CHAPTER

1 Introduction to Information Systems

Mass Customization… Revisited

- Building Impenetrable Customer Loyalty
  - "*A company that aspires to give customers exactly what they want must look at the world through new lenses. It must use technology to become two things: a mass customizer that efficiently provides individually customized goods and services, and a one-to-one marketer that elicits information from its customer about his or her specific needs and preferences.*"

B. Joseph Pine, II, Strategic Horizons

What is Data?

- Raw Material
- Numbers and strings of letters with no precise context or meaning

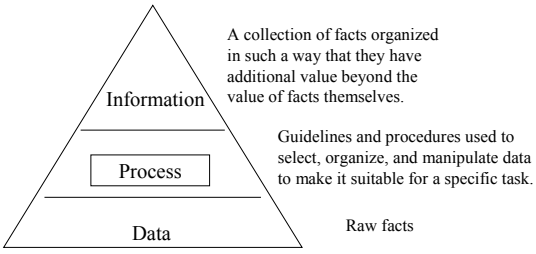
What is Information?

- Data processed with knowledge
- "Data endowed with relevance and purpose"
- "Data becomes information when its creator adds meaning"
- "An organized, meaningful, and useful interpretation of data"

What is Knowledge?

- "A body of guidelines and rules used to select, organize, and manipulate data to make it suitable for a given task"
- "An awareness and understanding of a set of information and how that information can be put to its best use"
- "Internalized information + the ability to utilize this information"

Data transformed into Information



A collection of facts organized in such a way that they have additional value beyond the value of facts themselves.

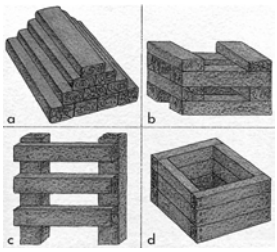
Guidelines and procedures used to select, organize, and manipulate data to make it suitable for a specific task.

Raw facts

Data becomes Information

- Establishing relationships between data creates information.

Information = Data + Relationships



Characteristics of Valuable Information

- Relevant
- Complete
- Accurate
- Current/Timely
- Economical
- Accessible

Does Perfect Information Lead to Perfect Decisions?

- IBM
  - Among the first to learn that PCs were revolutionizing the computer industry.
- Wal-Mart
  - "We got big by replacing inventory with information"

Wal-Mart CIO

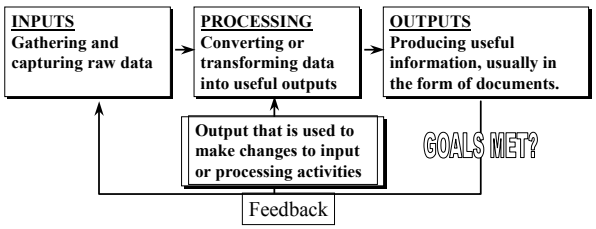
Determining the Value of Information

- Measurements
  - Time saved, lower costs
  - More accurate forecasts
  - Improved service
- Often difficult to quantify
- Payback period?

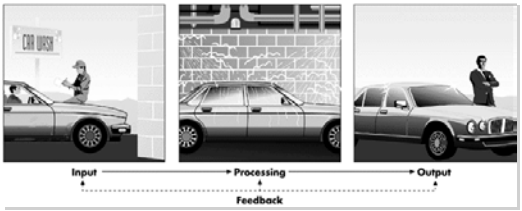
What is a System?

- Components that work together to achieve a goal by accepting input, processing it, and producing output in an organized manner.
  - e.g. a sound system

Components of a System



Components of a System



Open vs. Closed Systems

- Closed System
  - Stands alone
  - No connection to other systems
- Open System
  - Interfaces and interacts with other systems
  - Gets information from and provides information to other systems

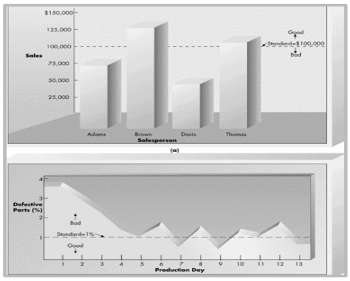
System Performance

- Efficiency
  - A measure of what is produced divided by what is consumed.
- Effectiveness
  - A measure of what is achieved divided by the stated goal.

