INTRODUCTION TO INFORMATION SYSTEMS

Lesson 1 cont.…

DAY 2

Introduction to Information Systems cont…
Information Systems in Organizations

Evaluation criteria

- Assignments – 30%
  - ~~*Group presentation/activity*~~
  - *In-class assignments (First half/ Second half)*
  - *Continuous assignments (15 min – 30 min)*
  - *Home work – Discussion Forums etc…*

CONTEMPORARY APPROACHES TO INFORMATION SYSTEMS

- The study of information systems is a multidisciplinary field.
- No single theory or perspective dominates.
- Due attention should be given to the related aspects like organizational structure, organizational culture, people behaviour, etc.
- Information systems are socio-technical systems.
- Though IS are composed of machines, devices, and “hard” physical technology, they require substantial social, organizational, and intellectual investments to make them work properly.

CONTEMPORARY APPROACHES TO INFORMATION SYSTEMS

- The study of IS deals with issues and insights contributed from
  - ***Technical*** *approach*
  - ***Behavioural*** *approaches*

Figure : contemporary approaches to information systems
Management information systems, Thirteenth edition

CONTEMPORARY APPROACHES TO INFORMATION SYSTEMS

Technical Approach to information systems

- This approach emphasizes **mathematically based models to study information systems**, as well as the **physical technology** and **formal capabilities of these systems**.
- The disciplines that contribute to the technical approach are **computer science, management science,** and **operations research**.
  - ***Computer science*** *is concerned with establishing theories of computability, methods of computation, and methods of efficient data storage and access.*
  - ***Management science*** *emphasizes the development of models for decision-making and management practices.*
  - ***Operations research*** *focuses on mathematical techniques for optimizing selected parameters of organizations, such as transportation, inventory control, and transaction costs.*

CONTEMPORARY APPROACHES TO INFORMATION SYSTEMS

Behavioural Approach to information systems

- **consider the behavioural impact/response of people in the organization**.
- Need to address and have knowledge of behavioural problems and issues
- The behavioural approach, therefore, borrows heavily from the principles of political science, psychology, sociology, and organizational behaviour, among others.
- This approach, according to Kling and Dutton, "**focuses not on technical solutions but on the changes in attitudes, management and organizational policy**".

BUSINESS INFORMATION SYSTEMS

Business vs Information Systems

Role of IS in Business

- **Support its business processes and operations**

How you manage your company's operations depends on the information you have.

Information systems can offer more complete and more recent information, allowing you to operate your company more efficiently.
E.g. record purchases, track inventory, pay employees, etc.

- **Support decision making by its employees and its managers**

The company IS can help you make better decisions by delivering all the information you need and by modelling the results of your decisions.

A decision involves choosing a course of action from several alternatives and carrying out the corresponding tasks.

E.g. what lines of merchandise need to be added, what kind of investment required, etc.

Role of IS in Business

- **Support its strategies for competitive advantage**

You can use information systems to gain a cost advantage over competitors or to differentiate yourself by offering better customer service. Sales data give you insights about what customers are buying and let you stock or produce items that are selling well. With guidance from the information system, you can streamline your operations.

E.g. put kiosk in store to connect to e-commerce website. Help gain advantage over competitor without such a kiosk.

- **Monitoring & Control**

Monitoring and controlling the activities of employees is a core function of information systems. This is especially true of financial transactions in which management has a duty to prevent fraud and theft.

The system imposes its control functions by allowing only authorized employees to log in and access the relevant functions.

For example, only few employees may be authorized to generate a company check. In addition to limiting who can perform such functions, the system **keeps track of who logged in and carried out the task**.

Role of IS in Business

- **Information Storage and Analysis**

Through the adoption of information systems, companies can **make use of sophisticated and comprehensive databases** that can contain all imaginable pieces of data about the company.

IS store, update and even **analyse the information**, which the company can then use to pinpoint solutions to current or future problems.

Furthermore, these systems can **integrate data from various sources**, inside and outside the company, keeping the company up to date with internal performance and external opportunities and threats.

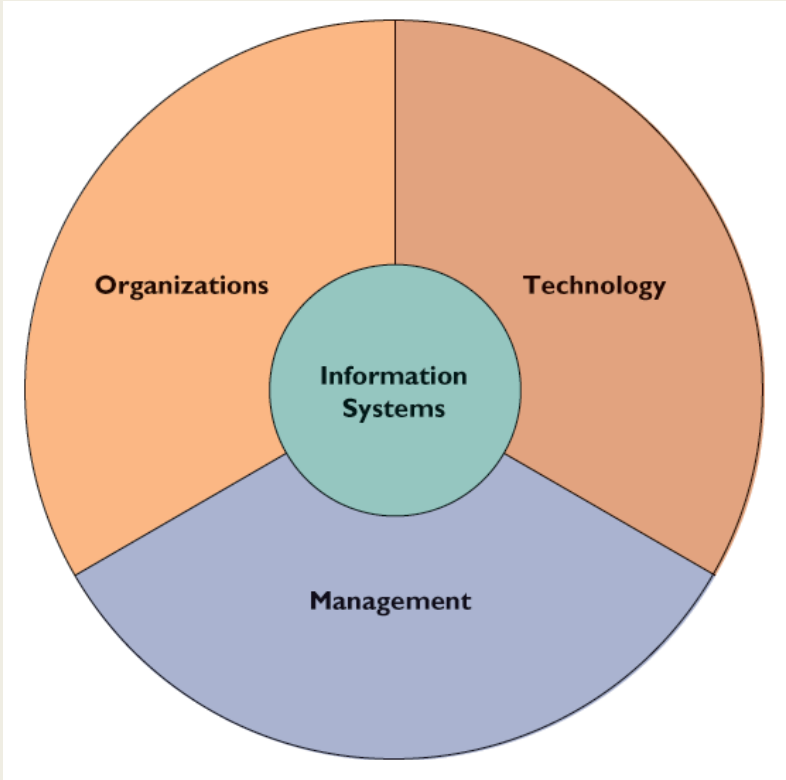
- **Communication**

Part of management is gathering and distributing information, and information systems can make this process more efficient by **allowing managers to communicate rapidly**.

