

COMM 226

COMPREHENSIVE NOTE PACK

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CHAPTER 1 - Introduction to Information Systems

Important Definitions

- **Information technology (IT)**: is any computer-based tool that people use to work with information and to support the information and information-processing needs of an organization.
- **Information system (IS)**: collects, processes, stores, analyzes, and disseminates information for a specific purpose.
 - ➔ The purpose of an IS is to get the right information to the right people at the right time in the right amount and in the right format to support business processes and decision-making.
- **Data**: elementary descriptions of things.
- **Information**: data organized in ways to provide value.
- **Knowledge**: data +/- info that is organized and processed to convey understanding.

Management Information Systems (MIS): the management and use of processes, information systems, and information to help organizations achieve their strategies.

Management consists of creating, monitoring and adapting processes, information systems and information.

MIS helps you learn skills such as

- **Abstract reasoning**: ability to analyze information, detect patterns and relationships, and solve problems on a complex, intangible level.
- **Systems thinking**: ability to model the components of a system and to connect the inputs and outputs among those components into a sensible whole, one that explains the phenomenon observed (e.g., output of production is the input to the sales process).
- **Experimentation**: **1.** making a careful and reasoned analysis of an opportunity, **2.** envisioning potential products, solutions or applications of technology, and **3.** developing the most promising ideas that are consistent with available resources.

Informed User: user knowledgeable about information systems and information technology

Computer-based Information systems (CIS or CBIS): information system that uses computer technology to perform some or all of its intended tasks.

Components:

1. Hardware: devices that accept, process, and display data and information.
2. Software: program(s) that enable the hardware to process data.
3. Database: collection of related files or tables containing data.
4. Network: connecting system that permits different computers to share resources.
5. Procedures: instructions for combining the above components
6. People: individuals who use the hardware and software, or their outputs.

Impacts of IT in Business Milieu

POSITIVE	NEGATIVE
Appearance of new industries	Disappearance of certain industries
Increase in manager productivity	Elimination of jobs
Analyze bigger and more complex data	Potential loss of identity and alienation
More remote supervision	Potential repetitive strain injury & vision issues
Opportunities for people with disabilities	Potential ergonomic issues

CHAPTER 2 + 3 - HARDWARE & SOFTWARE

HARDWARE

INPUTS

- **Human data-entry:** keyboard, mouse, pointing stick, trackball, joystick, touch-screen, stylus, digital pen, Wii, Webcam, voice-recognition, etc.
- **Source-data automation:** magnetic stripe reader, barcode scanners, optical mark reader, sensors, cameras, RFID, optical character recognition, etc.

PROCESSOR

Central Processing Unit (CPU): brain of the computer performs the actual computation or “number crunching” inside any computer.

Parts of the CPU include: control unit, Arithmetic-logic unit (ALU), registers.

➡ *Process:* **1.** Input from software into registers **2.** Instruction from primary storage **3.** Control unit decodes **4.** ALU executes and sends to registers **5.** Registers send to primary storage

PRIMARY STORAGE

Stores small amounts of data and information that the CPU will use immediately, located with the CPU.

- **Random Access Memory (RAM):** runs programs, temporary.
- **Read-only Memory:** starts computer, permanent.
- **Registers**
- **Cache Memory**

SECONDARY STORAGE

Stores large amounts of data and information for extended time, outside of the CPU.

- **Magnetic tape**
- **Hard drives (HDD) - or *Magnetic disks***
- **Solid state drives (SSDs)**
- **Optical disk drives (CD-ROM, DVD)**
- **Flash memory devices (or memory cards, USB, etc.)**

OUTPUTS

Provide requested, processed, and/or computed information to the user, by displaying, solidifying, emitting sounds, and more, through output devices.

- **Printer, computer screen, speakers, etc.**

Moore's Law: the number of transistors per square inch in a CPU doubles every 18 months

Moore's law displays that the cost of data processing, communications, and storage is *virtually zero*.

SOFTWARE

Definition: Set of computer programs that enable the hardware to process data

SYSTEMS SOFTWARE (OS)

Supervises the overall operation of the computer by monitoring the computer's status, scheduling operations, and managing input and output processes.

Functions: Controls + supports information processing activities and peripherals, directs basic computer functions, etc.

User Interfaces:

- Graphical user interfaces (GUI): manipulation of visible objects.
- Natural user interfaces (NUI): social, tactic gesture-control interfaces.
- Social Interface: cartoonlike guidance animations.
- Touch-enabled gesture-controlled interfaces
- Motion control gaming consoles

APPLICATION SOFTWARE

Set of computer instructions that provides specific functionality to a user.

Major Types of Personal Application Software

- Spreadsheets
- Word Processing
- Data Management
- Personal Finance
- Communications

OPEN-SOURCE SOFTWARE (OSS)

Software with source code that anyone can inspect, modify, and enhance.

➔ Examples: Linux, Android, Ubuntu, etc.

Advantages	Disadvantages
High quality	Cost of maintenance
Reliability	Hard to use
Flexibility	Training costs
Low cost to make	Compatibility issues

Issues with Software

- **Software defects:** when program code is inefficient, poorly designed, and riddled with errors.
- **Software licensing:** illegal copies (piracy), legal rights and copyright issues, etc.
- **Open systems:** group of computing products that work together make have compatibility issues.
- **Open-source systems:** see disadvantages above.

CHAPTER 4 - CLOUD COMPUTING

CLOUD COMPUTING CHARACTERISTICS

- **Provides On-Demand Self-Service:**
 - + Automatic access to computing resources
 - + Cloud customer can scale (increase/decrease) the amount of computing
 - + Flexibility & Adaptability
- **Encompasses the Characteristics of Grid Computing:**

Grid Computing: various hardware and software components pooled together, creating a single IT environment with shared resources.

