆ THE CHALLENGE OF SOCIAL RESPONSIBILITY

The Hard Rock Cafe

- ◆ First opened in 1971
 - ◆ Now – 110 restaurants in over 40 countries
- ◆ Rock music memorabilia
- ◆ Creates value in the form of good food and entertainment
- ◆ 3,500+ custom meals per day
- ◆ How does an item get on the menu?
- ◆ Role of the Operations Manager

What Is Operations Management?

Production is the creation of goods and services

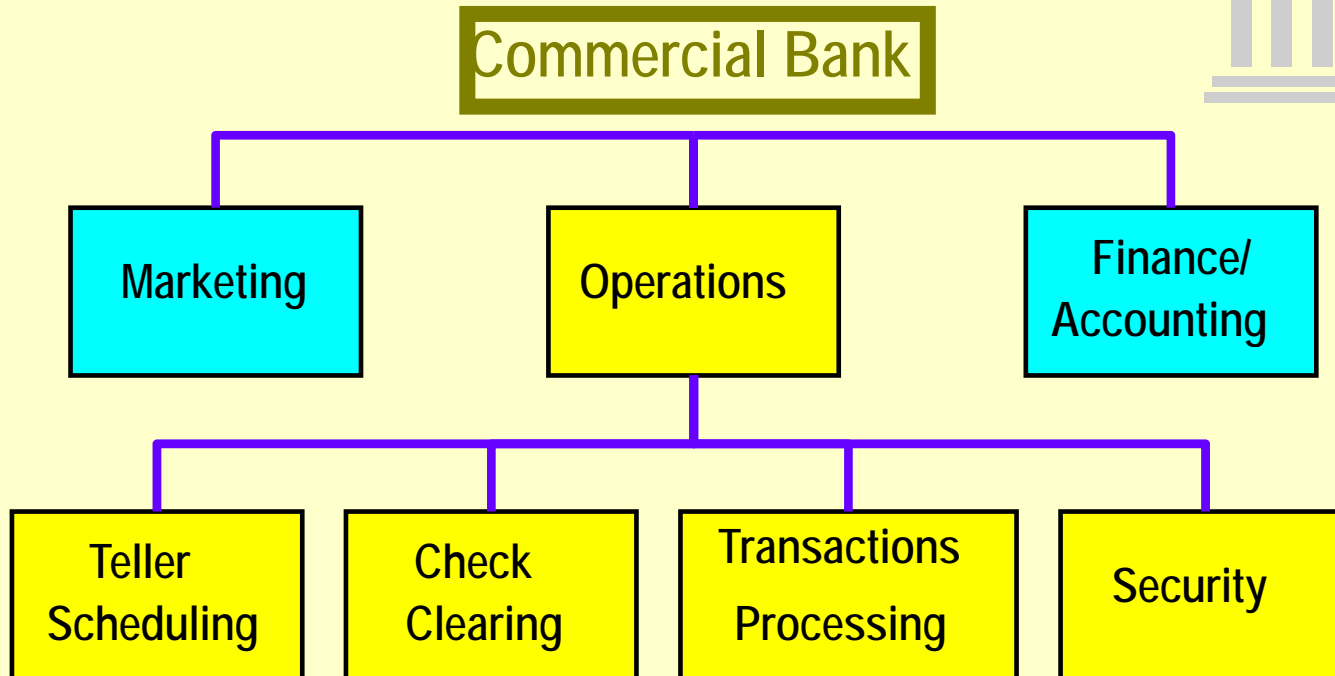
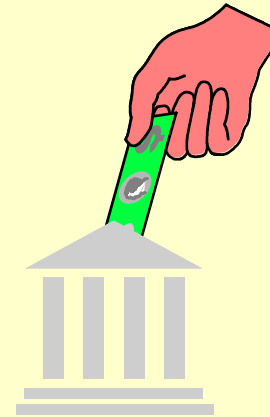
Operations management is the set of activities that creates value in the form of goods and services by transforming inputs into outputs