Email is quick and effective, but managers can use information systems even more efficiently by storing documents in folders that they share with the employees who need the information.

This type of communication lets employees collaborate in a systematic way.

Transforming Business with IS



Transforming Business with IS

- Information systems literacy

  Broad-based understanding of information systems that includes behavioral knowledge about organizations and individuals using information systems and technical knowledge about computers

- Computer literacy

  Knowledge about information technology, focusing on understanding how computer-based technologies work

Organization

- Key Elements
  - *People*
  - *Structure*
  - *Operating Procedures*
  - *Politics*
  - *Culture*
- Composed of different levels and specialties
- Employees are trained for different functionalities
  - *Sales & Marketing, Manufacturing & production, Finance, Accounting, Human resources*

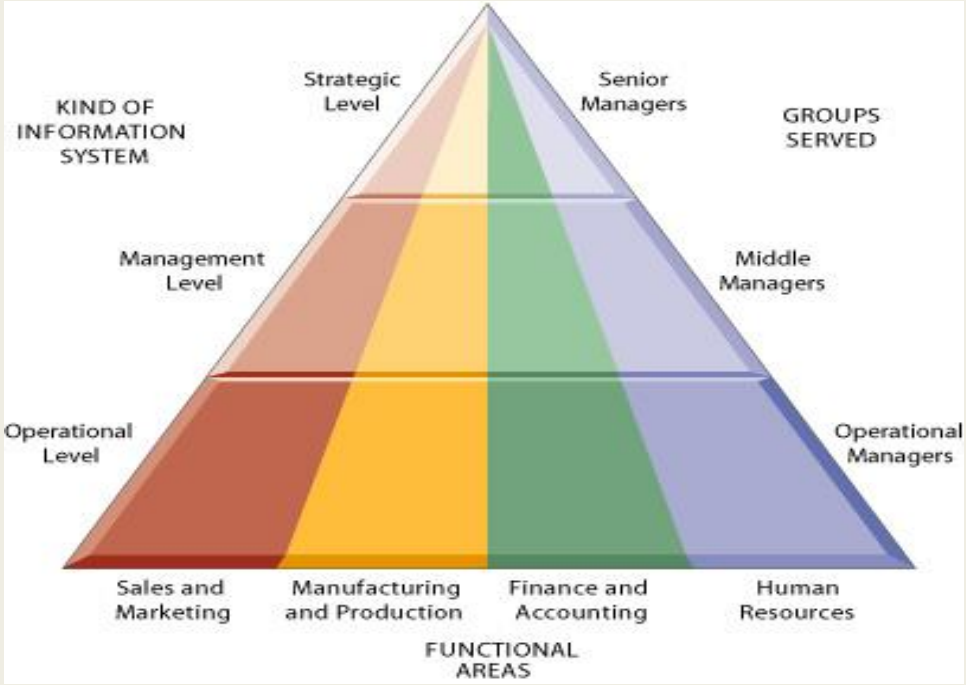
Management

- Sense out situations faced by organizations, make decisions, formulate action plans to solve organizational problems.
- Senior managers:
  - *make long-range strategic decisions about products and services*
- Middle managers:
  - *carry out the programs and plans of senior management*
- Operational managers:
  - *monitor the firm's daily activities*

Technology

- The tool used to cope with the change
- Computer Hardware : Physical equipment used for input, processing, and output activities in an information system
- Computer software: Detailed instructions that control and coordinate the work of computer hardware components in an information system.
- Storage technology: Physical media and software governing the storage and organization of data for use in an information system.
- Communications technology: Physical devices and software that link various computer hardware components and transfer data from one physical location to another.

Organizational Structure / Different Types of IS



- Organizations can be divided into Three major managerial levels and into four major functional areas
- Information systems serve each of these levels and functions.

