Learning Objectives

- Define
  - Operations Management & Supply Chain
- Identify
  - Similarities & Differences across Products and Services
  - Functional areas of organization and their inter relation
- Explain & Summarize
  - Importance of learning O&SCM
  - Aspects of process management
  - Current issues
  - Need to manage

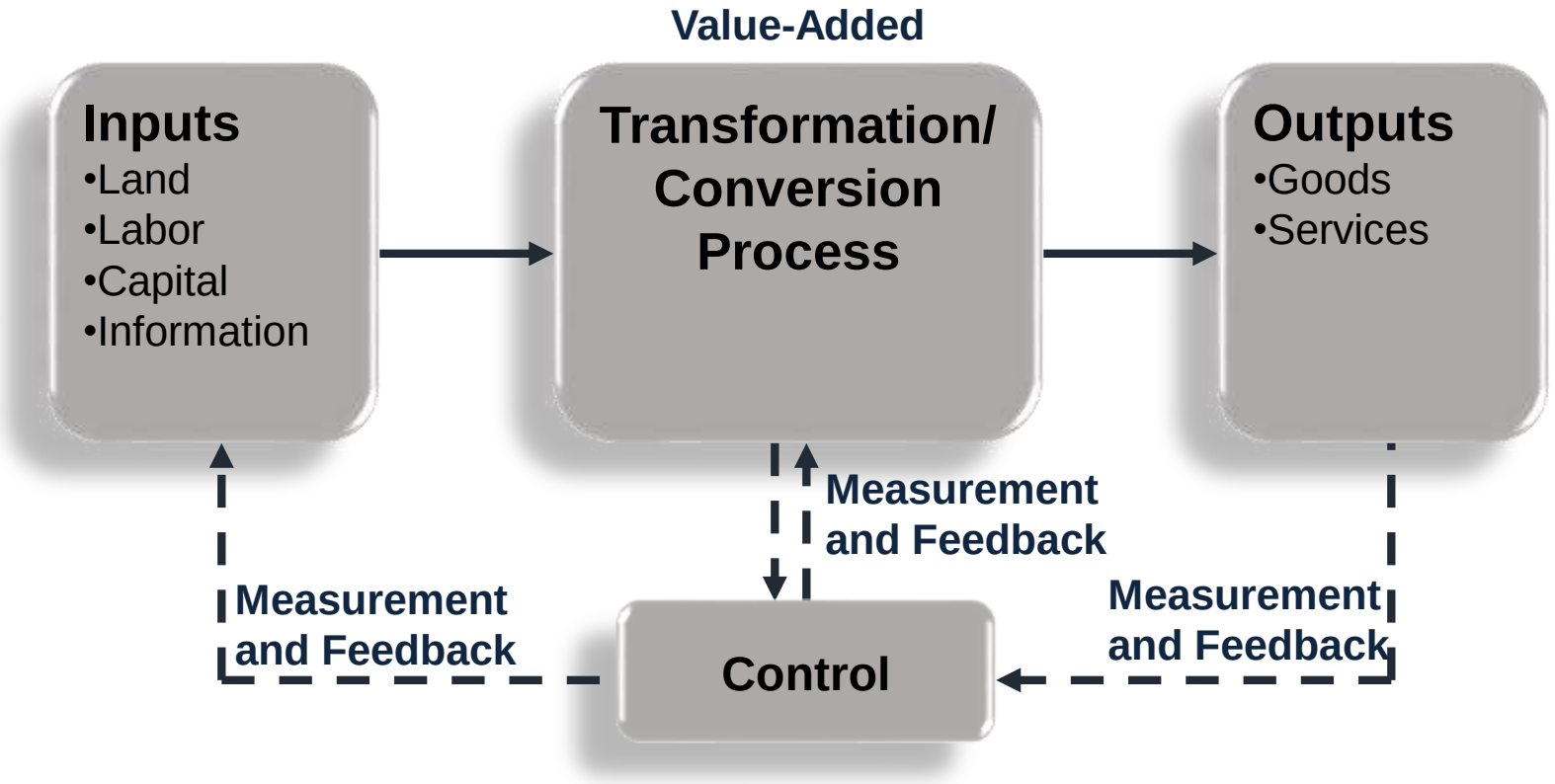
Background

- What are (business) organizations?

  Productive activity = F(Land, labour, capital, entrepreneurship)

- Why do they exist?

The Transformation Process



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.

Transformation Process

- *Physical:* as in manufacturing operations
- *Locational:* as in transportation or warehouse operations
- *Exchange:* as in retail operations
- *Physiological:* as in health care
- *Psychological:* as in entertainment
- *Informational:* as in communication

Manufacturing vs. Service

Pick a few business organizations and ask:

1. Degree of customer contact
2. Uniformity of input
3. Labor content of jobs
4. Uniformity of output
5. Measurement of productivity
6. Production and delivery
7. Quality assurance
8. Amount of inventory
9. Evaluation of work
10. Ability to patent design

Good or Service?

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

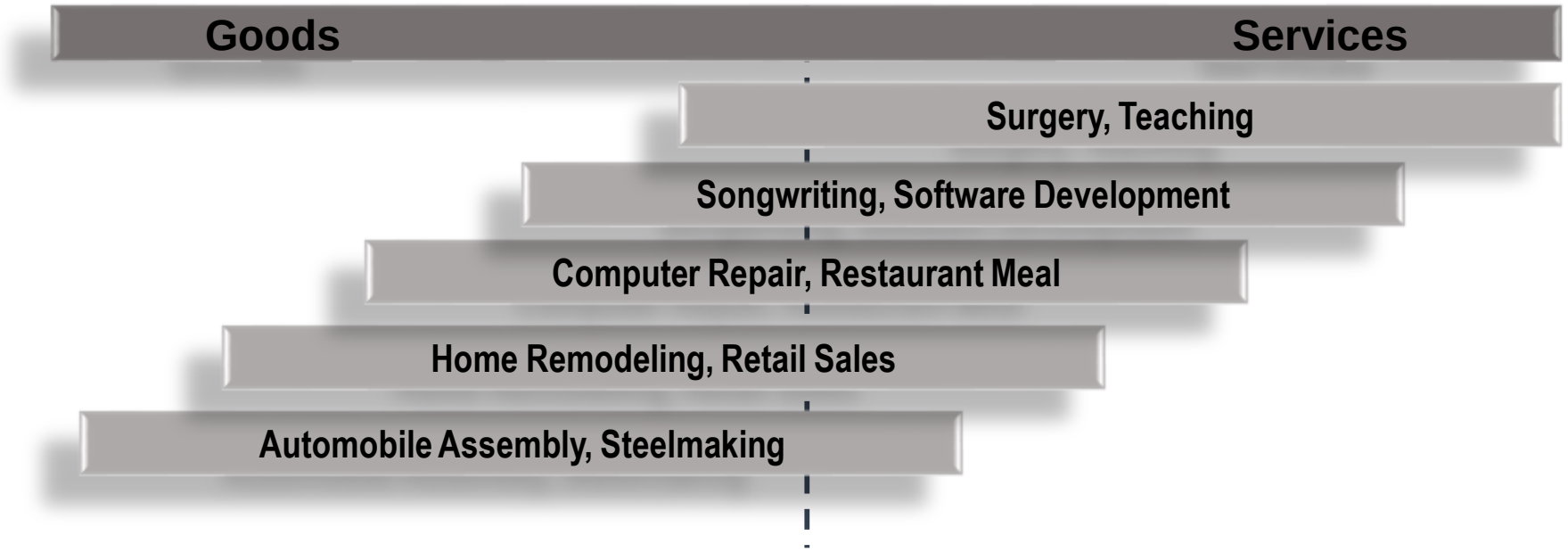
- Automobile
- Computer
- Oven
- Shampoo

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

- Air travel
- Education
- Haircut
- Legal counsel

Goods-service Continuum

Products are typically neither purely service- or purely goods-based.