Organizing to Produce Goods and Services

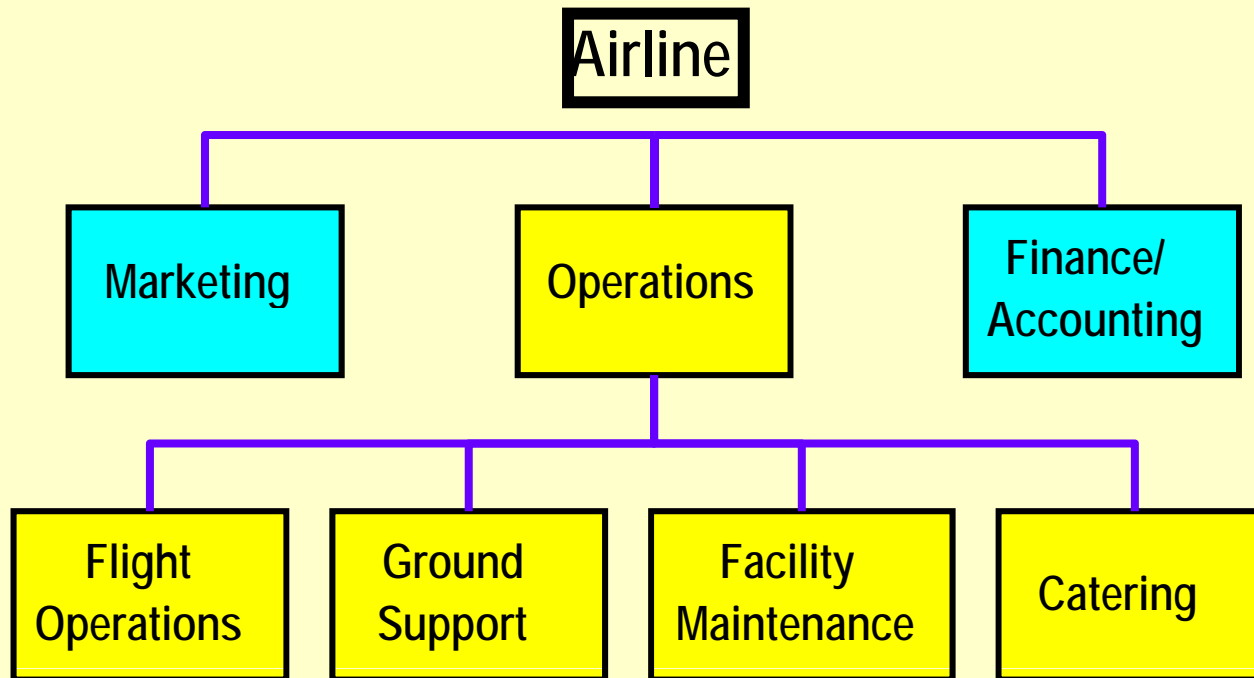
Organizing to Produce Goods and Services

- ◆ Essential functions:
 - ◆ Marketing – generates demand
 - ◆ Operations – creates the product
 - ◆ Finance/accounting – tracks organizational performance, pays bills, collects money

