



# Chapter 1 - Operations & Productivity

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## **Fundamentals of Operations Management**

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# Learning Objectives

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- Define and explain OM
- Explain the role of OM in business
- Describe the decisions that operations managers make
- Describe the differences between service and manufacturing operations
- Identify major historical developments in OM



# Learning Objectives – con't

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- Identify current trends in OM
- Describe the flow of information between OM and other business functions



# Operations Management is:

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The ***business function*** responsible for  
**planning, coordinating, and**  
**controlling** the resources needed to  
produce products and services for a  
company

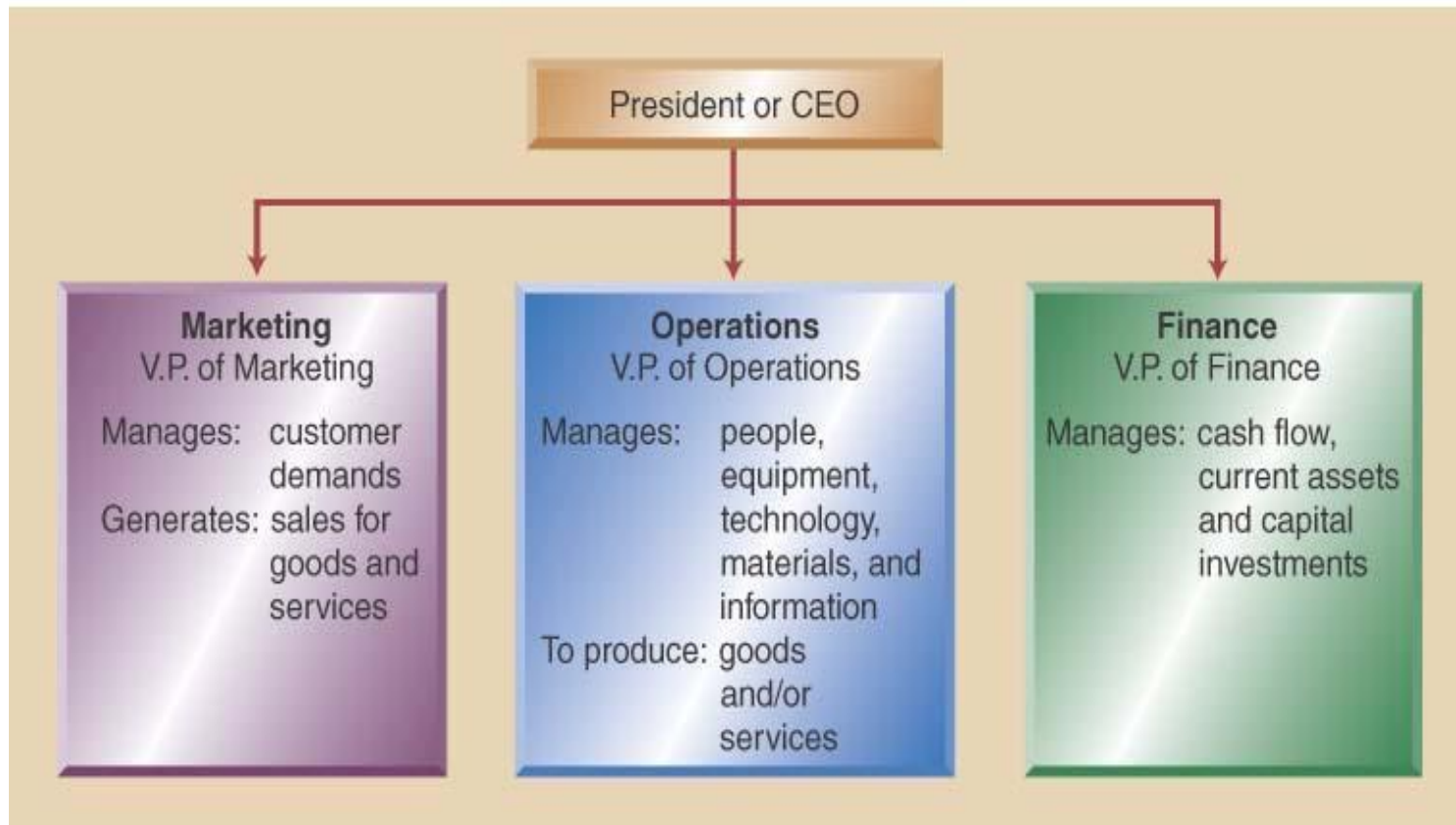


# Operations Management is:

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- A management function
- An organization's core function
- In *every* organization whether Service or Manufacturing, profit or Not for profit