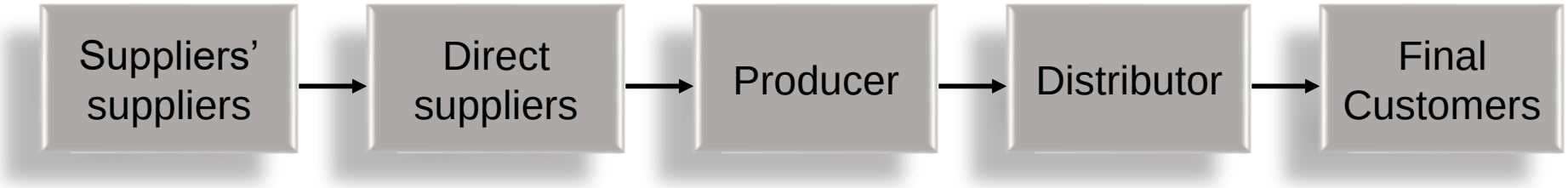


Operations Management

- 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

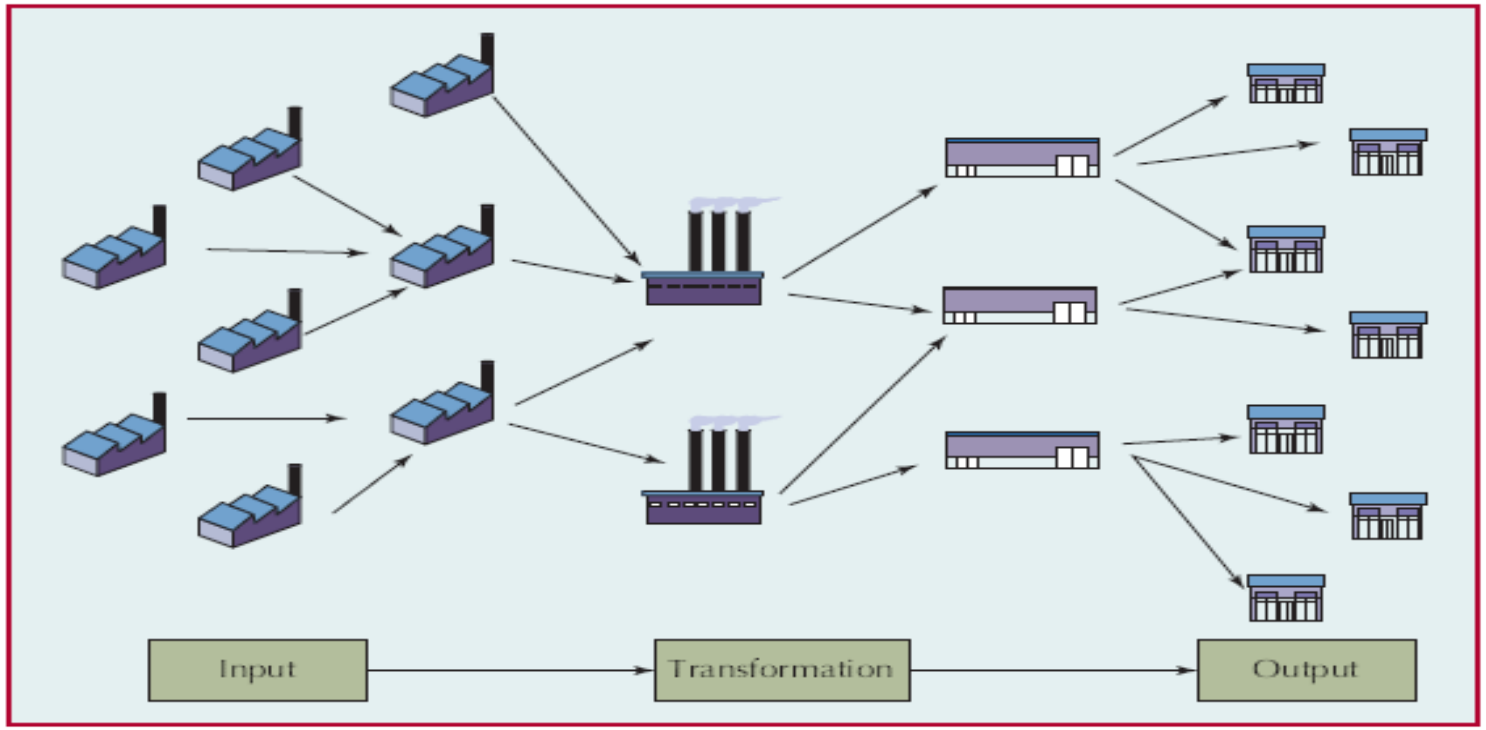
Supply Chain

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



Supply chain management

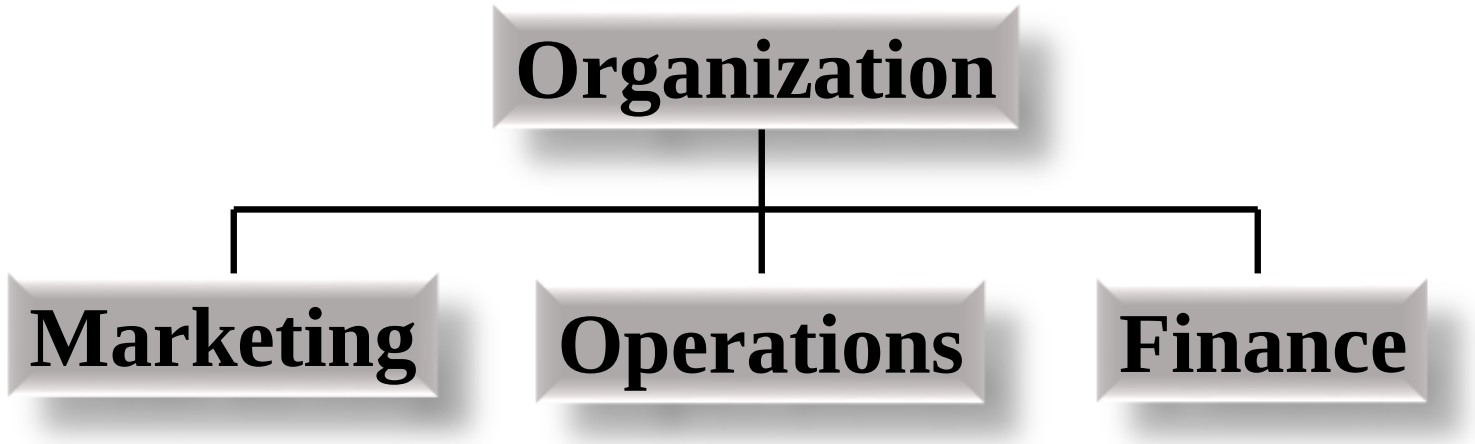
- management of the flow of information, products, and services across a network of customers, enterprises, and supply chain partners



Why Study Operations Management?