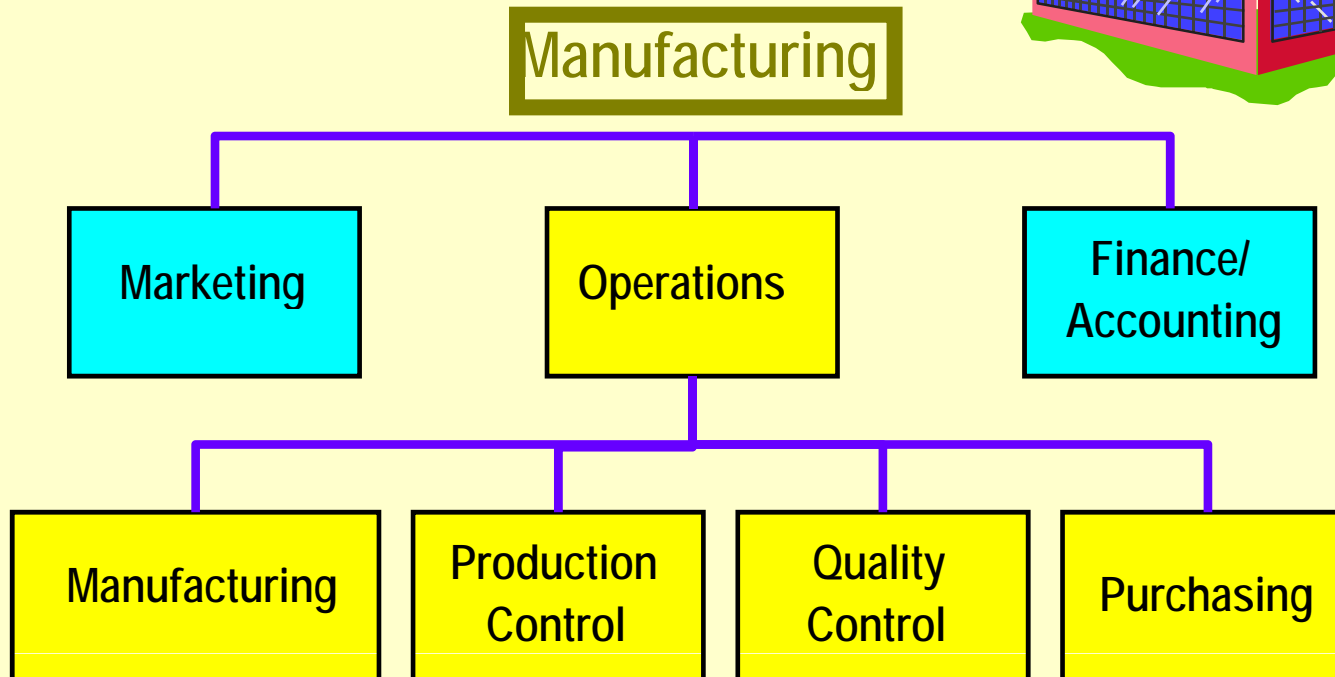
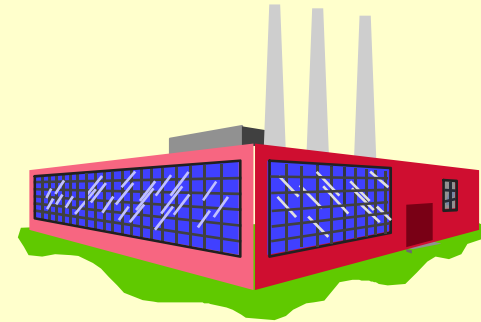
Functions - Bank



Functions - Airline



Functions - Manufacturer



Why Study OM?

Why Study OM?

- ◆ OM is one of three major functions (*marketing, finance, and operations*) of any organization.
- ◆ We want (*and need*) to know how goods and services are produced.
- ◆ We want to understand what operations managers do.
- ◆ OM is such a costly part of an organization.

Options for Increasing Contribution

	Current	Marketing Option Sales Revenue : +50%	Finance & Accounting Option Finance Costs: -50%	OM Option Production Costs: -20%
Sales	\$100,000	\$150,000	\$100,000	\$100,000
Cost of Goods Sold	<u>-80,000</u>	<u>-120,000</u>	<u>-80,000</u>	<u>-64,000</u>
Gross Margin	20,000	30,000	20,000	36,000
Finance Costs	<u>-6,000</u>	<u>-6,000</u>	<u>-3,000</u>	<u>-6,000</u>
Net Margin	14,000	24,000	17,000	30,000
Taxes @ 25%	<u>-3,500</u>	<u>-6,000</u>	<u>-4,250</u>	<u>-7,500</u>
Contribution	10,500	18,000	12,750	22,500

What Operations Managers Do

Plan - Organize - Staff - Lead - Control

Ten Critical Decisions

- ◆ Service, product design.....
- ◆ Quality management.....
- ◆ Process, capacity design.....
- ◆ Location
- ◆ Layout design
- ◆ Human resources, job design.....
- ◆ Supply-chain management.....
- ◆ Inventory management
- ◆ Scheduling
- ◆ Maintenance

The Critical Decisions

- ◆ *Service and product design*
 - ◆ What product or service should we offer?
 - ◆ How should we design these products and services?
- ◆ *Quality management*
 - ◆ Who is responsible for quality?
 - ◆ How do we define quality?

The Critical Decisions - Continued

- ◆ *Process and capacity design*
 - ◆ What processes will these products require and in what order?
 - ◆ What equipment and technology is necessary for these processes?
- ◆ *Location*
 - ◆ Where should we put the facility?
 - ◆ On what criteria should we base this location decision?

The Critical Decisions - Continued

◆ *Layout design*

- ◆ How should we arrange the facility?
- ◆ How large a facility is required?

◆ *Human resources and job design*

- ◆ How do we provide a reasonable work environment?
- ◆ How much can we expect our employees to produce?