 - + More efficient use of computing resources
 - + No single point of failure
 - + Easy to scale up or down
- **Encompasses the Characteristics of Utility Computing**

Utility Computing: service provider makes computing resources and infrastructure management available to a customer as needed.

 - + Charging for specific usage instead of flat rate
 - + Efficient meeting of fluctuating demands for computing power
- **Uses Broad Network Access:**
 - + Cloud provider's computing resources are available over a network
 - + Computing resources can be accessed with any device
- **Pools Computing Resources:**
 - + Computing resources are available to serve multiple customers
 - + Resources dynamically assigned/reassigned according to customer demand
- **Often Occurs on Virtualized Servers:**

Providers have placed hundreds or thousands of networked servers inside massive data centres called **server farms**.

Server Farms: Collections of hundreds or thousands of networked server computers maintained in a single location and used for applications that require very large amounts of computing power.

 - + Organizations use only a small percentage of farms total computing capacity.
 - + Companies regulate this inefficiency by using **server virtualization**; *single server is used to host multiple virtual servers, thus enabling one server to run multiple applications = reduce cost, inefficiency, space needed.*

TYPES OF CLOUDS

- + **Public**: shared multi-customer IT infrastructures available to the general public.
- + **Private**: can be accessed only by a single or group of entities sharing a same purpose.
- + **Hybrid**: has both mutually exclusive public and private clouds interdependent of each other.
- + **Vertical**: clouds for a specific use or a particular group/industry.

CLOUD COMPUTING SERVICES

ON-PREMISE SOFTWARE	INFRASTRUCTURE-AS-A-SERVICE	PLATFORM-AS-A-SERVICE	SOFTWARE-AS-A-SERVICE
Applications Data Operating system Servers Virtualization Storage Networking	CUSTOMER MANAGES Applications Data Operating system VENDOR MANAGES Servers Virtualization Storage Networking	CUSTOMER MANAGES Applications Data Operating system VENDOR MANAGES Servers Virtualization Storage Networking	VENDOR MANAGES Applications Data Operating system Servers Virtualization Storage Networking
Examples	Amazon, IBM, Google, Microsoft, Rackspace	Microsoft Windows Azure, Google App Engine, Force.com	Salesforce.com, Google Apps, Dropbox, Apple iCloud, Box.net

	IaaS	PaaS	SaaS
ADVANTAGES	<ul style="list-style-type: none"> + Remotely accessible servers, networks, storage capacity + Companies do not bare burden of installation and maintenance of IT infrastructure 	<ul style="list-style-type: none"> + No costs for buying/managing underlying hardware and software + Computing and storage resources scale automatically to match application demand + Frequent updating of OS features + Virtual teams can work together on software development projects + Diverse sources worldwide provide PaaS + Initial and ongoing costs reduced by using services from a single vendor 	<ul style="list-style-type: none"> + Software specific to customers' requirements + Monthly or yearly rate + SaaS applications reside in the cloud, thus minimal memory consumed on customer's hard drive + Simple maintenance and support, since no installation is made on the customer's computers + Better ability to scale + Facilitated backup

BENEFITS & CONCERNS OF CLOUD COMPUTING

BENEFITS	CONCERNS
<p>+ Positive Impact on Employees: + Flexibility in information access</p> <p>+ Saves money: + Cloud computing companies reduce costs by buying in large quantities</p> <p>+ Cloud customers outsource their IT needs, and reduce costs on maintenance and operation of computing capital</p> <p>+ Improves organizational flexibility and Competitiveness: + Scaling as needed</p>	<p>- Legacy IT systems: bundled diversity of IT systems need simplifying before being transferred to cloud.</p> <p>- Reliability: not as reliable as a well-managed, on premise IT infrastructure.</p> <p>- Privacy: major threat to privacy since the providers control, and lawfully or unlawfully monitor the data.</p> <p>- Security: access to sensitive data, data segregation, privacy, error exploitation, recovery, accountability, malicious insiders, and account control.</p> <p>- Regulatory and legality: regulations that involve data access and transport differ from nations to others.</p> <p>- Criminal use:</p> <ul style="list-style-type: none"> - Data attractive to criminals - Easy-to-use encryption technology - Anonymous communication channels - Policing the cloud is expensive - Possible to rent time on hundreds of servers at once - Difficult for authorities or companies to track digital crimes - Geographical diversity means attackers can come from anywhere - Criminals can easily mix in among legitimate users. - Cyberattacks can originate within cloud programs

WEB SERVICES AND SERVICE-ORIENTED ARCHITECTURE

Applications delivered over the cloud, which MIS professionals can select and combine through almost any device.

Key Protocols (*Rules that allow computers to form common language*):

1. Extensible Markup Language (XML)
2. Simple Object Access Protocol (SOAP)
3. Web Services Description Language (WSDL)
4. Universal Description, Discovery, and Integration (UDDI)

Service-Oriented Architecture (SOA)

A collection of web services that is used to build a firm's IT applications.

Benefits:

- Make quick changes to application software
- Integrate systems from a variety of platforms
- Be re-used in other applications

CHAPTER 5 - PRESSURES, ORGANIZATIONAL RESPONSES, AND IT SUPPORT

BUSINESS PRESSURES

Business environment: combination of social, legal, economic, physical, and political factors in which businesses conduct their operations. A significant change in any of these factors causes **business pressures**.

3 types of pressure:

1. **Market pressures:** generated by the global economy, intense competition, the changing nature of the workforce, and powerful customers.

Globalization markedly increases competition.

2. **Technology pressures:** pressures related to technology.

Innovation and Obsolescence: new/improved technologies rapidly create substitutes for products. Today's finest products may be obsolete tomorrow.

Information Overload: harder to find required value in information, given ever-increasing amounts of information.

3. **Societal/Political/Legal pressures:** social responsibility, government regulation/deregulation, spending for social programs, spending to protect against terrorism, and ethics.

Social Responsibility: Social issues range from the state of the physical environment, to company and individual philanthropy, to education.

