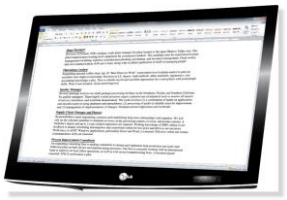
Principles of Operations Management: Sustainability and Supply Chain Management

Twelfth Edition, Global Edition



Chapter 1

Operations and Productivity

1

Outline

- **Global Company Profile**: *Hard Rock Cafe*
- What Is Operations Management?
- Organizing to Produce Goods and Services
- The Supply Chain
- Why Study OM?
- What Operations Managers Do

2

Outline (continued)

- The Heritage of Operations Management
- Operations for Goods and Services
- The Productivity Challenge
- Current Challenges in Operations Management
- Ethics, Social Responsibility, and Sustainability

3

Operations Management at Hard Rock Cafe

- First opened in 1971
  - Now - 25 hotels,185 restaurants and 12 casinos in over 74 countries
- Rock music memorabilia
- Creates value in the form of good food and entertainment
- 3,500+ custom meals per day in Orlando
- How does an item get on the menu?
- Role of the Operations Manager

4

Learning Objectives

When you complete this chapter you should be able to:

1.1 ***Define*** operations management

1.2 ***Identify*** the 10 strategic decisions of operations management

1.3 ***Identify*** career opportunities in operations management

1.4 ***Explain*** the distinction between goods and services

5

Learning Objectives (continued)

When you complete this chapter you should be able to:

1.5 ***Explain*** the difference between production and productivity

1.6 ***Compute*** single-factor productivity

1.7 ***Compute*** multifactor productivity

1.8 ***Identify*** the critical variables in enhancing productivity

6

What Is Operations Management?

- **Production** is the creation of goods and services
- **Operations management (OM)** is the set of activities that creates value in the form of goods and services by transforming inputs into outputs

7

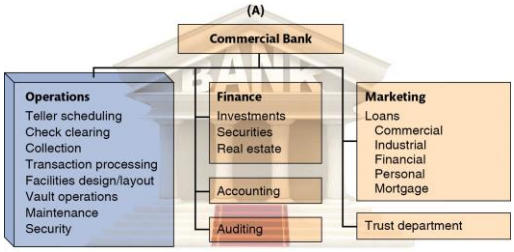
Organizing to Produce Goods and Services

- Essential functions:
  1. ***Marketing*** – generates demand
  2. ***Production/operations*** – creates the product
  3. ***Finance/accounting*** – tracks how well the organization is doing, pays bills, collects the money

8

Organization Charts (1 of 3)

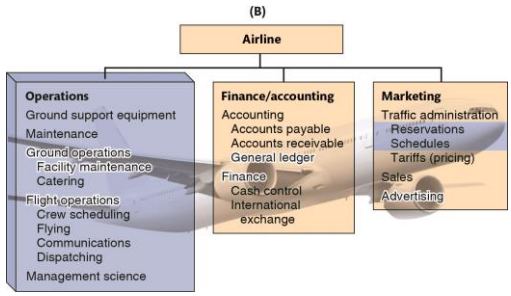
Figure 1.1



9

Organization Charts (2 of 3)

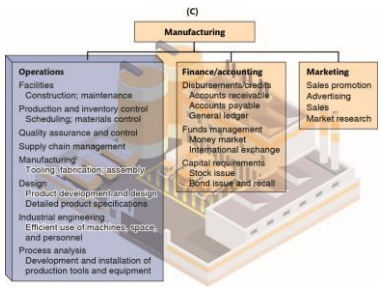
Figure 1.1



10

Organization Charts (3 of 3)

Figure 1.1

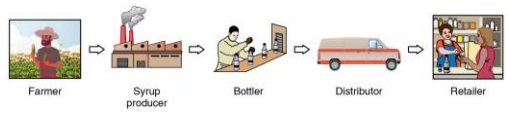


11

The Supply Chain

- A global network of organizations and activities that supplies a firm with goods and services
- Members of the supply chain collaborate to achieve high levels of customer satisfaction, efficiency, and competitive advantage

Figure 1.2



12

Why Study OM?