# Typical Organization Chart



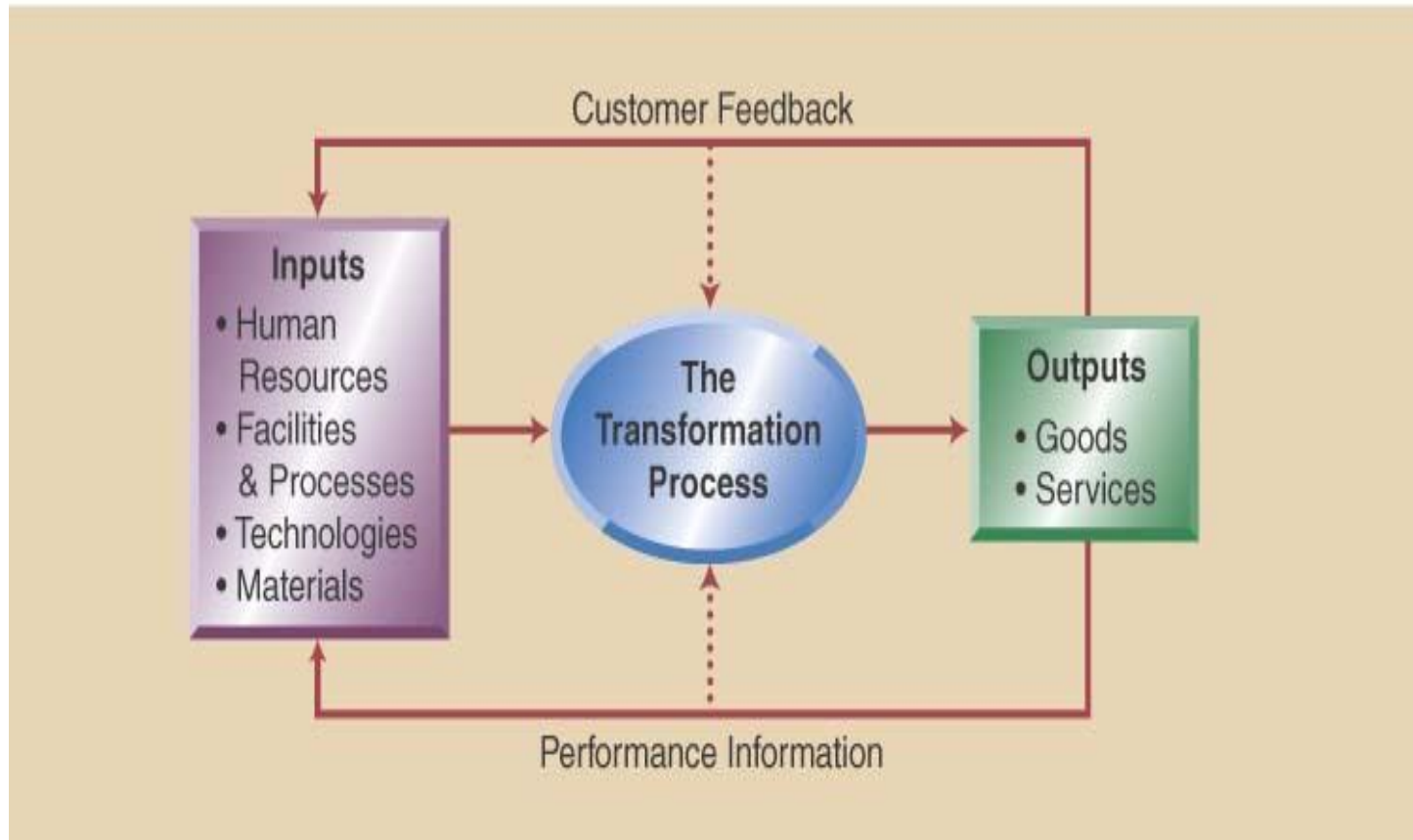


# What is Role of OM?

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- OM Transforms inputs to outputs
  - Inputs are resources such as
    - People, Material, and Money
  - Outputs are goods and services