The Critical Decisions - Continued

◆ *Supply chain management*

- ◆ Should we make or buy this item?
- ◆ Who are our good suppliers and how many should we have?

◆ *Inventory, material requirements planning,*

- ◆ How much inventory of each item should we have?
- ◆ When do we re-order?

The Critical Decisions - Continued

- ◆ *Intermediate, short term, and project scheduling*
 - ◆ Is subcontracting production a good idea?
 - ◆ Are we better off keeping people on the payroll during slowdowns?
- ◆ *Maintenance*
 - ◆ Who is responsible for maintenance?
 - ◆ When do we do maintenance?

Where are the OM Jobs

Where are the OM Jobs

PLANT MANAGER

Division of Fortune 1000 company seeks plant manager for plant located in the upper Hudson Valley area. This plant manufactures loading dock equipment for commercial markets.

The Candidate must be experienced in plant management including expertise in production planning, purchasing and inventory management. Good written and oral communication skills are a must along with excellent understanding and application skills in managing people.

Director of Purchasing

Well-established full line food distributor is seeking an experienced purchasing agent to support rapidly expanding food service sales. Must have thorough knowledge of day to day purchasing functions, ability to review vendor programs, establish operating par levels, and coordinate activities with operations. The candidate must be prepared to work with vendors to develop Internet catalogues. Must be well versed in all food categories, a team worker, and bottom line oriented. Salary commensurate with experience.

Quality Manager

Several openings exist in our small package processing facilities in the Northeast, Florida, and Southern California for quality managers. These highly visible positions require extensive use of statistical tools to monitor all aspects of service timeliness and workload measurement. The work involves (1) a combination of hands-on applications and detailed analysis using databases and spreadsheets, (2) process audits to identify areas for improvement, and (3) manage implementation of changes. Positions involve night hours and weekends. Send resume.

Process Improvement Consultants

An expanding consulting firm is seeking consultants to design and implement lean production and cycle time reduction plans in both service and manufacturing processes. Our firm is currently working with an international bank to improve its back office operations as well as several manufacturing firms. A business degree required, APICS certification a plus.

Supply Chain Manager and Planner

Responsibilities entail negotiating contracts and establishing long-term relationships with suppliers. We will rely on the selected candidate to maintain accuracy in the purchasing system, invoices, and product returns. A bachelor's degree and up to 2 years related experience are required. Working knowledge of MRP, ability to use feedback to master scheduling and suppliers and consolidate orders for best price and delivery are necessary. Proficiency in all PC Windows applications, particularly Excel and Word, is essential. Knowledge of Oracle business system I is a plus. Effective verbal and written communication skills are essential.

The Heritage of Operations Management

The Heritage of Operations Management

Division of labor (Adam Smith 1776 and Charles Babbage 1852)

Standardized parts (Whitney 1800)

Scientific Management (Taylor 1881)

Coordinated assembly line (Ford/Sorenson/Avery 1913)

Gantt charts (Gantt 1916)

Motion study (Frank and Lillian Gilbreth 1922)

Quality control (Shewhart 1924; Deming 1950)

Computer (Atanasoff 1938)

CPM/PERT (DuPont 1957)

The Heritage of Operations Management - Continued

Material requirements planning (Orlicky 1960)

Computer aided design (CAD 1970)

Flexible manufacturing system (FMS 1975)

Baldrige Quality Awards (1980)

Computer integrated manufacturing (1990)

Globalization(1992)

Internet (1995)

Eli Whitney

- ◆ Born 1765; died 1825
- ◆ In 1798, received government contract to make 10,000 muskets
- ◆ Showed that machine tools could make standardized parts to exact specifications
 - ◆ Musket parts could be used in any musket

Frederick W. Taylor

- ◆ Born 1856; died 1915
- ◆ Known as ‘father of scientific management’
- ◆ In 1881, as chief engineer for Midvale Steel, studied how tasks were done
 - ◆ Began first motion & time studies
- ◆ Created efficiency principles

Taylor: Management Should Take More Responsibility for

- ◆ Matching employees to right job
- ◆ Providing the proper training
- ◆ Providing proper work methods and tools
- ◆ Establishing legitimate incentives for work to be accomplished

Frank & Lillian Gilbreth

- ◆ Frank (1868-1924); Lillian (1878-1972)
- ◆ Husband-and-wife engineering team
- ◆ Further developed work measurement methods
- ◆ Applied efficiency methods to their home & 12 children!
- ◆ (Book & Movie: “Cheaper by the Dozen,” book: “Bells on Their Toes”)

Henry Ford

- ◆ Born 1863; died 1947
- ◆ In 1903, created Ford Motor Company
- ◆ In 1913, first used moving assembly line to make Model T
 - ◆ Unfinished product moved by conveyor past work station
- ◆ Paid workers very well for 1911 (\$5/day!)