System Performance Standards

Sales

Defects



System Variables and Parameters

- System Variable
  - A quantity or item that can be controlled by the decision maker (controllable).
    - e.g. selling price
- System Parameter
  - A value or quantity that cannot be controlled by the decision maker.
    - e.g. raw material costs

So, What is an Information System?

Information: An organized, meaningful, and useful interpretation of data

System: Components that work together to achieve a goal by accepting input, processing it, and producing output in an organized manner

- Information System: Components that work together to process data and produce information (to help companies solve problems and make decisions).

The Components of a CBIS

1) Hardware
2) Software
   - Operating systems
   - Applications
3) Databases
4) Telecommunications/Networks
5) People
6) Procedures

Types of Business Information Systems

- Transaction Processing
- E-Commerce
- Workflow
- Enterprise Resource Planning
- Management Information
- Decision Support
- Artificial Intelligence/Expert

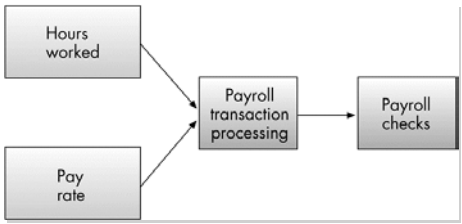
Transaction Processing

- Transaction
  - Any business related exchange
  - Tend to be routine, labor-intensive
  - "Interactions"

Transaction Processing

- Transaction processing system (TPS)
  - The application of information technology to routine, repetitive, and usually ordinary business transactions

Transaction Processing System



E-Commerce

- E-Commerce
  - Any business transaction executed electronically between parties involving the exchange of goods and/or services
    - B2B, B2C
- Workflow
  - Rule-based

E-Commerce

- Lowering Barriers to Entry
  - Traditionally
    - Sales force
    - Advertising & promotion
    - Factories, warehouses, retail stores
  - Competing electronically
    - Increases the threat of new companies

Enterprise Resource Planning (ERP)

- Integrated programs that can manage a company's entire set of business operations
- Often coordinate planning, inventory control, production and ordering

Management Information System (MIS)

- Management Information System
  - Used to provide routine information to help managers plan, control, and make decisions
- Characteristics
  - Focus on operational efficiency
  - Supports functional areas
  - Common database
  - Standard reports…

Management Information System

- Types of Reports
  - Scheduled
  - Demand
  - Exception

Decision Support Systems

- Decision Support Systems (DSS)
  - Used to support decision making (e.g. where to build, how much to order)
- Characteristics
  - Suggests and compares alternatives
  - Problem is complex
  - Information is voluminous

Artificial Intelligence

- Artificial Intelligence (AI)
  - A field that involves computer systems taking on the characteristics of human intelligence
    - Robotics
    - Natural language processing
    - Learning systems
    - Neural networks (patterns & trends)

Expert Systems

- Expert Systems (ES)
  - Give the computer the ability to make suggestions and act like an expert in a particular field
    - Medical diagnoses
    - Repair problems
    - Credit evaluations
    - Investment strategies

Systems Development

- Systems Development
  - The activity of creating or modifying existing business systems.
- Objectives
  - Make the process manageable
  - Achieve predictable costs and timing

Systems Development Steps

1) Systems Investigation
   - Gain a clear understanding of the problem to be solved or opportunity to be addressed.
2) Systems Analysis
   - Define the problems and opportunities of the existing system.
3) Systems Design
   - Determine how the new system will work to meet the business needs defined during systems analysis.

Systems Development Steps

4) Systems Implementation
   - Create or acquire the various system components defined in the design step, assemble them, and put the new system into operation.
5) System Maintenance and Review
   - Check and modify the system so that it continues to meet changing business needs.