1. OM is one of three major functions of any organization; we want to study *how people organize themselves for productive enterprise*
2. We want (*and need*) to know *how goods and services are produced*
3. We want to *understand what operations managers do*
4. OM *is such a costly part of an organization*

13

Options for Increasing Contribution

Table 1.1

		MARKETING OPTION [a]	FINANCE/ ACCOUNTING OPTION [b]	OM OPTION [c]
	CURRENT	INCREASE SALES REVENUE 50%	REDUCE FINANCE COSTS 50%	REDUCE PRODUCTION COSTS 20%
Sales	$100,000	$100,000	$100,000	$100,000
Costs of goods	−80,000	−120,000	−80,000	−64,000
Gross margin	20,000	30,000	20,000	36,000
Finance costs	−6,000	−6,000	−3,000	−6,000
Subtotal	14,000	24,000	17,000	30,000
Taxes at 25%	−3,500	−6,000	−4,250	−7,500
Contribution[d]	$ 10,500	$ 18,000	$ 12,750	$ 22,500

[a] Increasing sales 50% increases contribution by $7,500, or 71% (7,500 / 10,500).

[b] Reducing finance costs 50% increases contribution by $2,250, or 21% (2,250 / 10,500).

[c] Reducing production costs 20% increases contribution by $12,000, or 114% (12,000 / 10,500).

[d] Contribution to fixed cost (excluding finance costs) and profit.

14

What Operations Managers Do

Basic Management Functions

- Planning
- Organizing
- Staffing
- Leading
- Controlling

15

Ten Strategic Decisions

Table 1.2

DECISION	CHAPTER(S)
1. *Design of goods and services*	5, Supplement 5
2. *Managing quality*	6, Supplement 6
3. *Process and capacity strategy*	7, Supplement 7
4. *Location strategy*	8
5. *Layout strategy*	9
6. *Human resources and job design*	10
7. *Supply-chain management*	11, Supplement 11
8. *Inventory management*	12, 14, 16
9. *Scheduling*	13, 15
10. *Maintenance*	17

16

The Strategic Decisions (1 of 5)

1. **Design of goods and services**
   - Defines what is required of operations
   - Product design determines cost, quality, sustainability and human resources
2. **Managing quality**
   - Determine the customer's quality expectations
   - Establish policies and procedures to identify and achieve that quality

17

The Strategic Decisions (2 of 5)

3. **Process and capacity design**
   - How is a good or service produced?
   - Commits management to specific technology, quality, human resources, and investments
4. **Location strategy**
   - Nearness to customers, suppliers, and talent
   - Considering costs, infrastructure, logistics, and government

18

The Strategic Decisions (3 of 5)

5. **Layout strategy**
   - Integrate capacity needs, personnel levels, technology, and inventory
   - Determine the efficient flow of materials, people, and information
6. **Human resources, job design and work management**
   - Recruit, motivate, and retain personnel with the required talent and skills
   - Integral and expensive part of the total system design

19

The Strategic Decisions (4 of 5)

7. **Supply chain management**
   - Integrate supply chain into the firm's strategy
   - Determine what is to be purchased, from whom, and under what conditions
8. **Inventory management**
   - Inventory ordering and holding decisions
   - Optimize considering customer satisfaction, supplier capability, and production schedules

20

The Strategic Decisions (5 of 5)

9. **Scheduling**
   - Determine and implement intermediate- and short-term schedules
   - Utilize personnel and facilities while meeting customer demands
10. **Maintenance**
   - Consider facility capacity, production demands, and personnel
   - Maintain a reliable and stable process

21

Where are the OM Jobs?