Compliance with Government Regulations: regulations cover health, safety, environmental protection, and equal opportunity. Businesses tend to view them as expensive constraints on their activities.

Protection against Terrorist Attacks: organizations are under increased pressure to protect themselves against terrorist attacks.

Ethical Issues: general standards of right and wrong. If handled poorly, ethical issues can damage an organization's image and destroy its employees' morale.

IT is instrumental in organizational efforts to "go green" in three areas:

1. *Facilities design and management*
2. *Carbon management*
3. *International and U.S. environmental laws*

ORGANIZATIONAL RESPONSES

- **Strategic Systems:** provide organizations with advantages that enable them to increase their market share and/or profits, to enhance negotiations with suppliers, and to prevent competitors from entering their markets.
- **Customer Focus:** providing superb customer service can make the difference between attracting and retaining customers versus losing them to competitors. Numerous IT tools and business processes have been designed to keep customers happy.
- **Make-to-Order:** a strategy of producing customized products and services.
- **Mass Customization:** a company produces a large quantity of items, but it customizes them to match the needs and preferences of individual customers. Mass customization is essentially an attempt to perform make-to-order on a large scale.
- **E-Business and E-Commerce:** Conducting business electronically is an essential strategy for companies that are competing in today's business environment.
- **Electronic commerce (EC or e-commerce):** describes the process of buying, selling, transferring, or exchanging products, services, or information via computer networks, including the Internet.
- **E-business:** a somewhat broader concept than EC that includes servicing customers, collaborating with business partners, and performing electronic transactions within an organization.

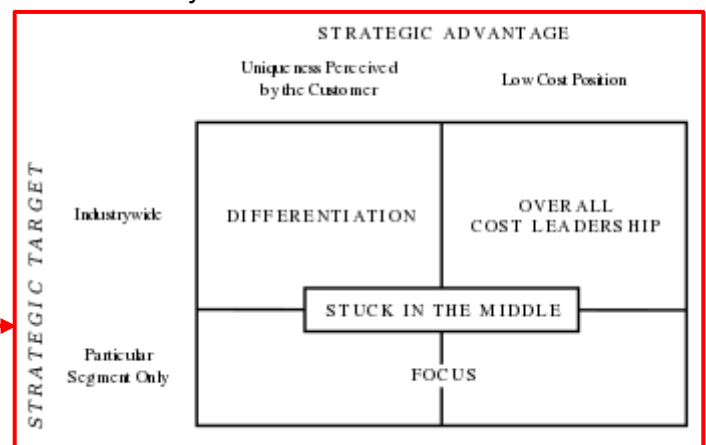
COMPETITIVE ADVANTAGE AND STRATEGIC INFORMATION SYSTEMS

Strategic Information Systems (SISs): provide a competitive advantage by helping an organization implement its strategic goals and improve its performance and productivity.

PORTER'S FIVE FORCES MODEL analyzes competition by assessing:

1. **Threat of substitutes:** performs the same or similar function as an industry's product by another means)
2. **Threat of new entrants:** industry's barriers to entry & reaction new entrants can expect from established companies in the industry)
3. **Existing rivals**
4. **Bargaining power of suppliers**
5. **Bargaining power of customers**

Porter's four fundamental competitive strategies →



PORTER'S VALUE CHAIN

Value chain: set of activities that an organization carries out to create value for its customers.

- Value = amount of money that a customer is willing to pay for a resource, product or service.
- Value - Cost = Margin

Figure 1: Porter's Generic Value Chain



5 primary activities:

1. **Inbound logistics:** receiving, storing and disseminating inputs to products.
2. **Operations & manufacturing:** transforming inputs into final products.
3. **Outbound logistics:** collecting, storing and physically distributing products to buyers.
4. **Sales & marketing:** seducing buyers to purchase products and providing means for them to do so.
5. **Customer service:** assisting customers, while maintaining and enhancing the product value.

4 support activities (contribute indirectly to the primary value chain activities):

1. **Procurement:** process of finding vendors, setting up contractual arrangements and negotiating prices.
2. **Technology:** includes research and development, and innovating activities that develop new techniques, methods and procedures.
3. **Human resources:** recruiting, compensating, evaluating and training employees.

4. **Firm infrastructure:** general management, finance, accounting, legal and government affairs.

BUSINESS–INFORMATION TECHNOLOGY ALIGNMENT

IT function directly supports the business objectives of the organization through the **tight integration of the IT function with the organization's strategy, mission, and goals.**

Characteristics of Excellent Business-IT Alignment:

1. Organizations view **IT as an engine of innovation** that continually transforms the business, often creating new revenue streams.
2. Organizations view their internal and external customers and their **customer service function as supremely important.**
3. Organizations **rotate business and IT professionals** across departments and job functions.
4. Organizations provide **overarching goals** that are completely clear to each IT and business employee.
5. Organizations ensure that **IT employees understand how the company makes (or loses) money.**
6. Organizations create a **vibrant and inclusive company culture.**

CHAPTER 6 + 7 - Business Processes

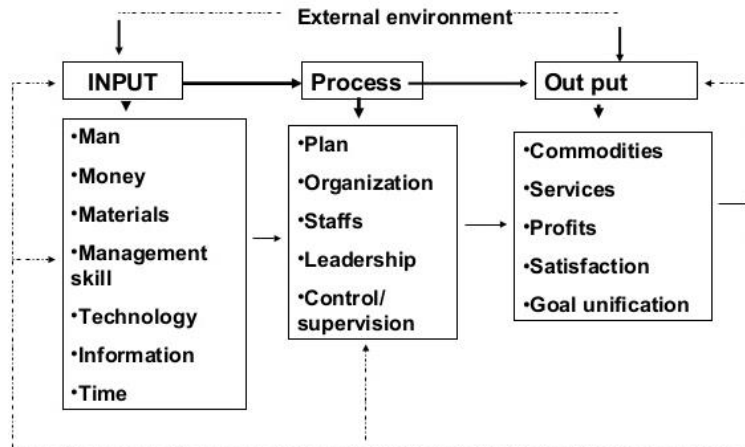
IPO MODEL

Business processes: ongoing collection of related activities that create a product or a service of value to the organization, its business partners, and/or its customers.