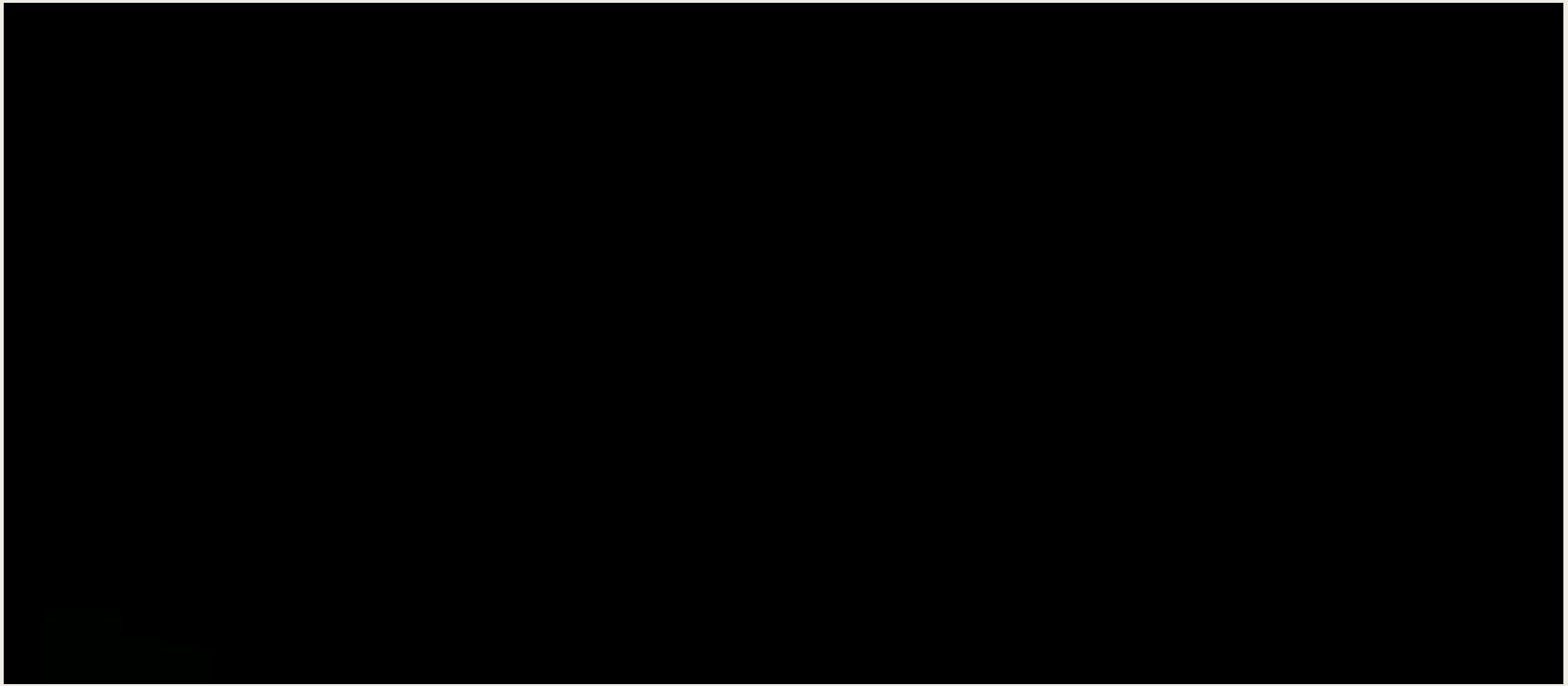
Decision Making – Organizational Level

- Operational Level
  - *determines how to perform tasks and ways to distribute information*
- Management Level
  - *monitors effective usage of resources, performance*
- Strategic Level
  - *determines long-term objectives, resources, policies*

Three main categories

- Operational-level systems
  - Monitor the elementary activities and transactions of the organization
- Management-level systems
  - Support the monitoring, controlling, decision-making, and administrative activities of middle managers
- Strategic-level systems
  - Tackle and address strategic issues and long-term trends

Four Major types of Information Systems



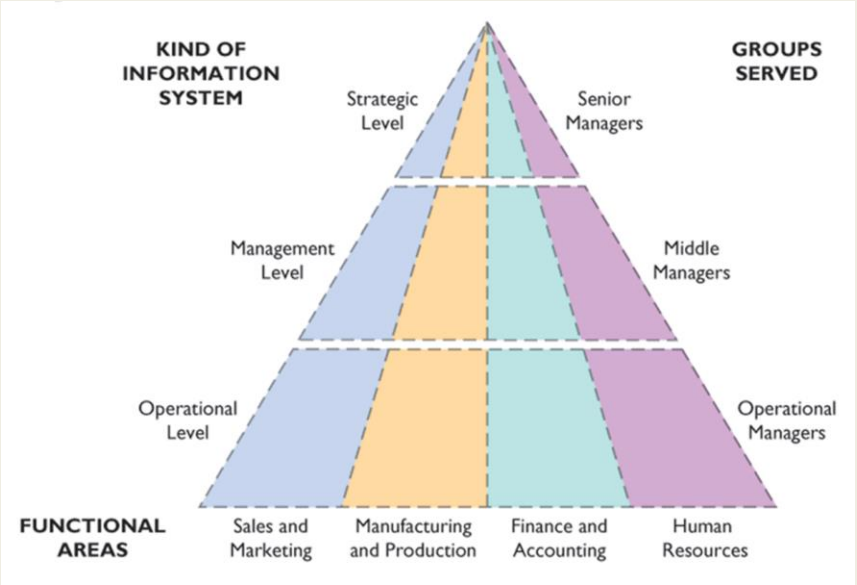
https://www.youtube.com/watch?v=jdFQBYZSEiQ