- Introducing new technologies and methods
- Improving facility location and space utilization
- Defining and implementing operations strategy
- Improving response time
- Developing people and teams
- Improving customer service
- Managing quality
- Managing and controlling inventory
- Enhancing productivity

22

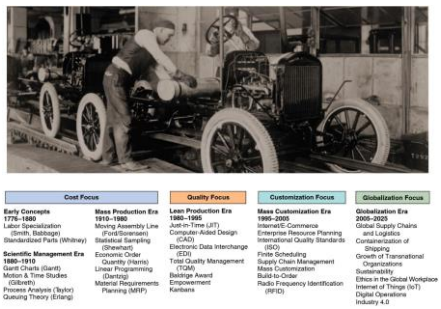
Certifications

- Association for Supply Chain Management (ASCM/APICS)
- American Society for Quality (ASQ)
- Institute for Supply Management (ISM)
- Project Management Institute (PMI)
- Council of Supply Chain Management Professionals

23

Significant Events in OM

Figure 1.3



24

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

25

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 and time studies
- Created efficiency principles

26

Taylor's Principles

Management Should Take More Responsibility for:

1. Matching employees to right job
2. Providing the proper training
3. Providing proper work methods and tools
4. Establishing legitimate incentives for work to be accomplished

27

Frank and Lillian Gilbreth

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

28

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!)

29

W. Edwards Deming

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

30

OM Relies on Contributions From

- Industrial engineering
- Statistics
- Management
- Analytics
- Economics
- Physical sciences
- Information technology

Operations for Goods and Services

Services – Economic activities that typically produce an intangible product (such as education, entertainment, lodging, government, financial, and health services)

Operations for Goods and Services (continued)

- Manufacturers produce tangible product, services often intangible
- Operations activities are performed in both manufacturing and services
- Distinction not always clear
- Few pure services

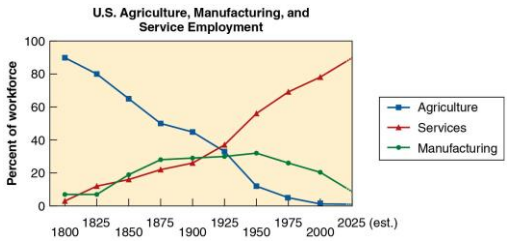
Differences Between Goods and Services

Table 1.3

CHARACTERISTICS OF SERVICES	CHARACTERISTICS OF GOODS
Intangible: Ride in an airline seat	Tangible: The seat itself
Produced and consumed simultaneously: Beauty salon produces a haircut that is consumed as it is produced	Product can usually be kept in inventory (beauty care products)
Unique: Your investments and medical care are unique	Similar products produced (iPads, earbuds)
High customer interaction: Often what the customer is paying for (consulting, education)	Limited customer involvement in production
Inconsistent product definition: Auto Insurance changes with age and type of car	Product standardized (iPhone)
Often knowledge based: Legal, education, and medical services are hard to automate	Standard tangible product tends to make automation feasible
Services dispersed: Service may occur at retail store, local office, house call, or via Internet	Product typically produced at a fixed facility
Quality may be hard to evaluate: Consulting, education, and medical services	Many aspects of quality for tangible products are easy to evaluate (strength of a bolt)
Reselling is unusual: Musical concert or medical care	Product often has some residual value

U.S. Agriculture, Manufacturing, and Service Employment

Figure 1.4



Organizations in Each Sector

Table 1.4

SECTOR	EXAMPLE	PERCENTAGE OF ALL JOBS	
Service Sector			
Education, Medical, Other	San Diego State University, Arnold Palmer Hospital	14.9	
Trade (retail, wholesale), Transportation, Utilities	Walgreen's, Walmart, Nordstrom, Alaska Airlines	17.0	
Information, Publishers, Broadcast	IBM, Bloomberg, Pearson, ESPN	1.8	
Professional, Legal, Business Services, Associations	Snelling and Snelling, Waste Management, American Medical Association, Ernst & Young	17.2	85.7
Finance, Insurance, Real Estate	Citicorp, American Express, Prudential, Aetna	10.8	
Leisure, Lodging, Entertainment	Red Lobster, Motel 6, Celebrity Cruises	10.2	
Government (Fed, State, Local)	U.S., State of Alabama, Cook County	13.8	
Manufacturing Sector	General Electric, Ford, U.S. Steel, Intel		7.9
Construction Sector	Bechtel, McDermott		4.6
Agriculture	King Ranch		1.4
Mining Sector	Homestake Mining		0.4
Grand Total			100.0