3 Fundamental Elements

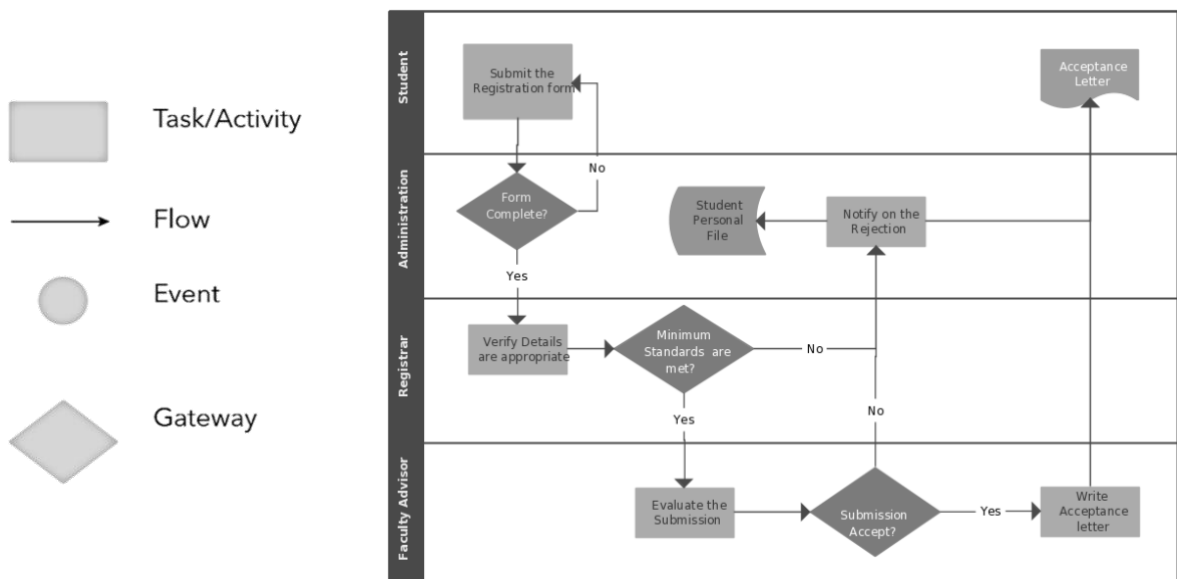
1. **Inputs:** materials, services, and information that flow through and are transformed as a result of process activities
2. **Resources:** people and equipment that perform process activities
3. **Outputs:** the product or a service created by the process

IPO model:



CROSS-FUNCTIONAL PROCESSES

- ➔ Multiple functional areas collaborate to perform the process.
- ➔ Can be represented in **FLOWCHARTS**:



INFORMATION SYSTEMS AND BUSINESS PROCESSES

➔ Information systems (IS) are critical enablers of an organization's business processes. They facilitate **communication and coordination** among functional areas and allow **easy exchange and access of data** across processes.

3 areas of IS importance:

- **Executing the process**
- **Capturing and storing process data**
- **Monitoring process performance**

BUSINESS PROCESS EXCELLENCE

➔ Excellence in executing business processes is widely recognized as the underlying basis for all significant measures of competitive performance in an organization.

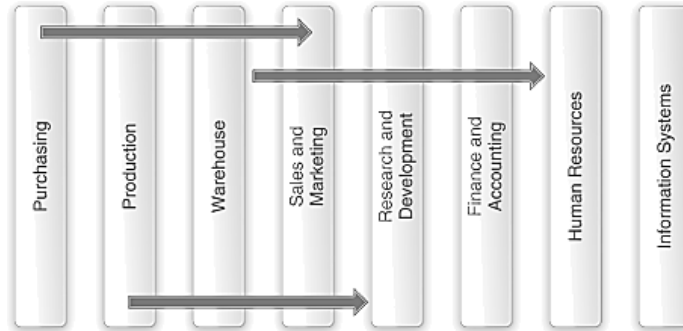
- **Customer satisfaction:** optimizing/aligning business processes to fulfill customers' needs, wants, and desires.
- **Cost reduction:** optimizing operations and supplier processes.
- **Cycle and fulfillment time reduction:** optimizing the manufacturing and logistics processes.
- **Quality:** optimizing the design, development, and production processes.
- **Differentiation:** optimizing the marketing and innovation processes.
- **Productivity:** optimizing each individual's work processes.

3 Methods to ensure business process excellence

1. **Business process reengineering (BPR):** radical redesign of business processes that is intended to improve the efficiency and effectiveness of an organization's business processes
2. **Business process improvement (BPI):** less radical than BPR, organizes work around business processes rather than individual tasks.
3. **Business process management (BPM):** management system that integrates BPI initiatives, and includes methods/tools to support the continuous optimization of core business processes throughout the organization.

FUNCTIONAL ORGANIZATIONAL STRUCTURE

→ Organizations are divided into functions, or departments, each of which is responsible for a set of closely related activities.



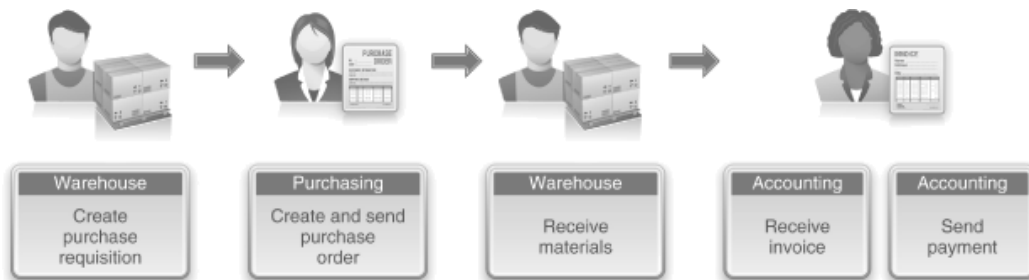
THE SILO EFFECT

Focusing narrowly on specific tasks and losing sight of the “big picture” of the larger process. Employees complete their tasks in their functional “silos”, with no regard to the consequences for the other components in the process.