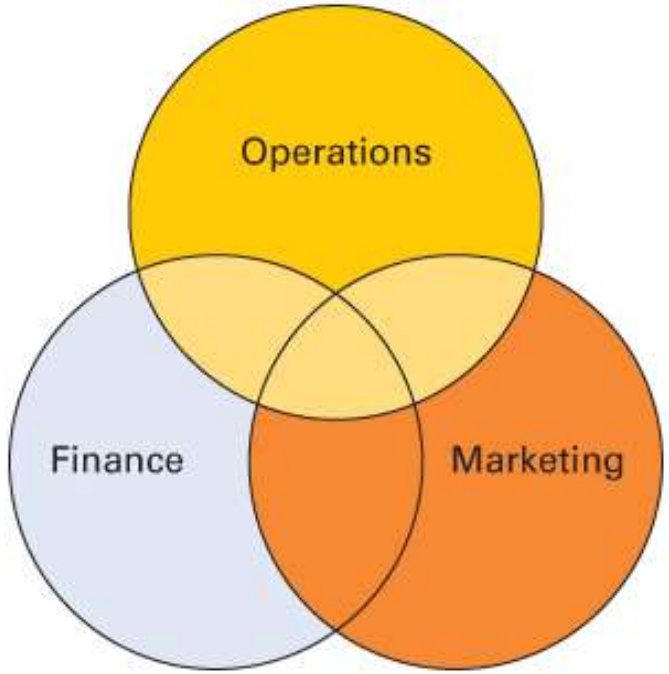
- Every aspect of business affects or is affected by operations
- Many service jobs are closely related to operations
  - Financial services
  - Marketing services
  - Accounting services
  - Information services
- Through learning about operations and supply chains you will have a better understanding of:
  - The world you live in
  - The global dependencies of companies and nations
  - Reasons that companies succeed or fail
  - The importance of working with others

Basic Functions of the Business Organization



Function Overlap

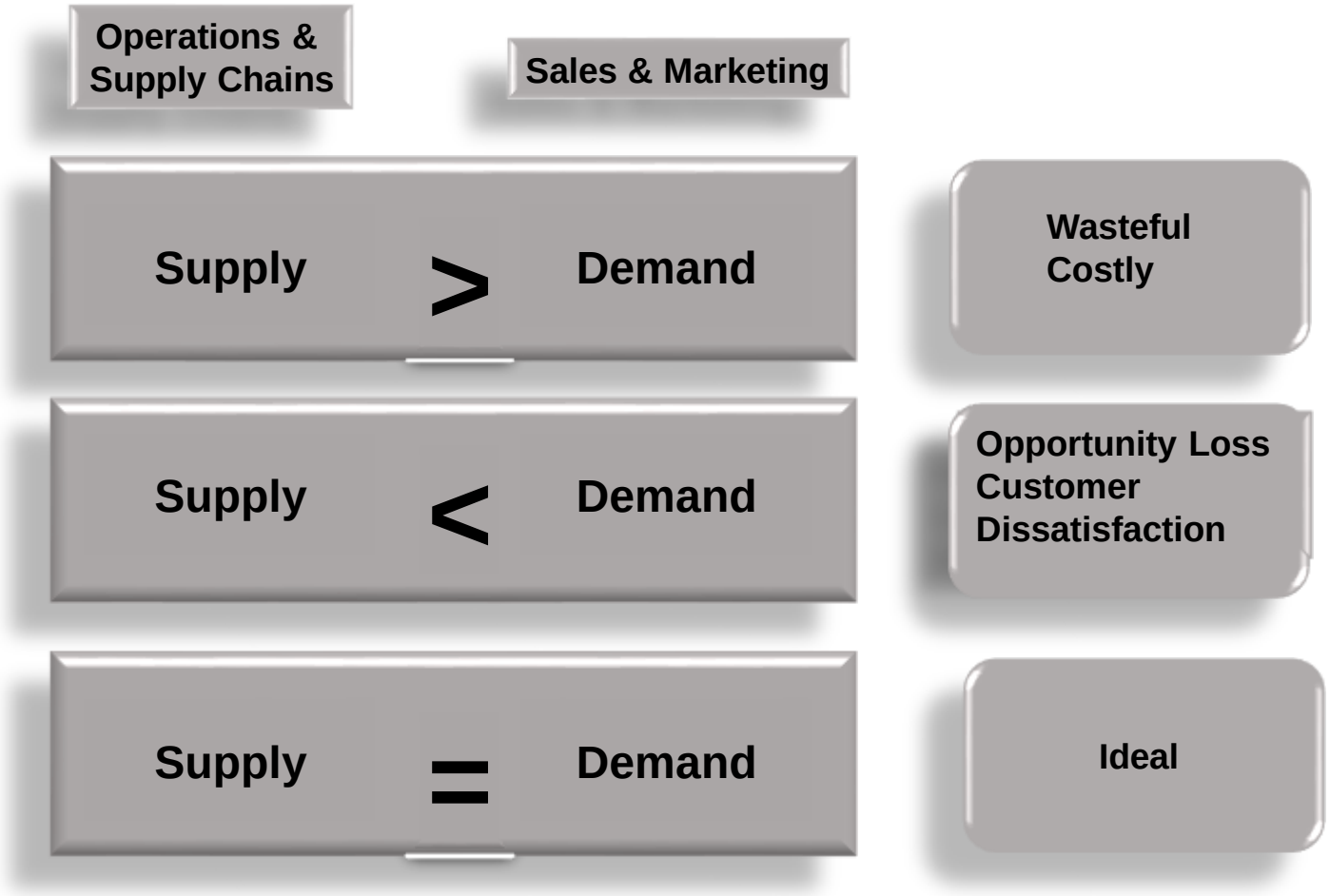
- Finance & Operations
  - Budgeting
  - Economic analysis of investment proposals
  - Provision of funds
- Marketing & Operations
  - Demand data
  - Product and service design
  - Competitor analysis
  - Lead time data



OM and Supply Chain Career Opportunities

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

Supply & Demand



Process/Operation

Process - one or more actions that transform inputs into outputs

Three Categories of Business Processes:	
Upper-management processes	These govern the operation of the entire organization.
Operational processes	These are core processes that make up the value stream.
Supporting processes	These support the core processes.

Process Variation

Four Sources of Variation:	
Variety of goods or services being offered	The greater the variety of goods and services offered, the greater the variation in production or service requirements.
Structural variation in demand	These are generally predictable. They are important for capacity planning.
Random variation	Natural variation that is present in all processes. Generally, it cannot be influenced by managers.
Assignable variation	Variation that has identifiable sources. This type of variation can be reduced, or eliminated, by analysis and corrective action.

Variations can be disruptive to operations and supply chain processes. They may result in additional costs, delays and shortages, poor quality, and inefficient work systems.

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 . . .

Historical Events in Operations Management

Era	Events/Concepts	Dates	Originator
Industrial Revolution	Steam engine	1769	James Watt
	Division of labor	1776	Adam Smith
	Interchangeable parts	1790	Eli Whitney
Scientific Management	Principles of scientific management	1911	Frederick W. Taylor
	Time and motion studies	1911	Frank and Lillian Gilbreth
	Activity scheduling chart	1912	Henry Gantt
	Moving assembly line	1913	Henry Ford

Historical Events in Operations Management

Era	Events/Concepts	Dates	Originator
Human Relations	Hawthorne studies	1930	Elton Mayo
	Motivation theories	1940s	Abraham Maslow
		1950s	Frederick Herzberg
		1960s	Douglas McGregor
Operations Research	Linear programming	1947	George Dantzig
	Digital computer	1951	Remington Rand
	Simulation, waiting line theory, decision theory, PERT/CPM	1950s	Operations research groups
	MRP, EDI, EFT, CIM	1960s, 1970s	Joseph Orlicky, IBM and others

Historical Events in Operations Management

Era	Events/Concepts	Dates	Originator
Quality Revolution	JIT (just-in-time)	1970s	Taiichi Ohno (Toyota)
	TQM (total quality management)	1980s	W. Edwards Deming, Joseph Juran
	Strategy and operations	1980s	Wickham Skinner, Robert Hayes
	Reengineering	1990s	Michael Hammer, James Champy
	Six Sigma	1990s	GE, Motorola