***Source*:** Bureau of Labor Statistics, 2020.

Service Pay

- Perception that services are low-paying
- 42% of service workers receive above average wages
- 14 of 33 service industries pay below average
- Retail trade pays only 61% of national average
- Overall average wage is 96% of the average

37

Productivity Challenge

Productivity is the ratio of outputs (goods and services) divided by the inputs (resources such as labor and capital)

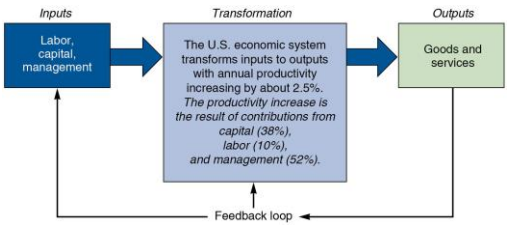
The objective is to improve productivity!

Important Note! Production is a measure of output only and not a measure of efficiency

38

The Economic System

Figure 1.5



39

Improving Productivity at Starbucks

A team of 10 analysts continually look for ways to shave time. Some improvements:

Stop requiring signatures on credit card purchases under $25	Saved 8 seconds per transaction
Change the size of the ice scoop	Saved 14 seconds per drink
New espresso machines	Saved 12 seconds per shot

40

Improving Productivity at Starbucks (continued)

A team of 10 analysts continually look for ways to shave time. Some improvements:

Stop requiring signatures on credit card purchases under $25	Saved 8 seconds per transaction
Change the size of the ice scoop	Saved 14 seconds per drink
New espresso machines	Saved 12 seconds per shot

Operations improvements have helped Starbucks increase yearly revenue per outlet by $250,000 to $1,000,000.

Productivity has improved by 27%, or about 4.5% per year.

41

Productivity

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

- Measure of process improvement
- Represents output relative to input
- Only through productivity increases can our standard of living improve

42

Productivity Calculations

Labor Productivity

$$\text{Productivity} = \frac{\text{Units produced}}{\text{Labor – hours used}}$$

$$= \frac{1{,}000}{250} = 4 \text{ units / labor – hour}$$

One resource input ⇨ single-factor productivity

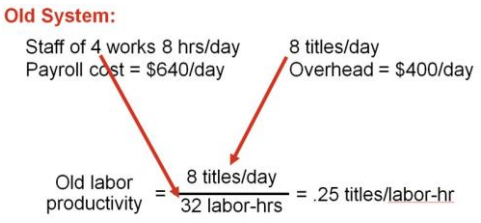
Multi-Factor Productivity

$$\text{Multifactor} = \frac{\text{Output}}{\text{Labor + Material + Energy + Capital + Miscellaneous}}$$

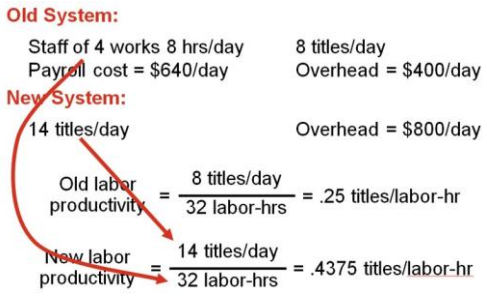
- Also known as total factor productivity
- Output and inputs are often expressed in dollars

Multiple resource inputs ⇨ multi-factor productivity

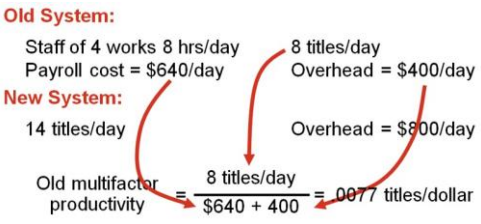
Collins Title Productivity (1 of 4)