Four Major types of Information Systems

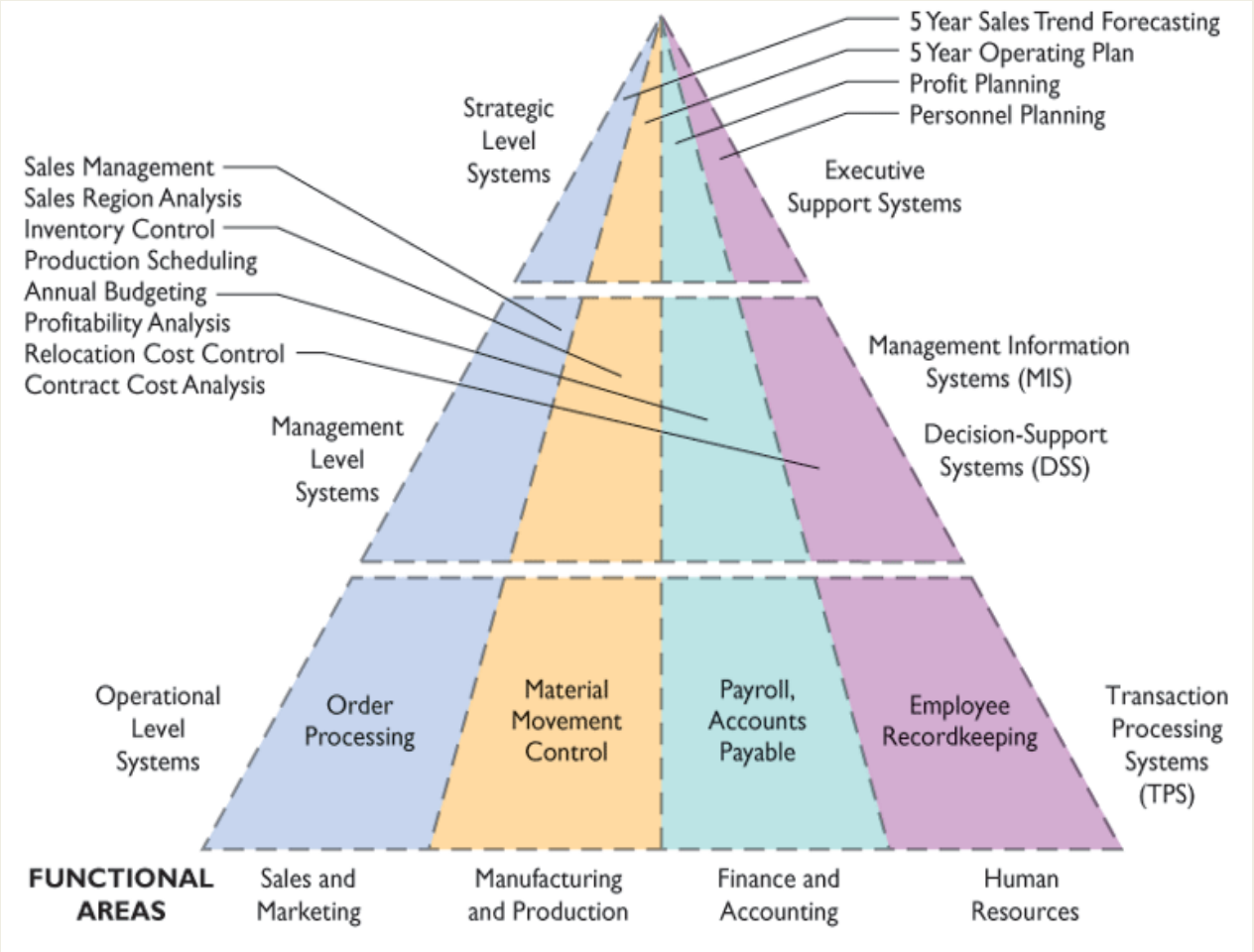
- Transaction Processing Systems (TPS)
- Management Information Systems (MIS)
- Decision-Support Systems (DSS)
- Executive-Support Systems (ESS)

Exercise

- Categorize the four major types of information systems in to the different sections of the pyramid.



Answer


5 Year Sales Trend Forecasting
5 Year Operating Plan
Profit Planning
Personnel Planning
Strategic Level Systems
Executive Support Systems
Sales Management
Sales Region Analysis
Inventory Control
Production Scheduling
Annual Budgeting
Profitability Analysis
Relocation Cost Control
Contract Cost Analysis
Management Information Systems (MIS)
Management Level Systems
Decision-Support Systems (DSS)
Operational Level Systems
Order Processing
Material Movement Control
Payroll, Accounts Payable
Employee Recordkeeping
Transaction Processing Systems (TPS)
FUNCTIONAL AREAS
Sales and Marketing
Manufacturing and Production
Finance and Accounting
Human Resources

Types of Information Systems

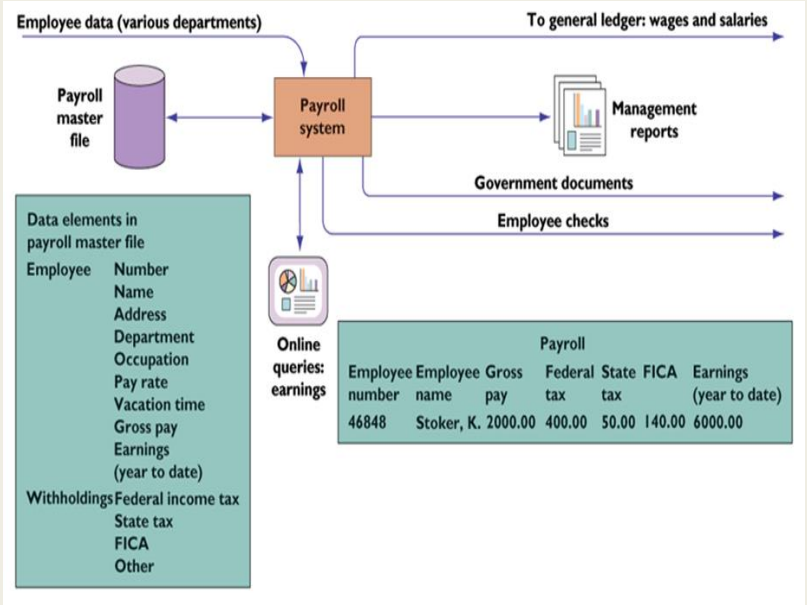
Three main categories of information systems serve different organizational levels: operational-level systems, management-level systems, and strategic-level systems.

1. Operational-level systems

- Support operational managers by **keeping track of the elementary activities** and transactions of the organization.
- Examples: such as sales, receipts, cash deposits, payroll, credit decisions, and the flow of materials in a factory.
- Answer routine questions and track the flow of transactions.
  - *Examples:How many parts are in inventory?, number of hours worked each day by employees on a factory floor.*
- Information generally must be easily available, current, and accurate.