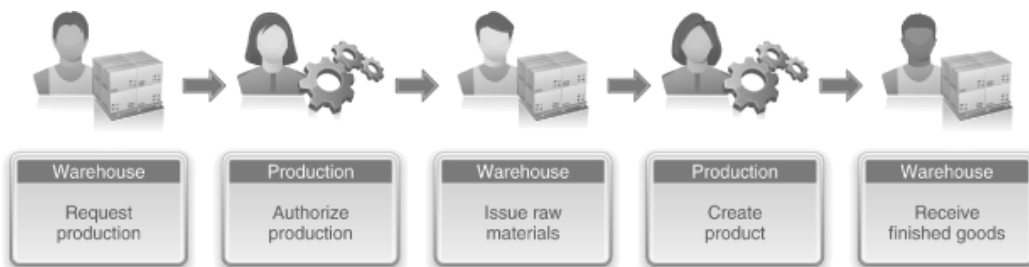
Solution: cross-functional communication and collaborative execution.

KEY BUSINESS PROCESSES

1. The **PROCUREMENT** process (buy): all of the activities involved in **buying or acquiring the materials** used by the organization, such as raw materials needed to make products.



2. The **PRODUCTION** process (make): the **actual creation of the products** within the organization.



3. The **FULFILLMENT** process (sell): all the steps involved in **selling and delivering the products** to the organization's customers.



CHAPTER 8 - ENTERPRISE SYSTEMS

Enterprise Systems (ES): large-scale application software packages that support business processes, information flows, reporting, and data analytics in complex organizations.

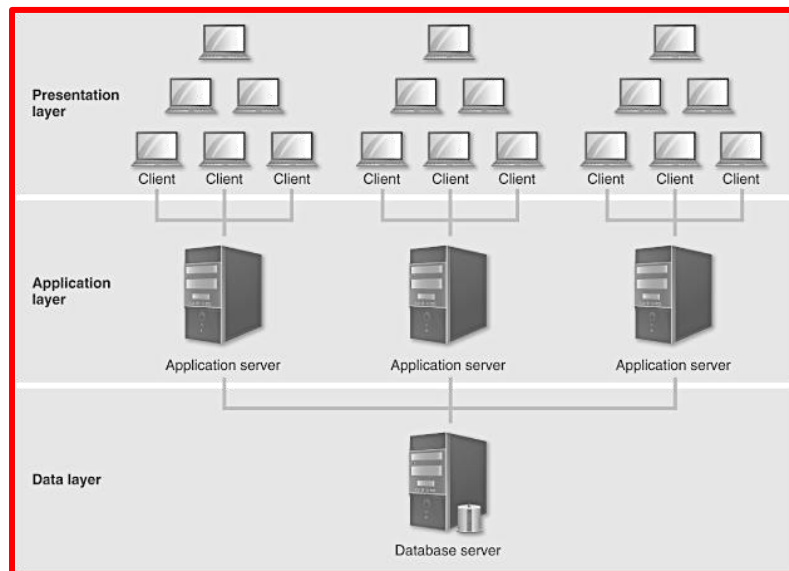
ARCHITECTURE OF ENTERPRISE SYSTEMS

➔ Architecture of an enterprise system refers to the **technical structure of the software, the ways that users interact with the software, and the ways the software is physically managed on computer hardware.**

2 Modern Architecture Models:

Client-Server Architecture: applications that consist of three layers contained in one system, hence the name three-tier client-server. These layers are:

1. **Presentation Layer:** how you interact with the application (using menus, typing, and selecting).
2. **Application Layer:** what the application allows you to do (create formulas or charts, compose an essay).
3. **Data Layer:** here the application stores your work (on your hard drive or flash drive).



Benefits:

- Reduced the costs of acquiring, implementing, and using an ES
- Increased the SCALABILITY (ability to support a greater number of users over time, t at a decreasing cost per user) of the systems.

Service-Oriented Architecture (SOA): web-enabled three-tier applications that users can access through a communication protocol over a network, or *Web services*. By using Web services, companies could now integrate multiple client-server applications and create enterprise *mash-ups*, or *composite applications*.

ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS

- ➔ World's largest and most complex ES.
- ➔ ERP systems focus primarily on ***intra-company processes*** (the operations that are performed within an organization) and integrate functional and cross-functional business processes.
- ➔ ERP systems support Operations (Production), Human Resources, Finance & Accounting, Sales & Distribution, and Procurement.

Best example: SAP ERP

-SAP covers different business process capabilities, called modules. SAP ERP modules include:

- Production Planning (PP)
- Materials Management (MM)
- Sales and Distribution (SD)
- Plant Maintenance (PM)
- Project Systems (PS)
- Quality Management (QM)
- Financial Accounting (FI)
- Management Accounting / Controlling (CO)
- Human Resources (HR)
- Business Intelligence (BI)

-SAP supports **inter-company systems**, such as:

-Supply Chain Management (SCM): connects a company to other companies that supply the materials it needs to make its products.

-Supplier Relationship Management (SRM): systems that typically manage the overall relationships with the materials suppliers.

-Customer Relationship Management (CRM): systems connect a company's ERP system to those of its customers.

-Product Lifecycle Management (PLM): systems that help companies administer the processes of research, design, and product management.

➔ The ERP system combining these inter-company systems is called **application suite**.

APPLICATION PLATFORMS

➔ Enterprise operating systems which contain specifically tailored ES.