Historical Events in Operations Management

Era	Events/Concepts	Dates	Originator
Internet Revolution	Internet, WWW, ERP, supply chain management	1990s	ARPANET, Tim Berners-Lee SAP, i2 Technologies, ORACLE, Dell
	E-commerce	2000s	Amazon, Yahoo, eBay, Google, and others
Globalization	WTO, European Union, Global supply chains, Outsourcing, Service Science	1990s 2000s	China, India, Emerging economies

Historical Events in Operations Management

Era	Events/Concepts	Dates	Originator
Sustainability	Global warming Carbon footprint Green products Corporate social responsibility (CSR) UN Global Compact	Today	Numerous companies, statesmen, governments, United Nations, World Economic Forum

Key Issues for Operations and Supply Chain Managers Today

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

Ethical Issues

- Financial statements
- Worker safety
- Product safety
- Quality
- The environment
- The community
- Hiring and firing workers
- Closing facilities
- Workers rights

Environmental Concerns

- Sustainability
  - Using resources in ways that do not harm ecological systems that support human existence
    - Sustainability measures often go beyond traditional environmental and economic measures to include measures that incorporate social criteria in decision making
    - All areas of business will be affected
      - Product and service design
      - Consumer education programs
      - Disaster preparation and response
      - Supply chain waste management
      - Outsourcing decisions