Transaction Processing Systems (TPS)

- Basic business systems that serve the organization's operational level
- Input: Transactions, events
- Processing: Sorting, listing, merging, updating
- Output: Detailed reports, lists, summaries
- Users: Operations personnel, supervisors



Types of Information Systems

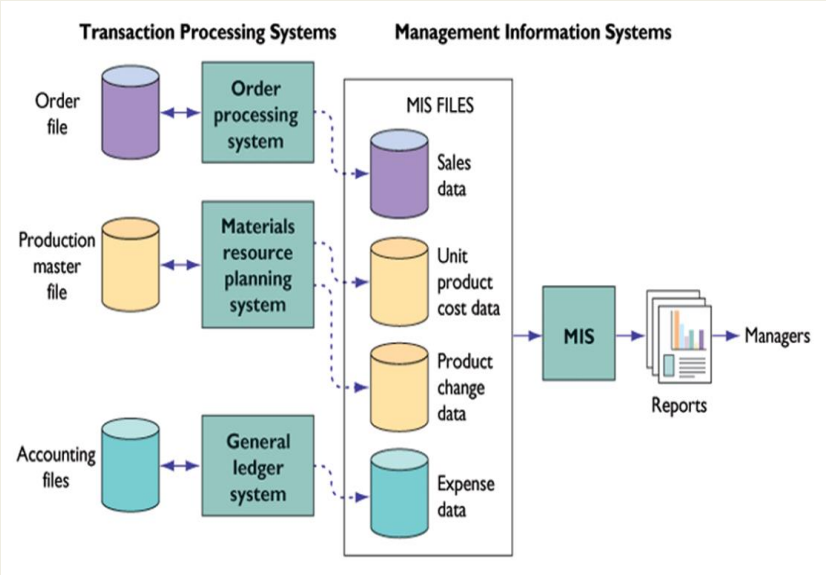
2. Management-level systems

- Serve the monitoring, controlling, decision-making, and administrative activities of middle managers.
- Provide periodic reports rather than instant information on operations.
- Answer “what-if” questions.
  - *Ex: What would be the impact on production schedules if we were to double sales in the month of December?*

    What would happen to our return on investment if a factory schedule were delayed for six months?

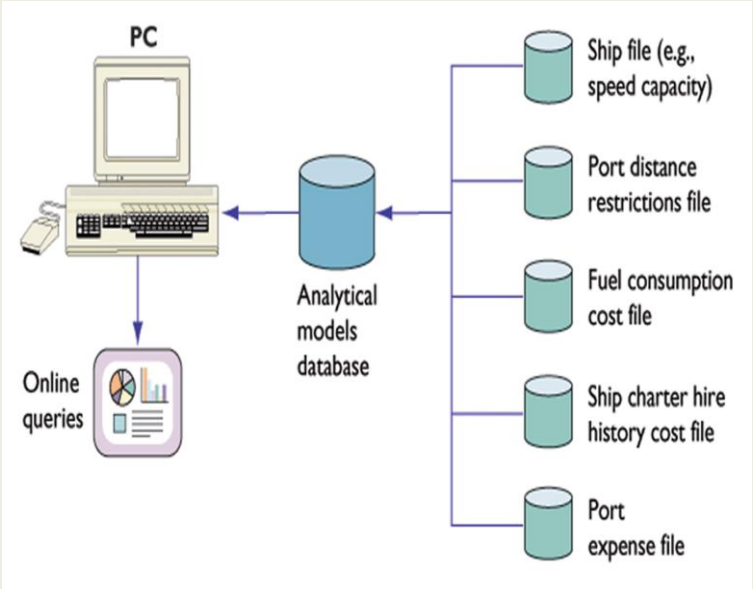
Management Information Systems (MIS)

- Serve management level; provide reports and access to company data
- Input: Summary transaction data, high-volume data, simple models
- Processing: Routine reports, simple models, low-level analysis
- Output: Summary and exception reports
- Users: Middle managers



Decision-Support Systems (DSS)

- Serve management level with data analysis for making decisions
- Input: Low-volume data or massive databases, analytic models, and data analysis tools
- Processing: Interactive, simulations, analysis
- Output: Special reports, decision analyses, responses to queries
- Users: Professionals, staff managers



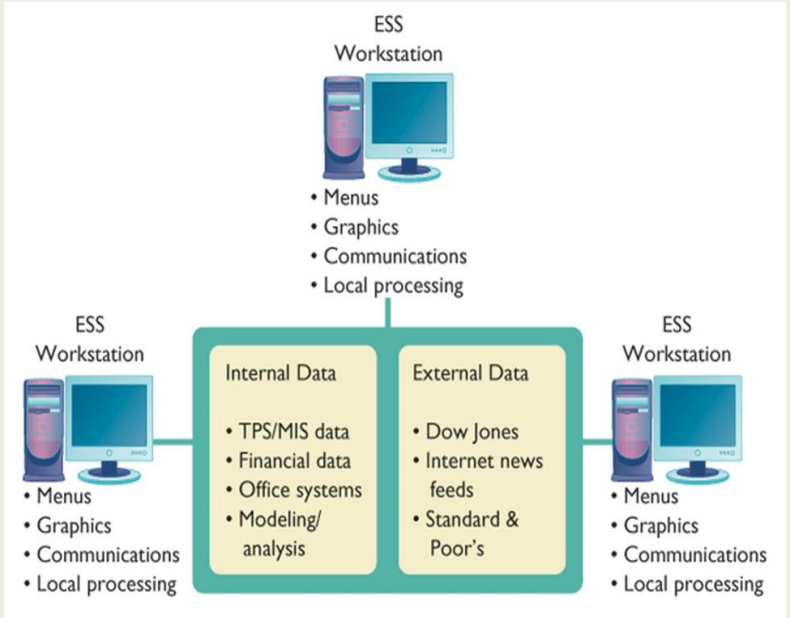
Types of Information Systems

3. Strategic-level systems

- Help senior management tackle and address strategic issues and long-term trends, both in the firm and in the external environment.
- Principal concern is matching changes in the external environment with existing organizational capability.
- Examples:
  - *What will employment levels be in five years?*
  - *What are the long-term industry cost trends, and where does our firm fit in?*
  - *What products should we be making in five years?*