W. Edwards Deming

- ◆ Born 1900; died 1993
- ◆ Engineer & physicist
- ◆ Credited with teaching Japan quality control methods in post-WW2
- ◆ Used statistics to analyze process
- ◆ His methods involve workers in decisions

Contributions From

- ◆ Human factors
- ◆ Industrial engineering
- ◆ Management science
- ◆ Biological science
- ◆ Physical sciences
- ◆ Information science

Significant Events in OM

- ◆ Division of labor (Smith, 1776)
- ◆ Standardized parts (Whitney, 1800)
- ◆ Scientific management (Taylor, 1881)
- ◆ Coordinated assembly line (Ford 1913)
- ◆ Gantt charts (Gantt, 1916)
- ◆ Motion study (the Gilbreths, 1922)
- ◆ Quality control (Shewhart, 1924)

Significant Events - Continued

- ◆ CPM/PERT (Dupont, 1957)
- ◆ MRP (Orlicky, 1960)
- ◆ CAD
- ◆ Flexible manufacturing systems (FMS)
- ◆ Manufacturing automation protocol (MAP)
- ◆ Computer integrated manufacturing (CIM)

Operations in the Service Sector

Characteristics of Goods

- ◆ Tangible product
- ◆ Consistent product definition
- ◆ Production usually separate from consumption
- ◆ Can be inventoried
- ◆ Low customer interaction

Characteristics of Service

- ◆ Intangible product
- ◆ Produced & consumed at same time
- ◆ Often unique
- ◆ High customer interaction
- ◆ Inconsistent product definition
- ◆ Often knowledge-based
- ◆ Frequently dispersed

Goods Versus Services

Goods

- ◆ Can be resold
- ◆ Can be inventoried
- ◆ Some aspects of quality measurable
- ◆ Selling is distinct from production

Service

- ◆ Reselling unusual
- ◆ Difficult to inventory
- ◆ Quality difficult to measure
- ◆ Selling is part of service