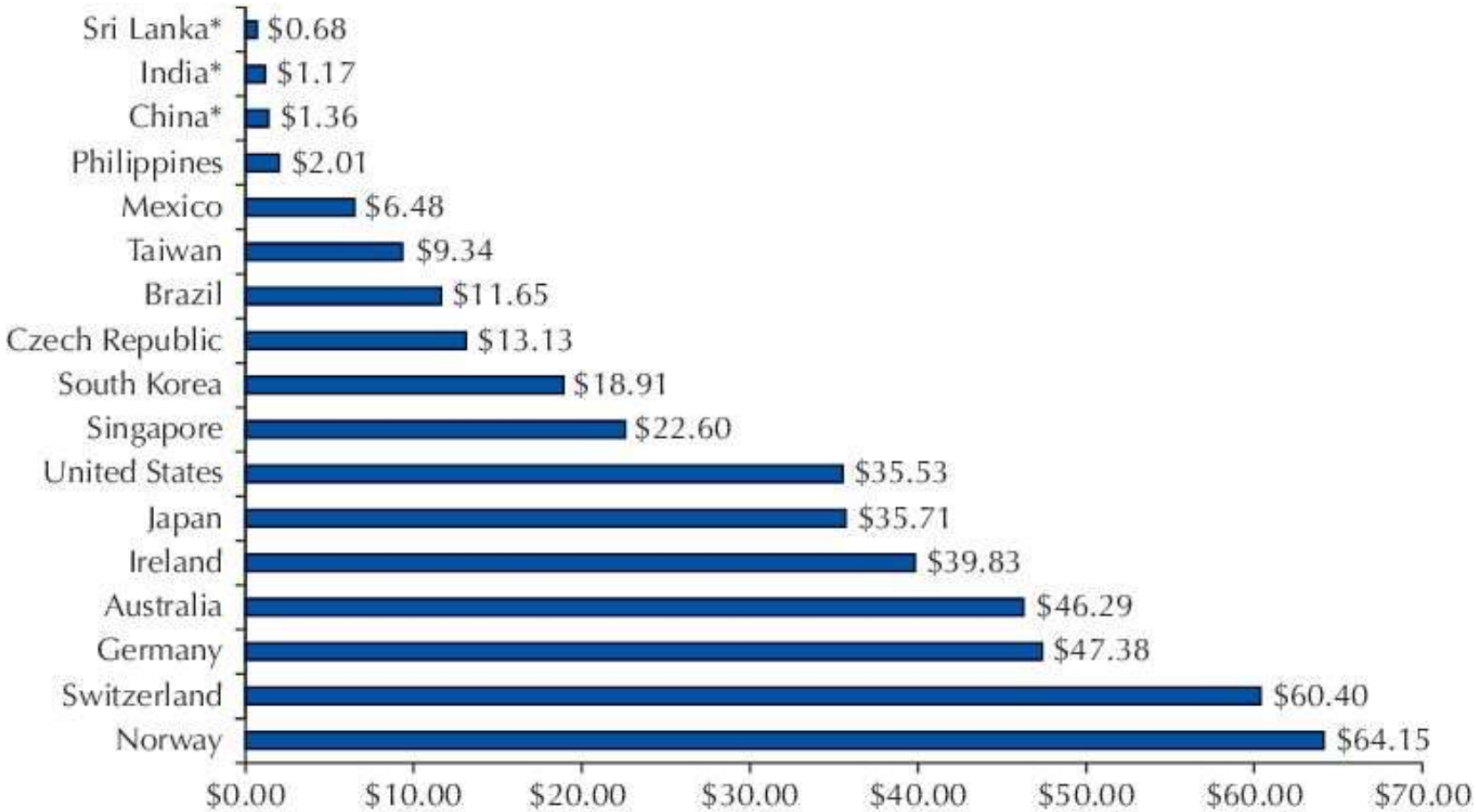
Digitization

- The exponential organization

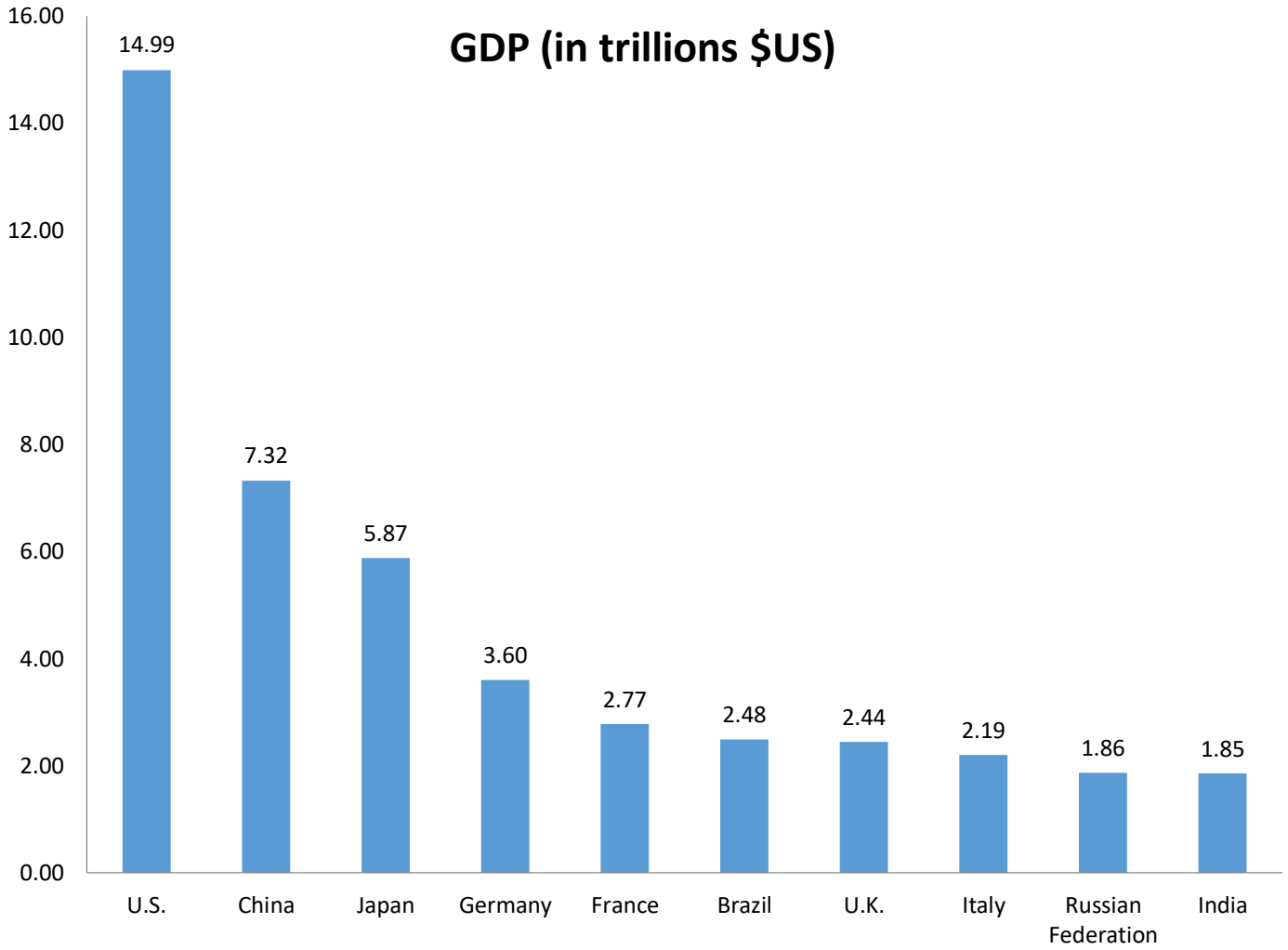
Globalization

- Why “go global”?
  - favorable cost
  - access to international markets
  - response to changes in demand
  - reliable sources of supply
  - latest trends and technologies
- Increased globalization
  - results from the Internet and falling trade barriers