Executive Support Systems (ESS)

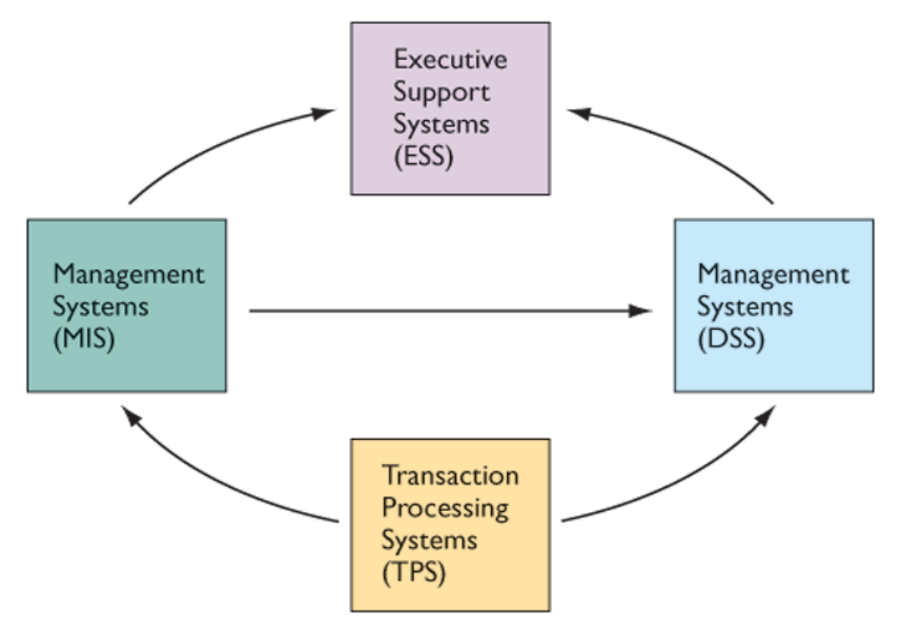
- Provide communications and computing environment that serves the organization's strategic level
- Input: External and internal aggregate data
- Processing: Graphics, simulations, interactive
- Output: Projections, responses to queries
- Users: Senior Managers



Summary

Type of system	Information inputs	Processing	Information outputs	Users
TPS	Transactions; events	Sorting, listing, merging, updating	detailed reports, lists, summaries	Operations personnel, supervisors
MIS	Summary transaction data, high volume data, simple models	Routine reports, simple models, low level analysis	Summary and exception reports	Middle managers
DSS	Low volume data or massive databases optimized for data analysis, analytic models and data analysis tools	Interactive, simulations, analysis	Special reports, decision analysis, responses to queries	Professionals, staff, managers
ESS	Aggregate data, external, internal	Graphics, simulations, interactive	Projections, responses to queries	Senior managers

Interrelationships among systems



Major Business Functions

1. Sales and Marketing Systems
2. Manufacturing and Production Systems
3. Finance and Accounting Systems
4. Human Resource Systems

Major Business Functions

- Identify potential employees
- Maintain employee records
- Track employee skills, job performance, and training
- Support planning for employee compensation and career development

- Manage firm's financial assets: cash, stocks, bonds, etc.
- Manage capitalization of firm and finding new financial assets
- Maintain and manage financial records

- Help identify customers
- Develop products and services
- Promote products and services
- Sell products and services, Provide ongoing customer support

- Planning, development, production of products and services
- Planning, development, maintenance of production facilities
- Acquisition, storage, availability of materials
- Scheduling materials, facilities, labor
- Controlling the flow of production

Exercise

Identify to which category the following systems belongs to (sales and marketing/ manufacturing and production/ finance and accounting/ human resource management

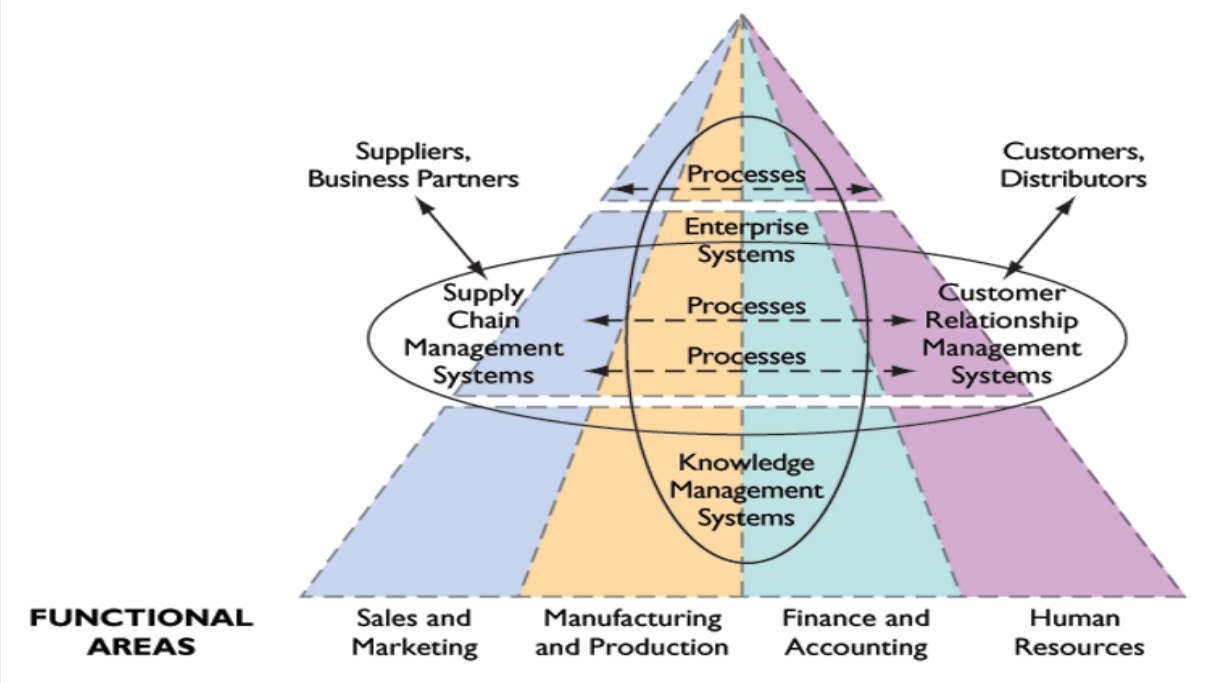
System	Description	Organizational Level
Order processing	Enter, process, and track orders	Operational
Pricing analysis	Determine prices for products and services	Management
Sales trend forecasting	Prepare 5-year sales forecasts	Strategic
Machine control	Control the actions of machines and equipment	Operational
Production planning	Decide when and how many products should be produced	Management
Facilities location	Decide where to locate new facilities	Strategic