# OM's Transformation Process







# OM's Objectives & Transformation Role

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- To add value
  - Increase product value at each stage
  - Value added is the net increase between output product value and input material value
- Provide an efficient transformation
  - Efficiency – means performing activities well for least possible cost



# Manufacturers vs Service Organizations

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## ■ **Services:**

- Intangible product
- Product cannot be inventoried
- High customer contact
- Short response time
- Labor intensive

## ■ **Manufacturers:**

- Tangible product
- Product is inventoried
- Low customer contact
- Longer response time
- Capital intensive



# Similarities for Service/Manufacturers

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- Both use technology
- Both have quality, productivity, & response issues
- Both must forecast demand
- Both can have capacity, layout, and location issues
- Both have customers, suppliers, scheduling and staffing issues

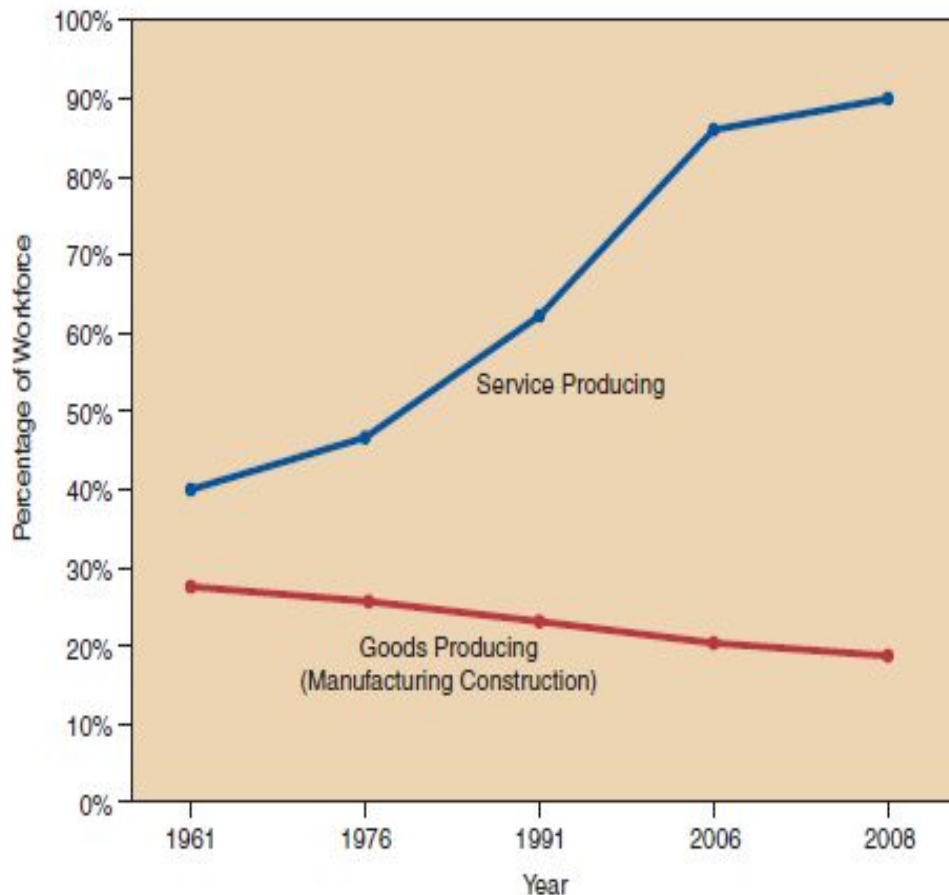


# Service vs Manufacturing

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- Manufacturing often provides services
- Services often provides tangible goods
- Some organizations are a blend of service/manufacturing/quasi-manufacturing
- Quasi-Manufacturing (QM) organizations characteristics include
  - Low customer contact & Capital Intensive (e.g., Postal services)

# Growth of the Service Sector



- Service sector growing to 50-80% of non-farm jobs
- Global competitiveness
- Demands for higher quality
- Huge technology changes
- Time based competition
- Work force diversity