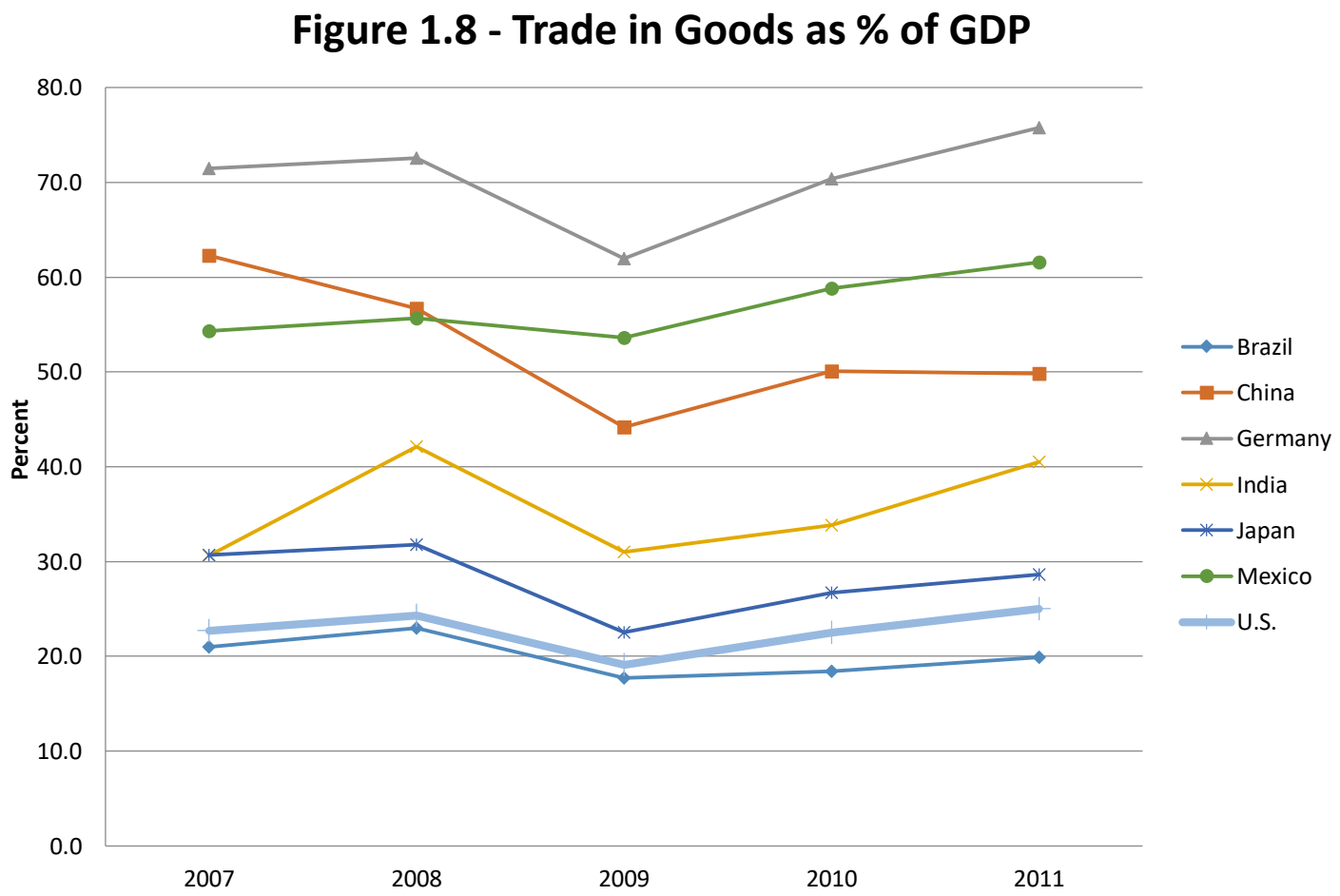
Hourly Compensation



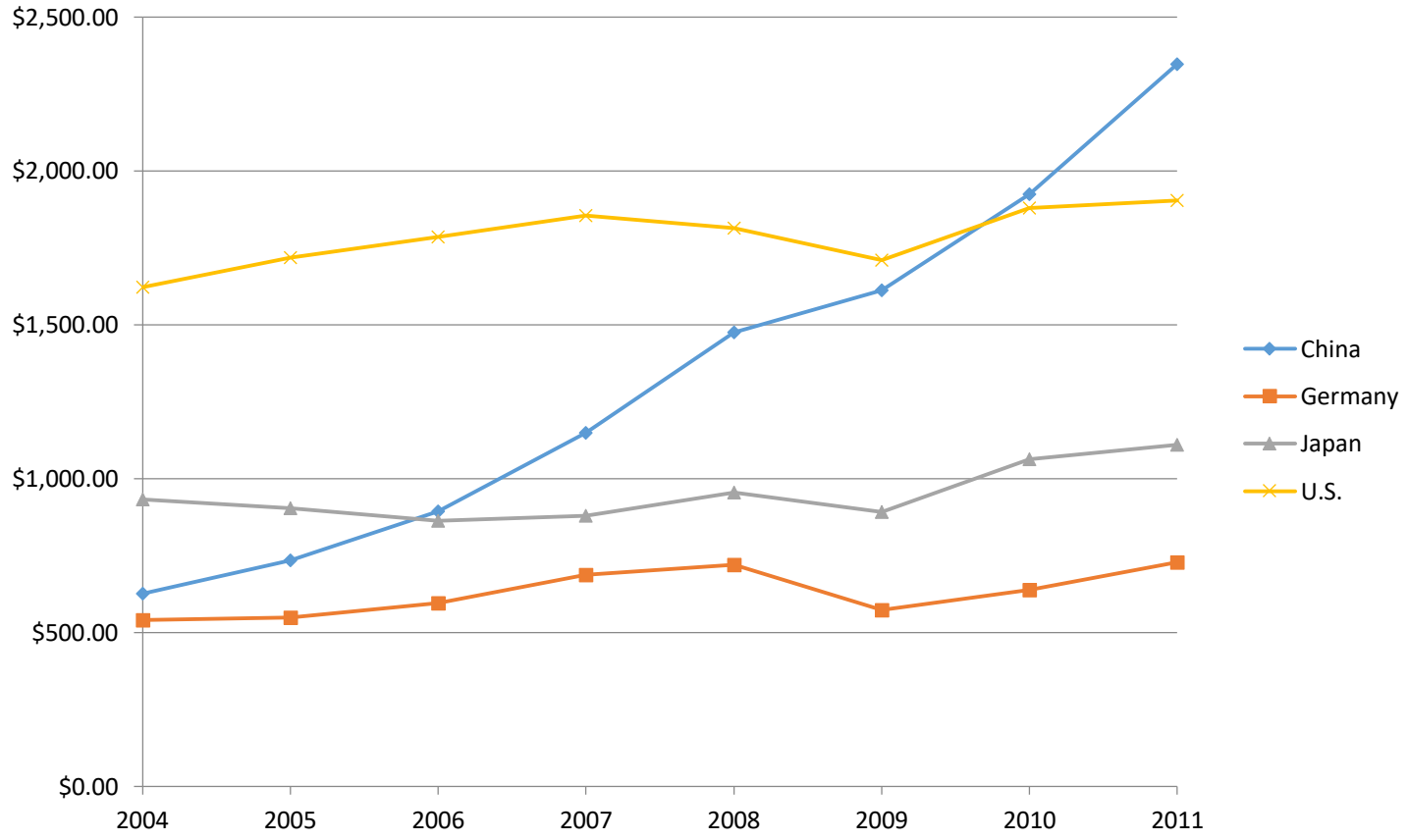
GDP


GDP (in trillions $US)
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
14.99
7.32
5.87
3.60
2.77
2.48
2.44
2.19
1.86
1.85
U.S.
China
Japan
Germany
France
Brazil
U.K.
Italy
Russian Federation
India

Trade in Goods, % of GDP



Manufacturing Output



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
- System Operation Decisions

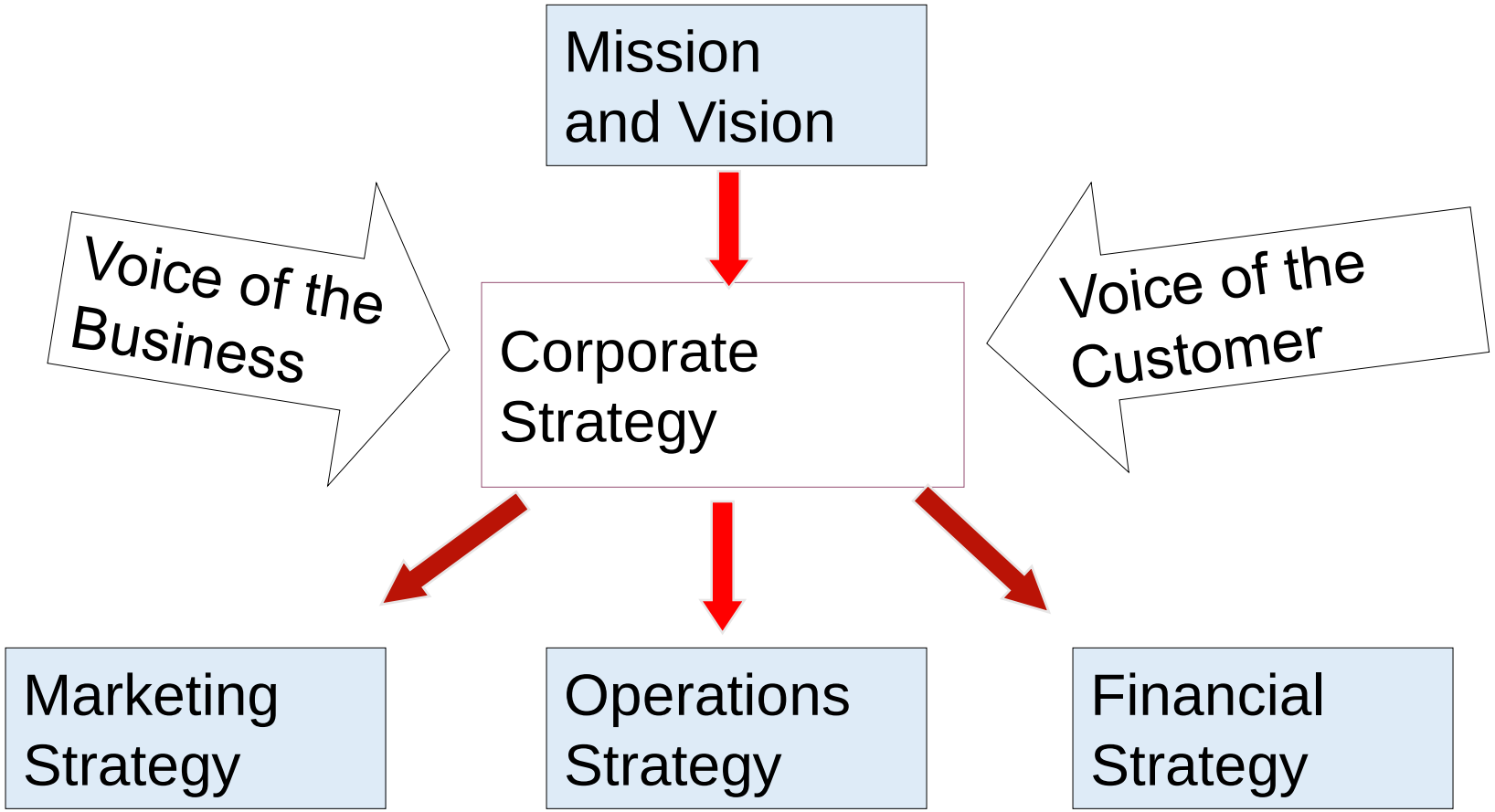
Design/Strategy and Operations

- How the mission of a company is accomplished
- Provides direction for achieving a mission
- Unites the organization
- Provides consistency in decisions
- Keeps organization moving in the right direction