System	Description	Organizational Level
Accounts receivable	Track money owed the firm	Operational
Budgeting	Prepare short-term budgets	Management
Profit planning	Plan long-term profits	Strategic
Training and development	Track employee training, skills, and performance	Operational
Compensation analysis	Monitor wages, salaries, benefits	Management
Human resources planning	Plan long-term labor force needs	Strategic

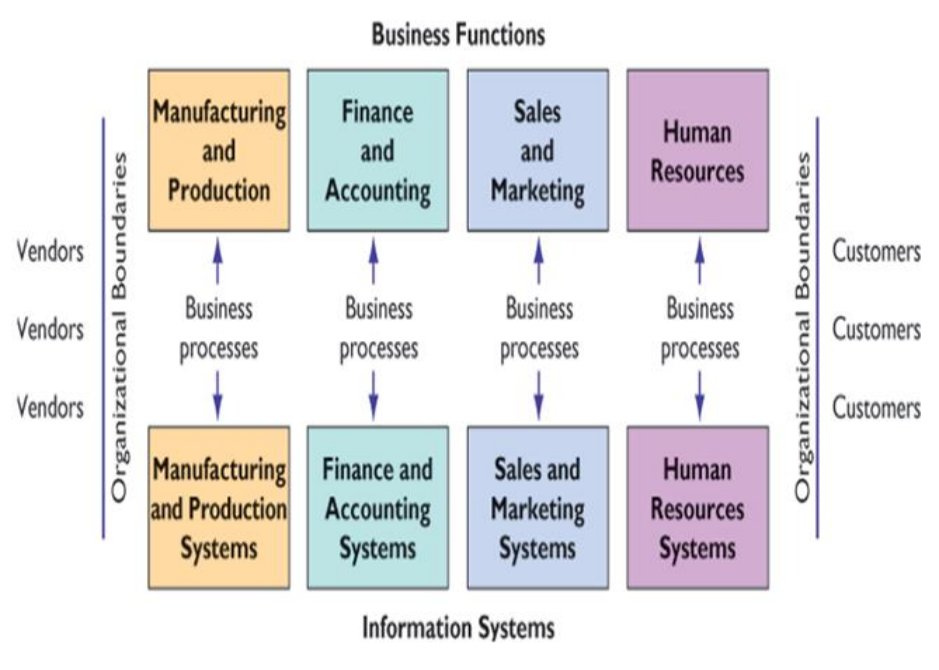
Enterprise Applications

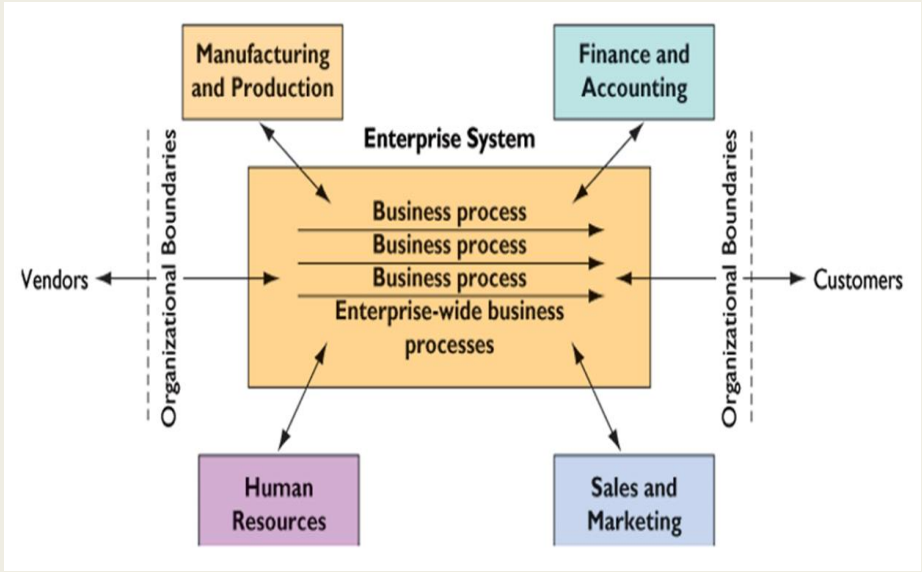
- Many Specialized types of systems.
- Serve many different business functions and organizational levels.
- Many of these systems were build in isolation.
- Systems are loosely coupled.