Example: SAP NetWeaver, which contains SAP ERP and other SAP applications.

DATA IN AN ENTERPRISE SYSTEM

There are three types of data in an ERP system:

1. **Organizational data:** used to represent the structure of an enterprise.

3 Elements:

1. Client Code
2. Company Code
3. Plant

2. **Master data:** represent entities associated with various processes.

Example:

Material Master: information on all the materials that a company procures or produces, stores, and sells.

Material types:

- **Raw materials (ROH):** purchased from an external source and used in the production process.
 - **Semi-finished goods (HALB):** produced in-house from other materials, such as raw material, and used in the production of a finished good.
 - **Finished goods (FERT):** created by the production process from other materials, such as raw materials and semi-finished goods.
 - **Trading goods (HAWA):** like raw materials, are purchased from a vendor but can be resold directly.
3. **Transaction data:** combination of organizational data, master data, and situational data.
 - ➔ Data that is specific to the task being executed, such as who, what, when, and where.

CHAPTER 10 – DATA & KNOWLEDGE MANAGEMENT

DATA GOVERNANCE - MASTER DATA MANAGEMENT

Master data management: provides companies with the ability to store, maintain, exchange, and synchronize a consistent, accurate, and timely “single version of the truth” for the company’s core master data.

Relational databases: allow people to compare information quickly by row or column. Items are easy to retrieve by finding the point of intersection of a particular row and column.

➔ **Large-scale relational databases:** composed of many interrelated tables, making the overall design complex with slow search and access times.

BIG DATA

Big Data: collection of data that is very large and complex, composed of **high-volume**, **high-velocity**, and **high-variety** data assets that require new forms of processing to enable enhanced decision making, insight discovery, and process optimization.

• **Volume:** vast quantities of data.

• **Velocity:** flows into an organization at increasing speed.

• **Variety:** huge variety of different data in differing data formats.

DATA WAREHOUSES & MARTS

Data Warehouses: repositories of historical data that are organized by subject to support decision makers in the organization.

Data Marts: low-cost, scaled-down version of a data warehouse that is designed for the end-user needs in a strategic business unit (SBU) or an individual department.

KNOWLEDGE MANAGEMENT SYSTEMS (KMS)

KMS: process that helps organizations manipulate important knowledge that makes up part of the organization’s memory, usually in an unstructured format.

QUERY LANGUAGES

Structured query language (SQL): is the most popular query language used for this operation. ➔ Allows people to perform complicated searches by using relatively simple statements or key words.

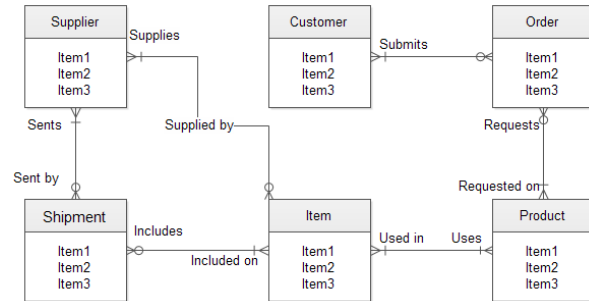
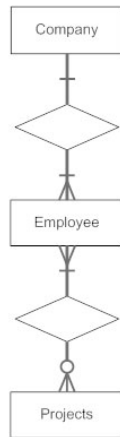
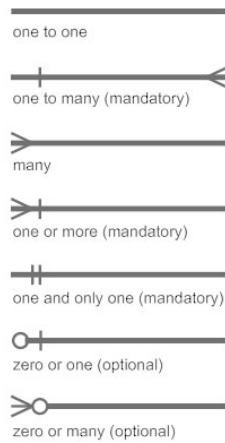
Query by example (QBE): user fills out a grid or template—also known as a *form*—to construct a sample or a description of the data desired. ➔ Simpler than keying in SQL commands.

ENTITY-RELATIONSHIP MODELLING (ERM)

ERM: process of designing a database by organizing data entities to be used and identifying the relationships among them. ➔ By using **Entity Relationship Diagrams**.

ER diagrams: **entities (rectangles)**, **attributes (lines)**, and **relationships (diamonds)**:

Information Engineering Style

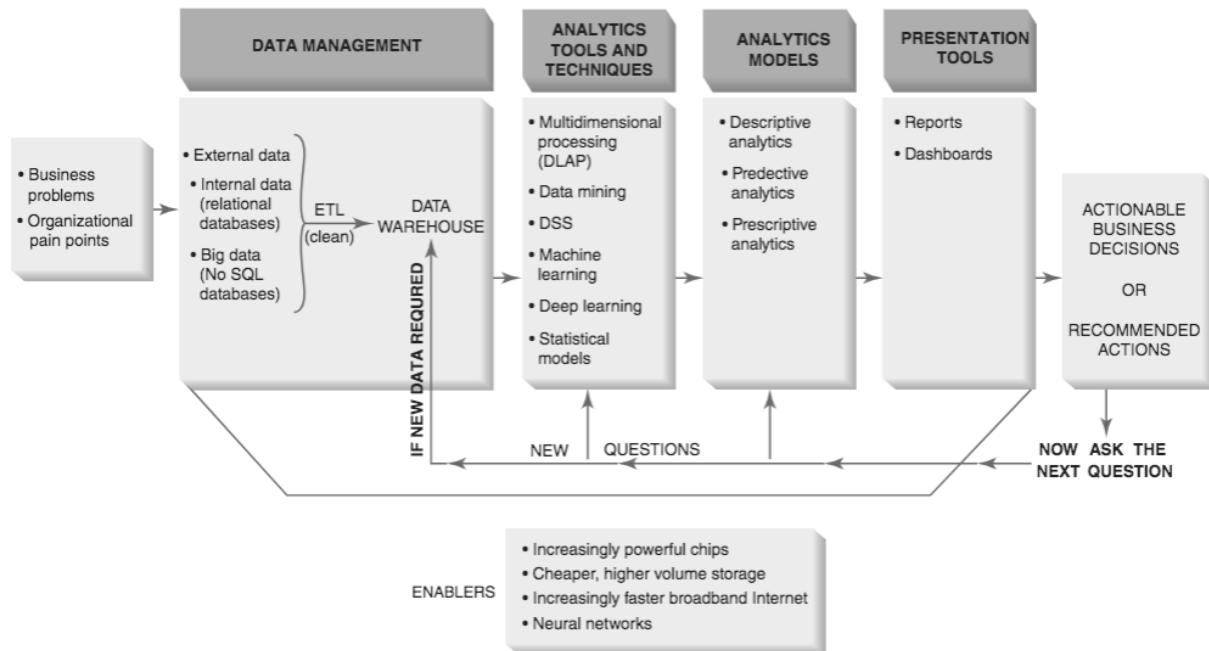


Normalization: method for **analyzing and reducing a relational database to its most streamlined form** to ensure minimum redundancy, maximum data integrity, and optimal processing performance. When data are *normalized*, attributes in each table depend only on the primary key.

Join operation combines records from two or more tables in a database to produce information that is located in different tables.

CHAPTER 11 – BUSINESS ANALYTICS

Business Analytics (BA): the process of developing actionable decisions or recommendations for actions based on insights generated from historical data.



Online Transaction Processing (OLTP)

Anything that involves transaction processing. System collects data electronically and process the transactions online.

OLTP systems: Backbone of all functional; supports decision making by providing raw information about transactions and status for an organization.

Business Intelligence (BI)

System that provides information for improving decision making. It involves business analytics, and a broad category of applications, technologies, and processes for gathering, storing, accessing, and analyzing data.

Retail Analytics Where businesses analyze their data

- **Group decision support systems:** multiple parties to participate in decision-making and improve outcomes
- **Reporting systems:** Integrate data from multiple sources
- **Data-mining systems:** Process data using sophisticated statistical techniques
- **Knowledge-management (KM) systems**
- **Expert systems:** knowledge of human experts in “if ____, then ____” form

Characteristics and Competitive Advantage of BI systems

Business Intelligence System	Characteristics	Competitive Advantage
Group Decision Support Systems (GDSS)	Allow multiple decision makers to collaborate, often anonymously and at different times and in different locations.	Improve decision outcomes by reducing many of the biases inherent in group discussion and option evaluation.
Reporting Systems	Integrate and process data by sorting, grouping, summing, and formatting. Produce, administer, and deliver reports.	Improve decisions by providing relevant, accurate, and timely information to the right person.
Data-Mining Systems	Use sophisticated statistical techniques to find patterns and relationships.	Improve decisions by discovering patterns and relationships in data to predict future outcomes.
Knowledge Management Systems	Share knowledge of products, product uses, best practices, etc., among employees, managers, customers, and others.	Improve decisions by publishing employee and other's knowledge. Create value from existing intellectual capital. Foster innovation, improve customer service, increase organizational responsiveness, and reduce costs.
Expert Systems	Encode human knowledge in the form of If/Then rules and process those rules to make a diagnosis or recommendation.	Improve decision making by non-experts by encoding, saving and processing expert knowledge.

CHAPTER 15 – E-BUSINESS & E-COMMERCE

TYPES OF ELECTRONIC COMMERCE (EC)

1. **Business-to-consumer (B2C)**: sellers are organizations and the buyers are individuals.
2. **Business-to-business (B2B)**: sellers and the buyers are businesses.
3. **Consumer-to-consumer (C2C)**: individual sells products or services to other individuals.
4. **Business-to-employee (B2E)**: an organization uses EC internally to provide information and services to its employees.
5. **E-government (G2C EC or G2B EC)**: the use of Internet technology in general and e-commerce in particular to deliver information and public services to citizens and business partners and suppliers.
6. **Mobile commerce**: EC conducted entirely in a wireless environment.

BUSINESS-TO-CONSUMER (B2C) EC SERVICES

- **Electronic banking**: involves conducting various banking activities from home.
- **Online securities trading**: involves buying and selling securities over the Web.
- **Online job matching**: promising environment for job seekers and for companies searching for hard-to-find employees.
- **Online travel services**: purchase airline tickets, reserve hotel rooms, and rent cars.
- **Online advertising**: media-rich, dynamic, and interactive advertising process.

BUSINESS-TO-BUSINESS (B2B) EC MODELS

- **Sell-side marketplace**: organizations attempt to sell their products or services to other organizations electronically from their own private e-marketplace website and/or from a third-party website.
- **Buy-side marketplace**: organizations attempt to buy needed products or services from other organizations electronically.
- **Public exchanges**: E-marketplaces, in which there are many sellers and many buyers.
 1. **Vertical exchanges**: connect buyers and sellers in a given industry.
 2. **Horizontal exchanges**: connect buyers and sellers across many industries.
 3. **Functional exchanges**: needed services are traded on an “as-needed” basis.

ETHICAL AND LEGAL ISSUES OF ELECTRONIC COMMERCE

Ethical issues:

- Protecting an individual's privacy
- The use of e-commerce for legitimate business activities.

Legal issues:

- Fraudulent email campaigns
- Fraudulent e-commerce websites set up to deceive the buyer
- Domain name registration and cybersquatting
- Tax online sales so as to comply with the legislation.

CHAPTER 16 – SOCIAL COMPUTING

WEB 2.0

- **Tags:** keywords or terms that describe a piece of information (e.g., a blog, a picture, an article, or a video clip).
- **Really Simple Syndication:** allows you to receive the information you want, when you want it, without having to surf thousands of websites.
- **Weblog:** (*blog* for short) is a personal website, open to the public, in which the site creator expresses his or her feelings or opinions with a series of chronological entries.
- **Microblogging:** form of blogging that allows users to write short messages (or capture an image or embedded video) and publish them.
- **Wiki:** website on which anyone can post material and make changes to already posted material.
- **Social networking:** websites allow users to upload their content to the Web in the form of text (e.g., blogs), voice (e.g., podcasts), images, and videos (e.g., videocasts).
- **Mashup:** is a website that takes different content from a number of other websites and mixes them together to create a new kind of content.