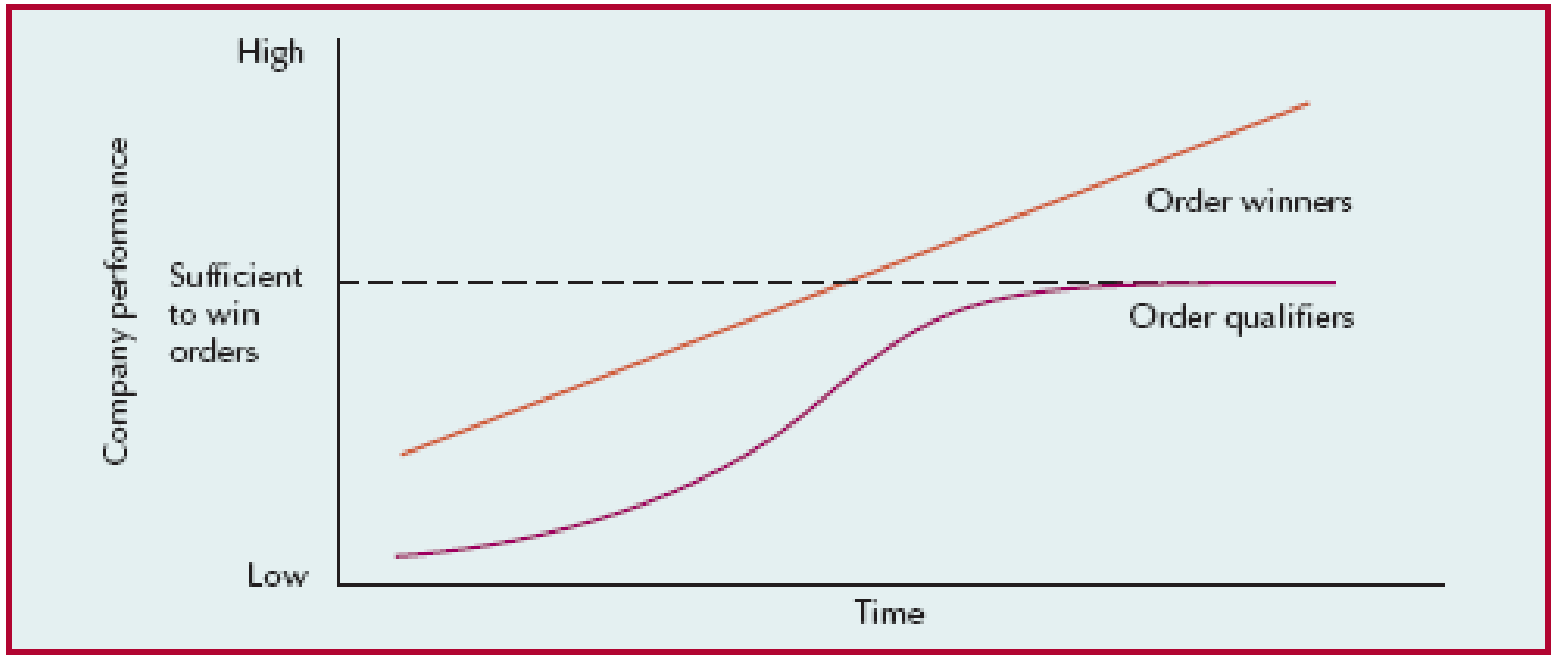
Strategy Formulation

1. Defining a primary task
   - What is the firm in the business of doing?
2. Assessing core competencies
   - What does the firm do better than anyone else?
3. Determining order winners and order qualifiers
   - What qualifies an item to be considered for purchase?
   - What wins the order?
4. Positioning the firm
   - How will the firm compete?
5. Deploying the strategy

Strategic Planning



Order Winners and Order Qualifiers



Source: Adapted from Nigel Slack, Stuart Chambers, Robert Johnston, and Alan Betts, *Operations and Process Management*, Prentice Hall, 2006, p. 47

Positioning the Firm

- Cost
- Speed
- Quality
- Flexibility

Positioning the Firm: Cost

- Waste elimination
  - relentlessly pursuing the removal of all waste
- Examination of cost structure
  - looking at the entire cost structure for reduction potential
- Lean production
  - providing low costs through disciplined operations

Positioning the Firm: Speed

- Fast moves, Fast adaptations, Tight linkages
- Internet
  - Customers expect immediate responses
- Service organizations
  - always competed on speed (McDonald's, LensCrafters, and Federal Express)
- Manufacturers
  - time-based competition: build-to-order production and efficient supply chains
- Fashion industry
  - two-week design-to-rack lead time of Spanish retailer, Zara

Positioning the Firm: Quality

- Minimizing defect rates or conforming to design specifications
- Ritz-Carlton - one customer at a time
  - Service system designed to “move heaven and earth” to satisfy customer
  - Employees empowered to satisfy a guest’s wish
  - Teams set objectives and devise quality action plans
  - Each hotel has a quality leader

Positioning the Firm: Flexibility

- Ability to adjust to changes in product mix, production volume, or design
- Mass customization
  - mass production of customized parts
- National Bicycle Industrial Company
  - offers 11,231,862 variations
  - delivers within two weeks at costs only 10% above standard models

Competing on Innovation

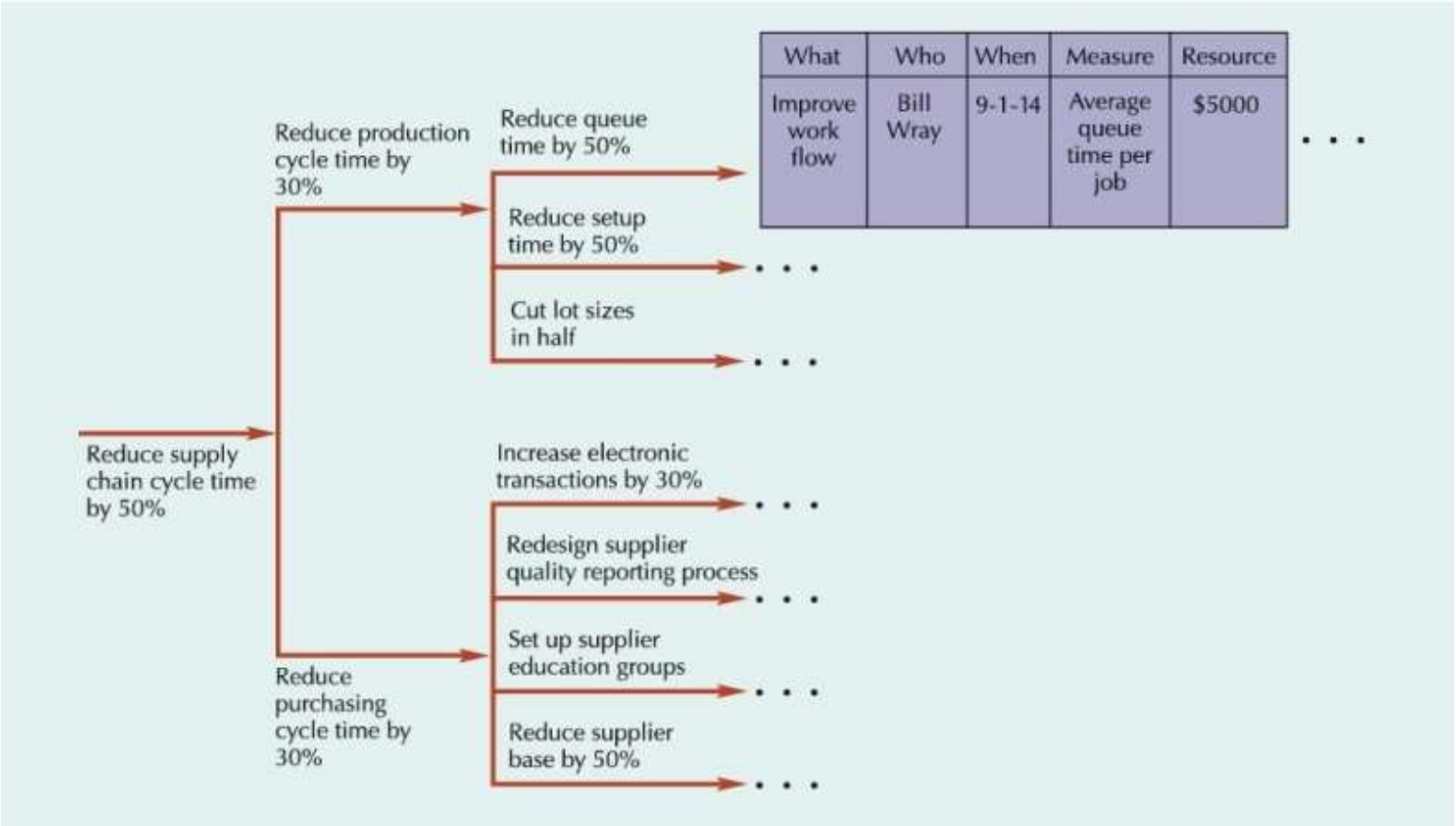
Questions

- Why is it difficult to match supply and demand?
- How do firms position themselves?
- What **goes into making a strategic plan for an organization?**
- What is the difference between order qualifiers, order winners and core competencies?