CHAPTER

2 Information Systems in Organizations

Strategic Information Systems

- Strategy
  - A plan designed to help an organization gain a competitive advantage
- Strategic Information Systems
  - Information systems that help accomplish a strategy

Achieving a Competitive Advantage

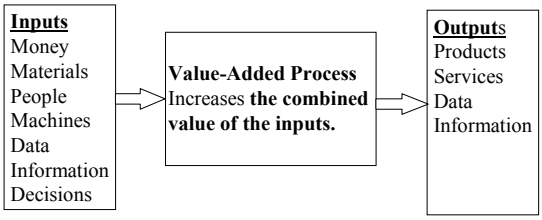
- The essence of strategy is innovation, so competitive advantage often occurs when an organization tries a strategy that no one has tried before.
  - e.g. Dell was the first PC manufacturer to use the Web to take customer orders.

The Value Chain

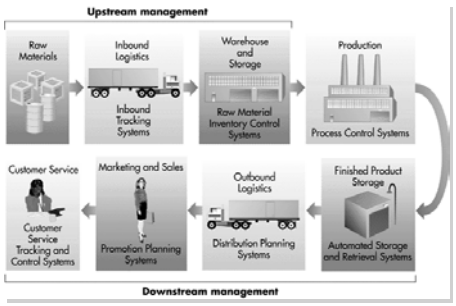
Michael Porter

- A series or "chain" of basic activities that add value to a firm's products or services
- Critical leverage points where information technology can enhance a firm's competitive position

The Value-Added Process



The Value Chain



What value can IT add at each step in the Value Chain?

Five-Force Model

Competitive forces that lead firms to seek competitive advantage

Substitute Products

Buyer Power

Rivalry

Supplier Power

New Entrants

Ways to Achieve a Competitive Advantage

- Reduce costs
  - Automation of a business process
    - Transaction processing
    - Online customer service
    - Factory robotics
- Raise barriers to entry
  - Legal protection of intellectual property
  - High cost of entry

Ways to Achieve a Competitive Advantage

- Establish high switching costs
  - Penalties for terminating contracts
  - Software re-training
- Create new products and services
  - Copyright protection
  - Continuous innovation

Ways to Achieve a Competitive Advantage

- Differentiate products and services
  - Branding
  - First to market
- Enhance products and services
  - Longer warranties, more information
  - Better service

Ways to Achieve a Competitive Advantage

- Establish alliances
  - Bundling products
  - Rewards programs
  - Outsourcing
- Lock in suppliers or customers
  - Purchasing volume
  - Create a standard

Ways to Achieve a Competitive Advantage

- Potentially winning business moves

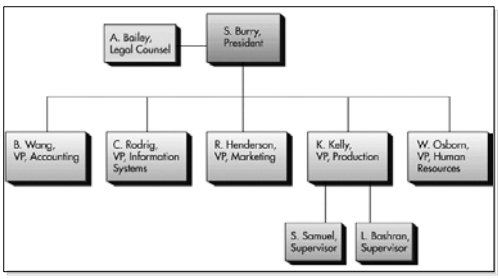
PLUS

- Ideas for harnessing technology to implement those moves

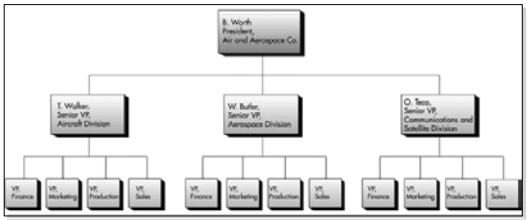
Organizational Structures

- An organization's structure can have an impact on how information systems are viewed and what kind are used:
  - Hierarchical
  - Project/Product
  - Team
  - Multidimensional