Source: U.S. Department of Commerce



# OM Decisions

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- All organizations make decisions and follow a similar path
  - First decisions very broad – Strategic decisions
    - Strategic Decisions – set the direction for the entire company; they are broad in scope and long-term in nature

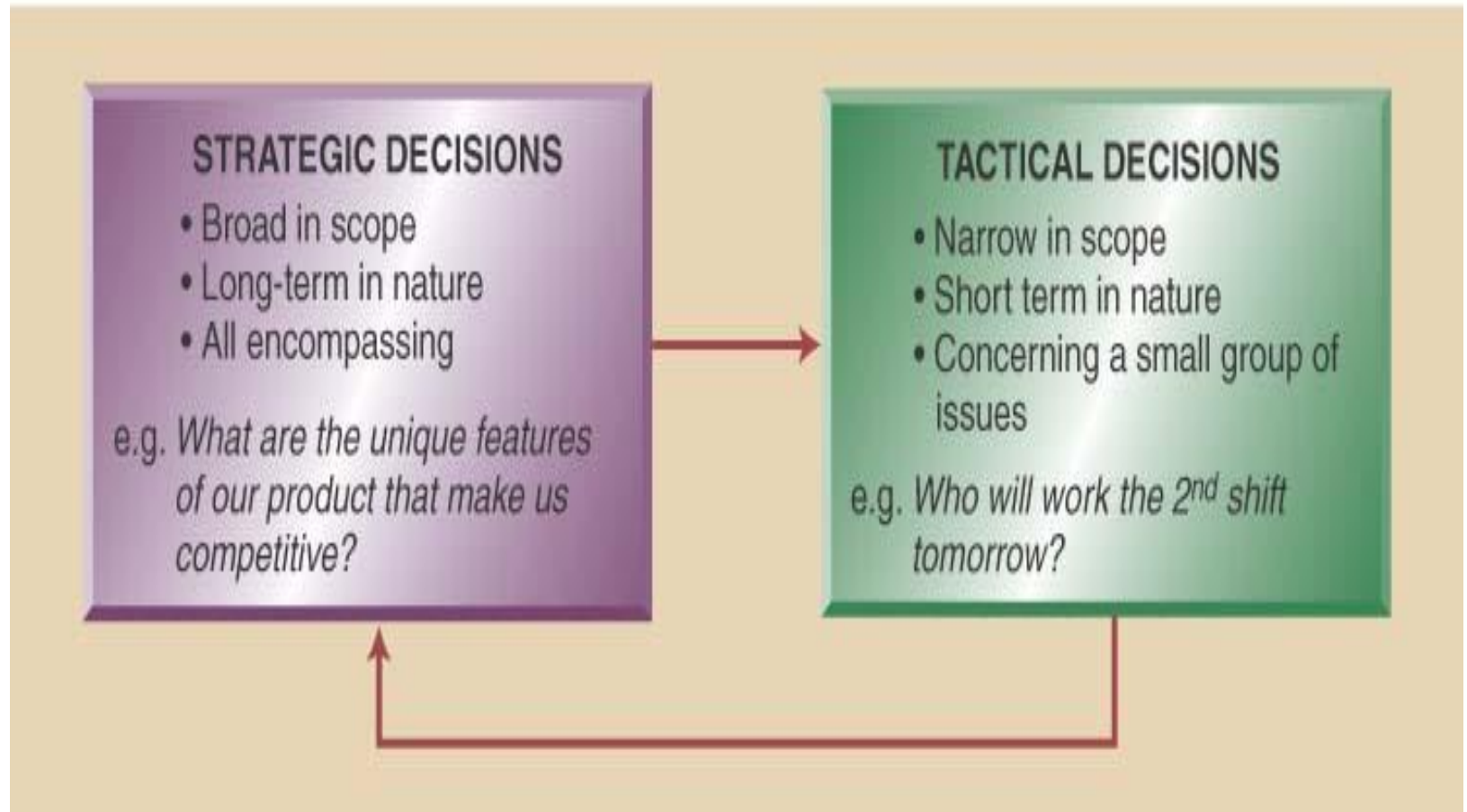


# OM Decisions

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- Following decisions focus on specifics -  
Tactical decision
  - Tactical decisions: focus on specific day-to-day issues like resource needs, schedules, & quantities to produce
  - are frequent
- Strategic decisions less frequent
- Tactical and Strategic decisions must align