Goods Versus Services - Continued

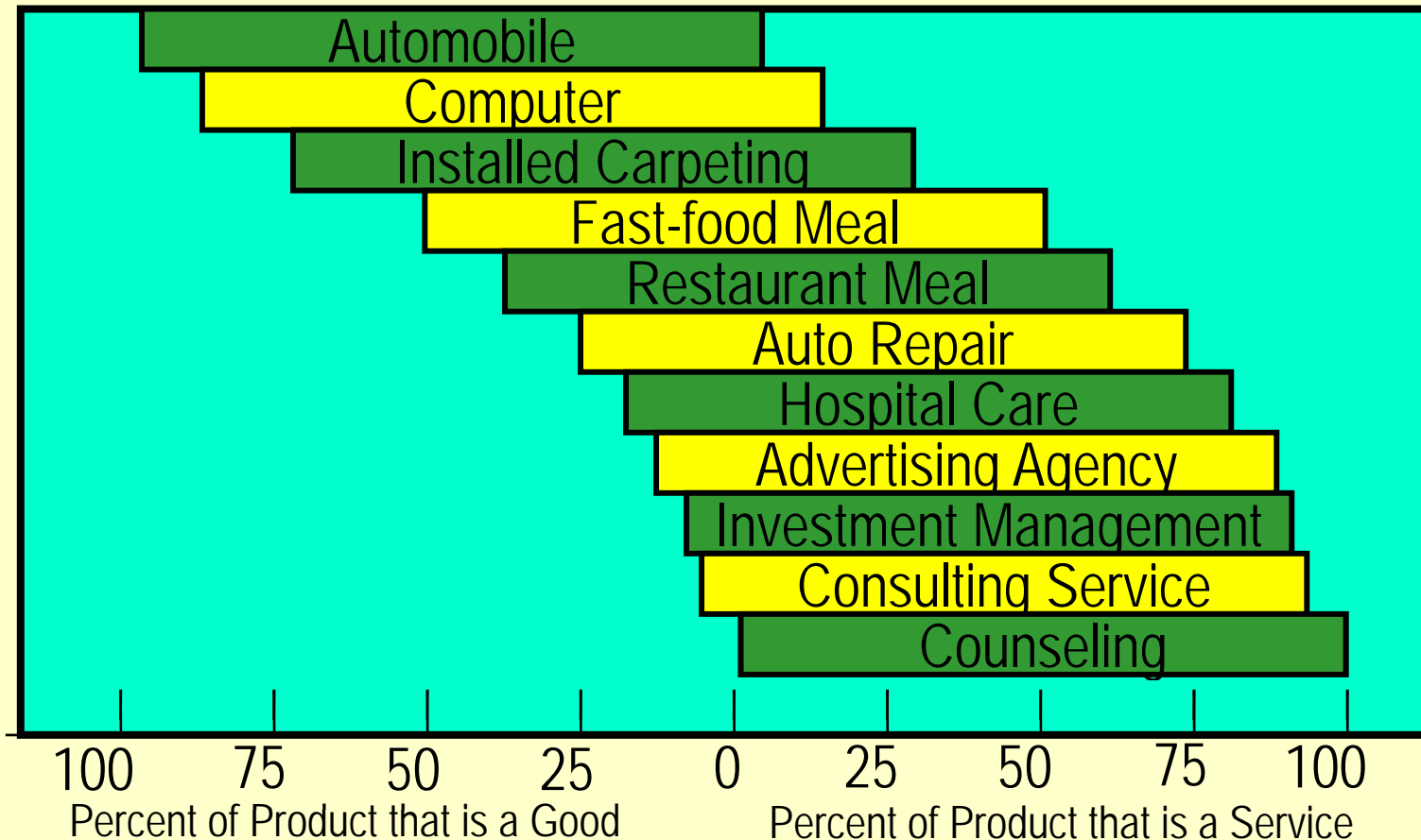
Goods

- ◆ Product is transportable
- ◆ Site of facility important for cost
- ◆ Often easy to automate
- ◆ Revenue generated primarily from tangible product

Service

- ◆ Provider, not product is transportable
- ◆ Site of facility important for customer contact
- ◆ Often difficult to automate
- ◆ Revenue generated primarily from intangible service.

Goods Contain Services / Services Contain Goods



Exciting New Challenges in Operations Management

Changing Challenges for the Operations Manager

Past	Causes	Future
Local or national focus	Low-cost, reliable worldwide communication and transportation networks	Global Focus
Batch (large) shipments	Cost of capital puts pressure on reducing investment in inventory	Just-in-time shipments
Low-bid purchasing	Quality emphasis requires that suppliers be engaged in product improvement	Supply-chain partners
Lengthy product development	Shorter life cycles, rapid international communication, computer-aided design, and international collaboration	Rapid product development, alliances, collaborative designs

Changing Challenges for the Operations Manager

Past	Causes	Future
Standardized products	Affluence and worldwide markets; increasingly flexible production processes	Mass customization
Job specialization	Changing sociocultural milieu. Increasingly a knowledge and information society.	Empowered employees, teams, and lean production
Low cost focus	Environmental issues, ISO 14000, increasing disposal costs	Environmentally sensitive production, Green manufacturing, recycled materials, remanufacturing

The Productivity Challenge

Productivity

- ◆ Measure of process improvement
- ◆ Represents output relative to input

$$\text{Productivity} = \frac{\text{Units produced}}{\text{Input used}}$$

- ◆ Only through productivity increases can our standard of living improve

Multi-factor Productivity

Productivity =

Output

Labor + material + energy + capital + miscellaneous

Measurement Problems

- ◆ *Quality* may change while the quantity of inputs and outputs remains constant
- ◆ *External elements* may cause an increase or decrease in productivity
- ◆ *Precise units* of measure may be lacking

Service Productivity

- ◆ Typically labor intensive
- ◆ Frequently individually processed
- ◆ Often an intellectual task performed by professionals
- ◆ Often difficult to mechanize
- ◆ Often difficult to evaluate for quality

The Challenge of Social Responsibility

Increasing emphasis on business and
social responsibility