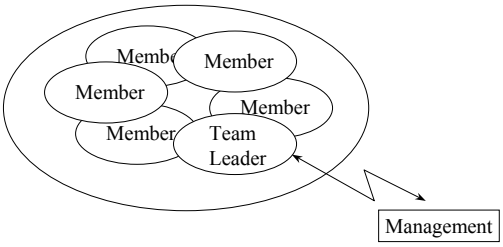
Traditional Organizational Structure



Project Organizational Structure



Team Organizational Structure



Multidimensional (Matrix) Organizational Structure

	Vice President, Marketing	Vice President, Production	Vice President, Finance
Publisher, College Division	Marketing Group	Production Group	Finance Group
Publisher, Trade Division	Marketing Group	Production Group	Finance Group
Publisher, High School Division	Marketing Group	Production Group	Finance Group

Organizational Culture & Change

- Organizational Culture
  - Set of shared beliefs and assumptions
- Organizational Change
  - A process that alters the way an organization functions
  - Often associated with new IS

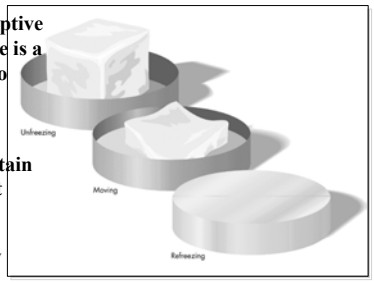
Organizational Change

Lewin & Schein

•Create receptive climate(there is a better way to operate)

•Learn new methods, obtain commitment

•Reinforce, reward new behavior



Reengineering

- The radical redesign of business processes to achieve a significant breakthrough in business results
  - Delivery time
  - Product & service quality
  - Costs, revenue & productivity

Reengineering

- Employee resistance
- Employees must understand benefits
- Old rules must be challenged

  Examples
  - Size of orders
  - Credit approval
  - Decision-making level

Reengineering

- Examples of reengineering initiatives
  - Simplifying work processes
  - Combining several jobs into one
  - Outsourcing ancillary processes
  - Entering new business areas
  - Establishing new management structures
  - Renovating technology systems

Reengineering vs. Continuous Improvement

▪ Strong action to solve serious problems	▪ Routine actions to make minor improvements
▪ Top-down-driven by senior executives	▪ Worker driven
▪ Broad in scope; cuts across organizations	▪ Narrow in scope; focus in a given area
▪ Goal is to achieve a major breakthrough	▪ Goal is continuous, gradual improvement

Total Quality Management

- Company-wide effort to add more value
  - Keen awareness of customer
  - Strategic vision for quality
  - Empowerment of employees
  - Rewards for high quality

Outsourcing

- Contracting with outside professional services to meet specific business needs.
  - Focus on core business
  - Save money

Downsizing

- Reducing the number of employees to cut costs

Performance-Based Information Systems

- Productivity
  - A measure of the output achieved divided by the input required.
- Return on Investment
  - Profit or benefit as a percentage of investment
- Earnings Growth
- Market Share
- Customer Awareness & Satisfaction
- Total Cost of Ownership

Identifying Risks

- How well are requirements understood?
- Does the project require pioneering effort?
- Is there a risk of severe business repercussions?

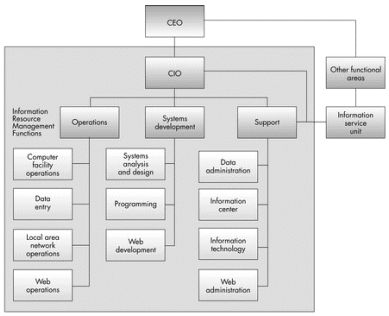
Leading Edge vs. Bleeding Edge

- Bleeding Edge: When failure occurs because an organization tries to be too far out on the technological leading edge
  - Time-Warner's Pathfinder portal
- Leading Edge: Let competitors test the new technology first
  - Microsoft Word, Excel, Access, IE

Justifying IS

- Tangible savings (reduced costs)
- Intangible savings (better decisions)
- Legal requirements (reports)
- Modernization (Y2K, new apps)
- Pilot project (laptops)

Roles and Functions in the IS Department



Homework

- Read articles about Buffet & Gates
- Subscribe to ListProc this week
- Study Guide by Friday
- Test on Monday