# OM Decisions







# Historical Development of OM

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- Industrial revolution                      Late 1700s
- Scientific management                      Early 1900s
- Human relations movement              1930s-60s
- Management science                      1940s-60s
- Computer age                      1960s
- Environmental Issues                      1970s
- JIT & TQM\*                      1980s

\*JIT= Just in Time, TQM= Total Quality Management



# Historical Development con't

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- Reengineering 1990s
- Global competition 1980s
- Flexibility 1990s
- Time-Based Competition 1990s
- Supply chain Management 1990s
- Electronic Commerce 2000s
- Outsourcing & flattening of world 2000s

For long-run success, companies must place much importance on their operations



# Today's OM Environment - Ethics & Social Responsibility

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- Customers demand better quality, greater speed, and lower costs
- Companies implementing lean system concepts – a total systems approach to efficient operations
- Recognized need to better manage information using ERP and CRM systems
- Increased cross-functional decision making

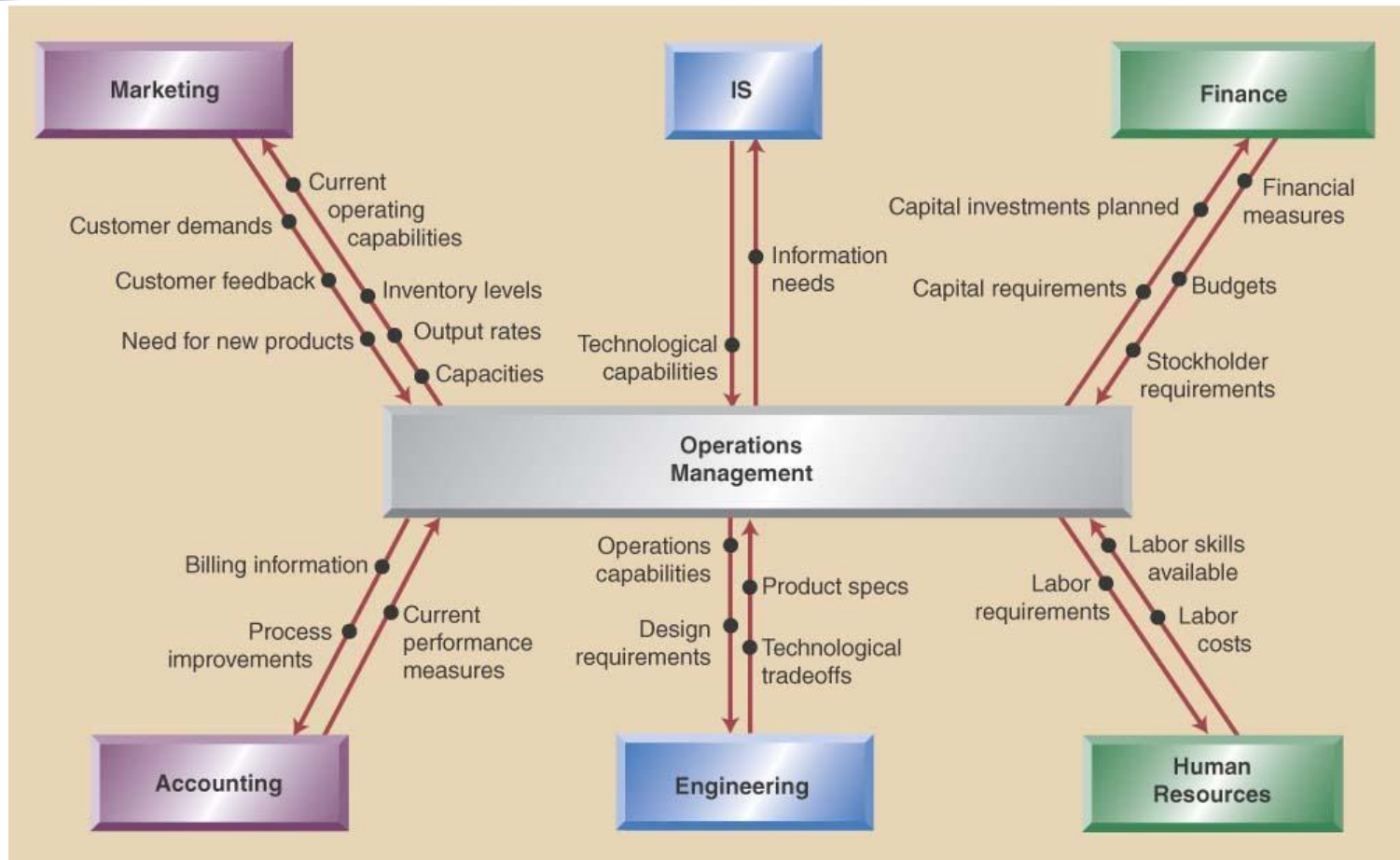


# OM in Practice

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- OM has the most diverse organizational function
- Manages the transformation process
- OM has many faces and names such as;
  - V. P. operations, Director of supply chains, Manufacturing manager
  - Plant manager, Quality specialists, etc.
- All business functions need information from OM in order to perform their tasks

# Business Information Flow





# OM Across the Organization

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- Most businesses are supported by the functions of operations, marketing, and finance
- The major functional areas must interact to achieve the organization goals



# OM Across the Organization – con't

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- Marketing is not fully able to meet customer needs if they do not understand what operations can produce
- Finance cannot judge the need for capital investments if they do not understand operations concepts and needs
- Information systems enables the information flow throughout the organization
- Human resources must understand job requirements and worker skills
- Accounting needs to consider inventory management, capacity information, and labor standards



# Measuring Productivity

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- Productivity is a measure of how efficiently inputs are converted to outputs