Policy Deployment

- Policy deployment
  - translates corporate strategy into measurable objectives
- Hoshins
  - action plans generated from the policy deployment process

Policy Deployment



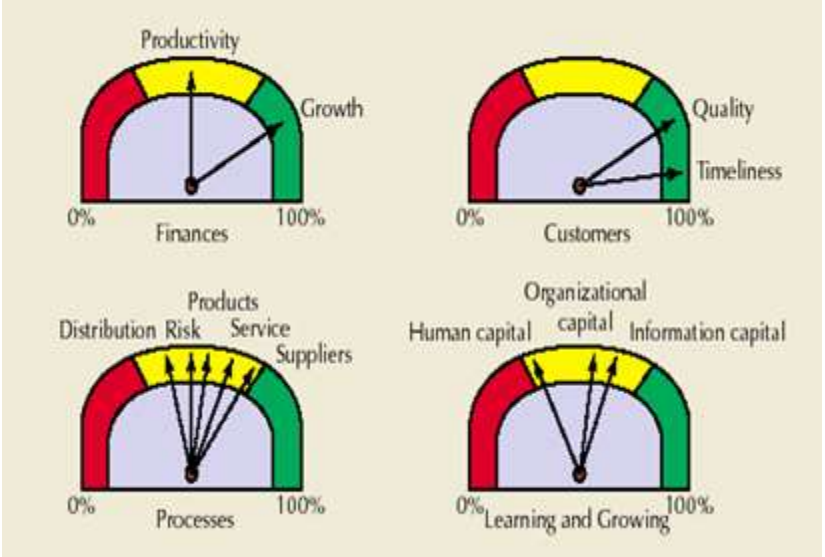
Derivation of an Action Plan Using Policy Deployment

Assessing an organization

- Balanced scorecard
  - measuring more than financial performance
    - finances
    - customers
    - processes
    - learning and growing
- Key performance indicators
  - set of measures to help managers evaluate performance in critical areas

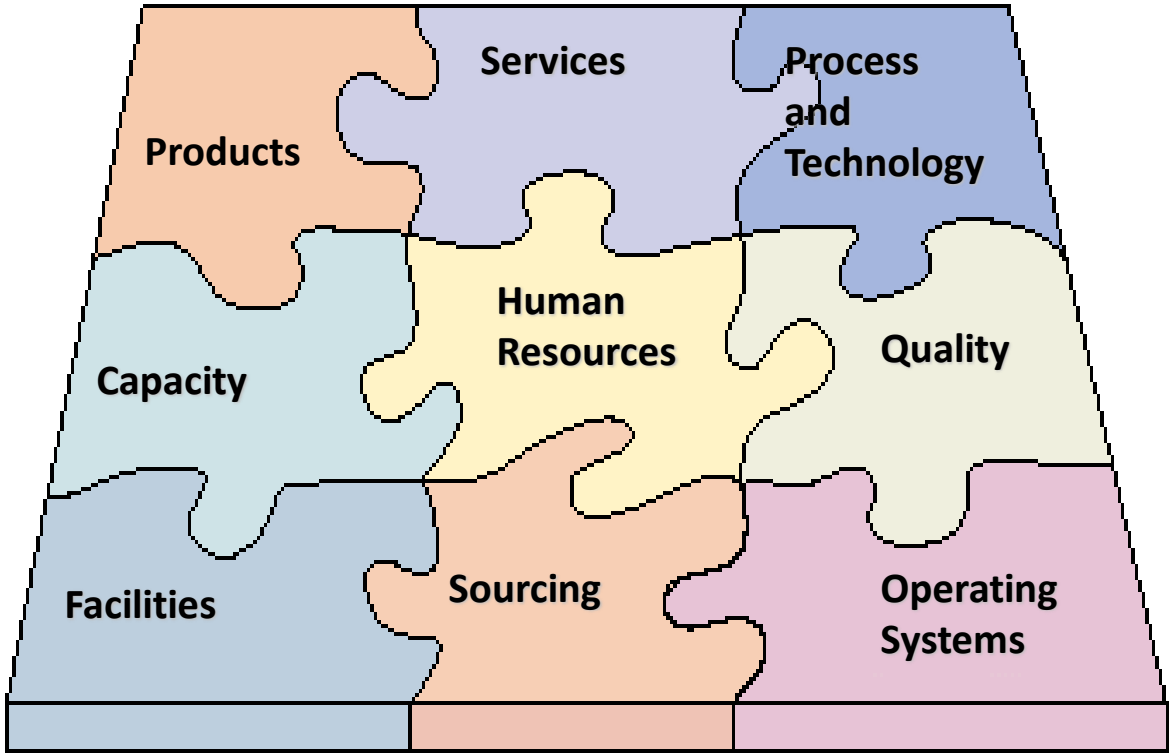
Balanced Scorecard

Radar Chart



Dashboard

Design/Strategy



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System Design Decisions

- **System Design**
  - Capacity
  - Facility location
  - Facility layout
  - Product and service planning
  - Acquisition and placement of equipment
- These are typically strategic decisions that
  - usually require long-term commitment of resources
  - determine parameters of system operation

System Operation Decisions

- **System Operation**
  - These are generally tactical and operational decisions
    - Management of personnel
    - Inventory management and control
    - Scheduling
    - Project management
    - Quality assurance
- Operations managers spend more time on system operation decision than any other decision area
  - **They still have a vital stake in system design**

OM 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 he product or service be designed? How will the work be done? How will resources be allocated?
  - ***Who:*** Who will do the work?

General Approach to Decision Making

- Modeling is a key tool used by all decision makers
  - ***Model*** - an abstraction of reality; a simplification of something.
  - Common features of models:
    - They are simplifications of real-life phenomena
    - They omit unimportant details of the real-life systems they mimic so that attention can be focused on the most important aspects of the real-life system

Understanding Models

- Keys to successfully using a model in decision making
  - What is its purpose?
  - How is it used to generate results?
  - How are the results interpreted and used?
  - What are the model's assumptions and limitations?

Benefits of Models

1. Models are generally easier to use and less expensive than dealing with the real system
2. Require users to organize and sometimes quantify information
3. Increase understanding of the problem
4. Enable managers to analyze “What if?” questions
5. Serve as a consistent tool for evaluation and provide a standardized format for analyzing a problem
6. Enable users to bring the power of mathematics to bear on a problem

Model Limitations

- Quantitative information may be emphasized at the expense of qualitative information
- Models may be incorrectly applied and the results misinterpreted
  - This is a real risk with the widespread availability of sophisticated, computerized models are placed in the hands of uninformed users.
- The use of models does not guarantee good decisions.

Quantitative Approaches

- A decision making approach that frequently seeks to obtain a mathematically optimal solution
  - Linear programming
  - Queuing techniques
  - Inventory models
  - Project models
  - Forecasting techniques
  - Statistical models

Metrics and Trade-Offs

- Performance Metrics
  - All managers use metrics to manage and control operations
    - Profits
    - Costs
    - Quality
    - Productivity
    - Flexibility
    - Inventories
    - Schedules
    - Forecast accuracy

- Analysis of Trade-Offs
  - A trade-off is giving up one thing in return for something else
    - Carrying more inventory (an expense) in order to achieve a greater level of customer service

Systems Approach

- *System* - a set of interrelated parts that must work together
  - The business organization is a system composed of subsystems
    - marketing subsystem
    - operations subsystem
    - finance subsystem
- The systems approach
  - Emphasizes *interrelationships among subsystems*
  - Main theme is that *the whole is greater than the sum of its parts*
  - The output and objectives of the organization take precedence over those of any one subsystem

Establishing Priorities

- In nearly all cases, certain issues or items are more important than others
- Recognizing this allows managers to focus their attention to those efforts that will do the most good
  - Pareto Phenomenon - a few factors account for a high percentage of occurrence of some event(s)
    - The critical few factors should receive the highest priority
    - This is a concept that is appropriately applied to all areas and levels of management

Learning Objectives of this Course

- Gain an appreciation of strategic importance of operations and supply chain management in a global business environment
- Understand how operations relates to other business functions
- Develop a working knowledge of concepts and methods related to designing and managing operations and creating value along the supply chains
- Develop a skill set for continuous improvement