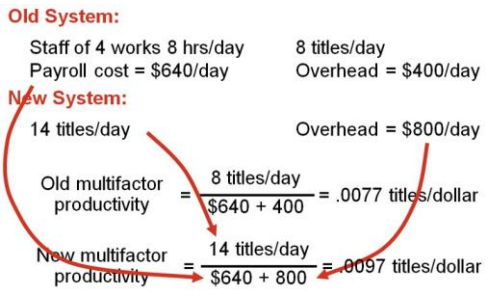
Collins Title Productivity (2 of 4)



Collins Title Productivity (3 of 4)



Collins Title Productivity (4 of 4)



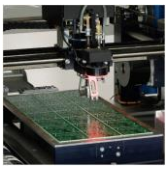
Measurement Problems

- ***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

49

Productivity Variables

1. ***Labor*** - contributes about 10% of the annual increase
2. ***Capital*** - contributes about 38% of the annual increase
3. ***Management*** - contributes about 52% of the annual increase



50

Key Variables for Improved Labor Productivity

1. Basic education appropriate for the labor force
2. Diet of the labor force
3. Social overhead that makes labor available
   - Challenge is in maintaining and enhancing skills in the midst of rapidly changing technology and knowledge

51

Maintaining and Enhancing the Skills of Labor

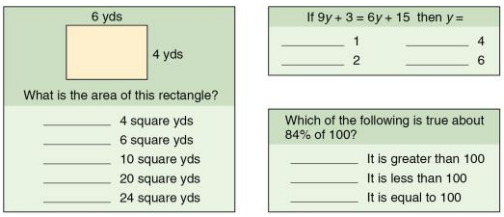
- Major challenge in developed nations
- About one-third of American job applicants tested for basic skills were deficient in reading, writing, or math
- Implications for nation's competitiveness
- Better utilized labor with a stronger commitment is necessary

52

Labor Skills

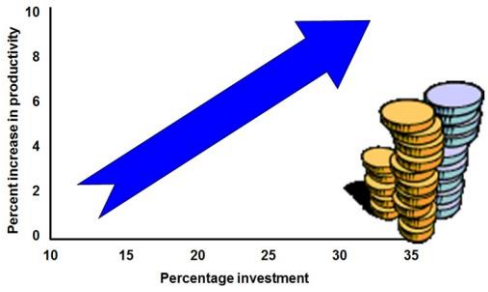
About half of the 17-year-olds in the U.S. cannot correctly answer questions of this type

Figure 1.6



53

Capital



54

Management

- Ensures labor and capital are effectively used to increase productivity
  - Use of knowledge
  - Application of technologies
- Knowledge societies
  - Labor has migrated from manual work to technical and information-processing tasks
- More effective use of technology, knowledge, and capital

55

Productivity in the Service Sector

- Productivity improvement in services is difficult because:
  1. Typically labor intensive
  2. Frequently focused on unique individual attributes or desires
  3. Often an intellectual task performed by professionals
  4. Often difficult to mechanize and automate
  5. Often difficult to evaluate for quality

56

Productivity at Taco Bell

Improvements:

- Revised the menu
- Designed meals for easy preparation
- Shifted some preparation to suppliers
- Efficient layout and automation
- Training and employee empowerment
- New water and energy saving grills

57

Productivity at Taco Bell (continued)

Results:

- Preparation time cut to 8 seconds
- Management span of control increased from 5 to 30
- In-store labor cut by 15 hours/day
- Floor space reduced by more than 50%
- Stores average 164 seconds/customer from drive-up to pull-out
- Water- and energy-savings grills conserve 300 million gallons of water and 200 million KwH of electricity each year
- Green-inspired cooking method saves 5,800 restaurants $17 million per year

58

Current Challenges in OM

- Globalization
- Supply-chain partnering
- Sustainability
- Technological change
- Mass customization
- Lean operations

59

Ethics, Social Responsibility, and Sustainability

Challenges facing operations managers:

- Develop and produce safe, high-quality green products
- Train, retrain, and motivate employees in a safe workplace
- Honor stakeholder commitments

60

Ethics, Social Responsibility, and Sustainability (continued)

Stakeholders

Those with a vested interest in an organization, including customers, distributors, suppliers, owners, lenders, employees, and community members.

Copyright