**Productivity = \$output/\$input**

- Partial Productivity Measure

**Labor Productivity = Output/Labor input**

**Capital Productivity = Output/Capital input**

**Material Productivity = Output/Material Input**

**Energy Productivity = Output/Energy Input**

- Multi-factor Productivity Measure

**Multi-factor Productivity = Output/(Labor input + Capital Input)**

**Total Factor Productivity = Output/(Labor + Capital + Material + Energy)**



**Productivity Example** - An automobile manufacturer has presented the following data for the past three years in its annual report. As a potential investor, you are interested in calculating yearly productivity and year to year productivity gains as one of several factors in your investment analysis.

|                                    | 2003      | 2002      | 2001      |
|------------------------------------|-----------|-----------|-----------|
| <b>Unit car sales</b>              | 2,700,000 | 2,400,000 | 2,100,000 |
| <b>Employees</b>                   | 112,000   | 113,000   | 115,000   |
| <b>\$ Sales</b><br>(billions\$)    | \$49,000  | \$41,000  | \$38,000  |
| <b>Cost of Sales</b><br>(billions) | \$39,000  | \$33,000  | \$32,000  |

2003   2002   2001

**Partial Prod. Measure**

Unit Car Sales/Employee   24.1   21.2   18.3

Year-to-year Improvement   13.7%   15.8%

**Multifactor Prod. Measures**

Total Cost Productivity   1.26   1.24   1.19

Year-to-year Improvement   1.6%   4.2%

**Which is the best measurement?**



The following data is available about ABC company:

Find partial productivity (labor, energy, capital, & material productivity), total factor productivity and total productivity.

|                      |                                |
|----------------------|--------------------------------|
| Output               | 500 pcs worth Rs. 15000        |
| Material input       | Rs. 300                        |
| Energy Input         | 600 kwhr costing Rs. 1500      |
| Labour input         | 200 man-hours costing Rs. 4500 |
| Capital input        | Rs. 4500                       |
| Other input expenses | Rs. 750                        |



# Interpreting Productivity Measures

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- Productivity measures must be compared to something, i.e. another year, a different company
- Raw productivity calculations do not tell the complete story unless there are no major structure differences.
- In the prior automobile business example, it is obvious that some major changes were taking place to yield 15.8% and 13.7% year-to-year cars/employee productivity improvements. What changes could improve car sales per employee? Automation? Out sourcing? Major re-design?