Enterprise Application Architecture



Enterprise vs Traditional



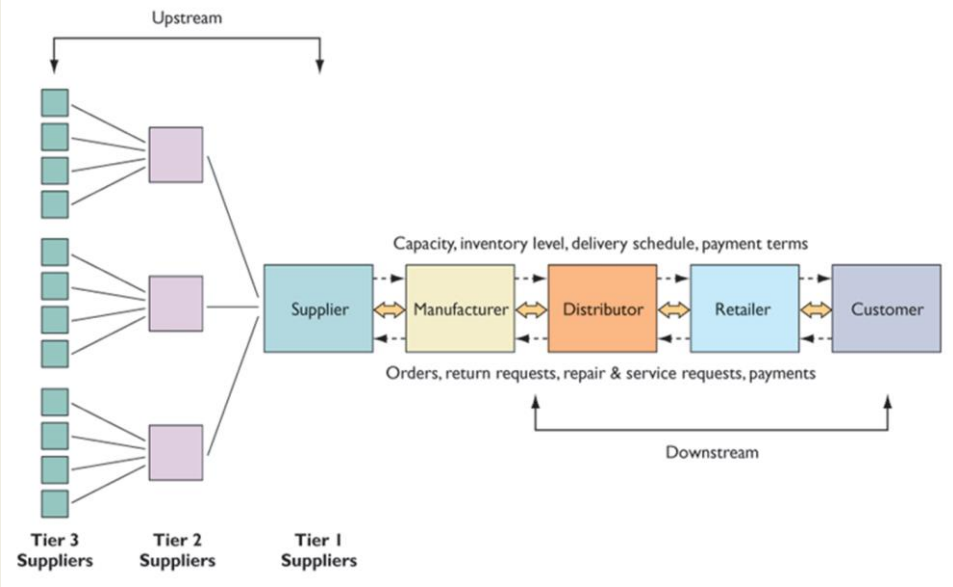


Enterprise systems

- Enterprise resource planning (ERP)
- Provides single information system for organization-wide coordination and integration of key business processes
- Models and automates many business processes

Supply Chain Management Systems

- Supply Chain Management Systems (SCM): Automate flow of information between firm and suppliers to optimize production and delivery
- Supply Chain Management: Close linkage of activities involved in buying, making, moving a product
- Supply Chain: Network of organizations and business processes for production and distribution of products

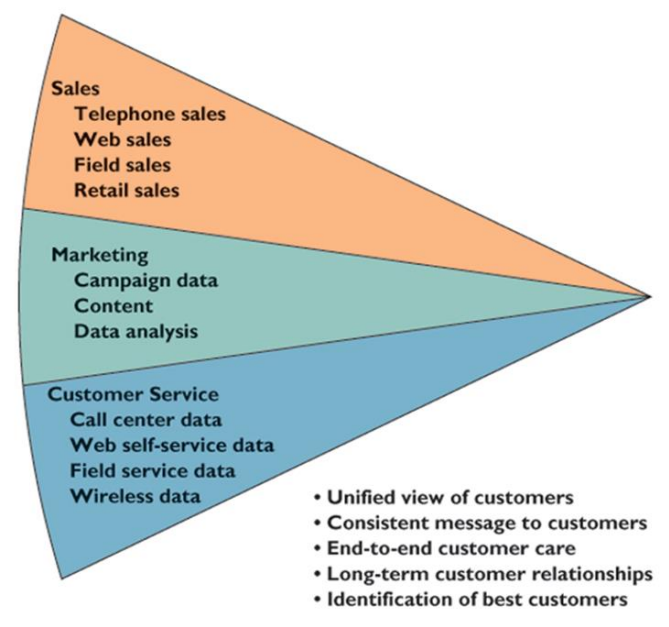


Supply chain information systems can help participants to

- Decide when and what to produce, store, and move
- Rapidly communicate orders
- Track status of orders
- Check and monitor inventory
- Reduce inventory, transportation, warehousing costs
- Track shipments
- Plan production based on actual customer demand
- Rapidly communicate changes in product design

Customer Relationship Management (CRM)

- Manages ways used to deal with existing and potential customers
- Track all customer interactions
- Analyze data to optimize revenue, profitability, customer satisfaction, customer retention
- Both a business and technology discipline
- Uses information systems to coordinate all customer interaction processes in sales, marketing, and service.



Knowledge Management Systems (KMS)

- Collect relevant knowledge and experience in firm to support business processes and management decisions
- Manage and distribute documents and other digital knowledge objects
- Main Role
  - ✓ *Acquire knowledge*
  - ✓ *Store knowledge*
  - ✓ *Distribute knowledge*
  - ✓ *Apply knowledge*

Positive Impacts of Information Systems

- Faster calculations and paperwork
- Analysis of customer purchase patterns and preferences
- More efficient business services
- Medical advances
- Instant global distribution of information

Negative Impacts of Information Systems

- Automation leading to job elimination
- Privacy concerns
- System outages and shutdowns
- Health problems, repetitive stress injury
- Illegal distribution of intellectual property

Home Work 1 (27th February 2018)

- Search through the internet / reading material for a recent article that discusses the use of information systems to deliver significant business benefits to an organization / business.
- ugVLE – Discussion Forum (Home work #No)
- Don't Copy and Paste – give the example in your own words.
- Plagiarism --- Zero Tolerance -> Zero Marks

ASSIGNMENT NO 1

20 Minutes

WHITMANN PRICE CONSULTING: A NEW SYSTEMS INITIATIVE

Case Study

QUESTIONS

Discussion Questions

1. What advantages would the proposed Advanced Mobile Communications and Information System provide for Whitmann Price Consulting? What problems might it assist in eliminating?
2. Why do you think Josh and Sandra have been asked to interview the managers of the six business units within WPC as a first step? As IT professionals, Josh, Sandra, and their boss Matt know much more about technology and information systems than the heads of the business units. Shouldn't they be able to design the system without suggestions from amateurs? Including more people in the planning stage is sure to complicate the process.

Critical Thinking Questions

1. If you were Josh or Sandra, what questions would you ask the heads of the six business units?
2. If you were Josh or Sandra, what additional research might you request of your IT staff at this point?