# Interpreting Productivity Measures

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- Other productivity measure questions:
  - Is this partial productivity measurement enough to make an investment decision?
  - Is the Total Cost Productivity measure a better reflection of year to year productivity at 4.2% and 1.6%. Why?
  - Should you also look at productivity measures for the two major competitors for comparison?
- Productivity measure provides information on how the firm is doing relative to what is critical to the firm



# Critical Factors for Productivity Improvement

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- The three critical factors are labor, capital and the art of Management
- Labor contributes about 10% of annual increase in productivity
- Capital contributes about 38% of annual increase
- Management, contributes about 52% of annual increase (How? Because it is responsible for ensuring that labor and capital are used effectively.)



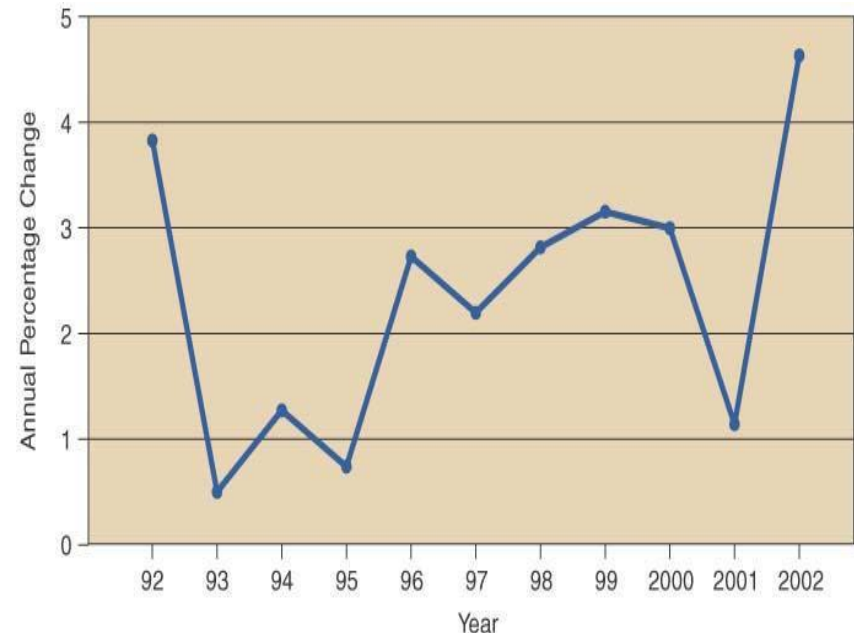
# Critical Factors for Productivity Improvement

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- Labor Productivity can be increased through
  - Skill based training and education
  - Providing healthy food/diet
  - Providing high quality health service
- Capital productivity can be increased through
  - Using latest plants and equipment
  - Use of automation
- Management productivity relies upon
  - Maximum use of knowledge and technology
  - Knowledge is a major competitive resource in post-industrial societies

# Productivity, Competitiveness, and the Service Sector

- Productivity is a scorecard on effective resource use
  - A nation's Productivity effects its standard of living
  - US productivity growth averaged 2.8% from 1948-1973
  - Productivity growth slowed for the next 25 years to 1.1%
  - Productivity growth in service industries has been less than in manufacturing



Source: Bureau of Labor Statistics



# Productivity and the Service Sector con't

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- Measuring service sector productivity is a unique challenge
  - Traditional measures focus on tangible outcomes
  - Service industries primarily produce intangible outcomes
  - Measuring intangibles is challenging





# Chapter 1 Highlights

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- OM is the business function that is responsible for managing and coordinating the resources needed to produce a company's products and services.
- The role of OM is to transform organizational inputs into company's products or services outputs
- OM is responsible for a wide range of decisions, ranging from strategic to tactical.
- Organizations can be divided into manufacturing and service organizations, which differ in the tangibility of the product or service



# Chapter 1 Highlights – con't

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- Many historical milestones have shaped OM. Some of these are the Industrial Revolution, scientific management, the human relations movement, management science, and the computer age
- OM is highly important function in today's dynamic business environment. Among the trends with significant impact are just-in-time, TQM, reengineering, flexibility, time-based competition, SCM, global marketplace, and environmental issues
- OM works closely with all other business functions



# The End

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