BENEFITS AND RISKS OF SOCIAL COMMERCE TO COMPANIES

Social commerce is the delivery of electronic commerce activities and transactions through social computing.

BENEFITS	RISKS
<p>To Customers</p> <ul style="list-style-type: none"> - Better and faster vendor response to complaints; - Assist other customers; - Expectations met more fully and quickly; - Search, link, chat, and buy while staying in the social network's page. <p>To Vendors</p> <ul style="list-style-type: none"> - Test new products and ideas quickly and inexpensively; - Learn much about their customers; - Identify problems quickly and alleviate anger - Learn from customers' experiences with rapid feedback; - Increase sales when customers discuss products positively on social networking sites; - Create better marketing campaigns and brand awareness; - Use low-cost user-generated content - Identify influential brand advocates and reward them. 	<ol style="list-style-type: none"> 1. Information security concerns 2. Invasion of privacy 3. Violation of intellectual property and copyright 4. Employees' reluctance to participate; data leakage of personal information or corporate strategic information 5. Poor or biased quality of users' generated content 6. Cyberbullying/cyberstalking and employee harassment.

SOCIAL SHOPPING METHODS

Social shopping: method of electronic commerce that takes all of the key aspects of social networks and focuses them on shopping. Methods include:

- Group shopping
- Shopping communities and clubs
- Social marketplaces and direct sales
- Peer-to-peer shopping

SOCIAL NETWORKING FOR ADVERTISING AND MARKET RESEARCH

Social advertising: advertising that employ the social context of the user viewing the ad.

Methods include the following:

- Create a company Facebook page;
- Tweet business success stories to your customers;
- Integrate ads into YouTube videos;
- Add a Facebook "Like" button with its sponsored story to your product.

Market Research

Facebook: Get feedback from your Facebook fans (and their friends if possible) on advertising campaigns, market research, etc.; test-market your messages; and use Facebook for survey invitations.

Twitter: Use Twitter Search; use Twellow; and look at the chart on TweetStats.

LinkedIn: Post a question, regarding the topic or issue you are interested in.

HUMAN RESOURCES AND SOCIAL COMPUTING

Recruiting:

- Using online social networks as new recruiting platforms.
- Scanning online social networks to find information about potential employees.
- Job seekers (online/active) have a better chance to be seen by recruiters.
- Passive job seekers (not desperate to find job) can be more easily identified.

Employee development:

- Using social tools to build relationships with employees.
- Can help them become more engaged and excited about their work.
- Social networks can also help to provide training.

CHAPTER 17 – ACQUIRING SYSTEMS AND INFORMATION SYSTEMS

SYSTEMS AND INFORMATION SYSTEMS

System: group of components that interact to achieve some purpose.

Information System (IS): is a group of components that interact to produce information. It involves Hardware, Software, Data, Procedures, People.

4 Methods for Acquiring Software and Applications:

1. Purchase a prewritten application: *buy it and use it directly*
2. Customize a prewritten application: *buy it, customize it, and use it*
3. Lease the application: *rent it*
4. Outsource
5. Develop it yourself

IT PLANNING & PROJECTS MANAGEMENT

IT operations: delivery of service, maintenance, protection of IT.

IT projects: renewal and adaptation of IT infrastructure.

Application Portfolio: the set of recommended applications resulting from the planning and justification process in application development.

IT Planning

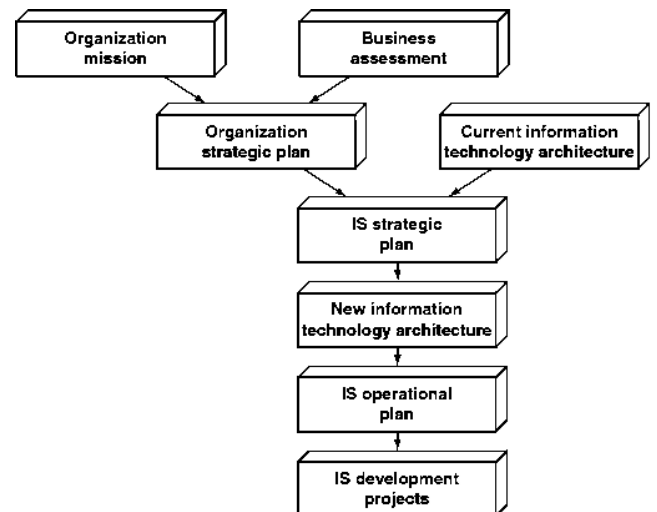
Organization strategic plan: identifies the firm's overall mission, the goals that follow from that mission, and the broad steps required to reach these goals.

IT architecture: delineates the way an organization should utilize its information resources to accomplish its mission.

IS strategic plan: set of long-range goals that describe the IT infrastructure and identify the major IT initiatives needed to achieve the organization's goals.

IS Operational plan: clear set of projects that the IS department and the functional area managers will execute in support of the IT strategic plan. Which contains:

- **Mission** (of project)
- **IS environment:** summary of the information needs of all areas.
- **Objectives** of the IS function: best current estimate of the goals.
- **Constraints** on the IS function: resource limitations on the IS function.
- **Application portfolio**
- **Resource allocation/project management:** listing of who is going to do what, how, and when.



Evaluating/Justifying IT Investment

1. Assessing the Costs

Fixed costs: infrastructure costs and the costs associated with IT services and IT management.

Variable costs: costs for maintaining, debugging, and improving the system

2. Assessing the Benefits

Benefits may be more **difficult to quantify**, especially because many of them are intangible

3. Conducting the Cost-Benefit Analysis

Common approaches:

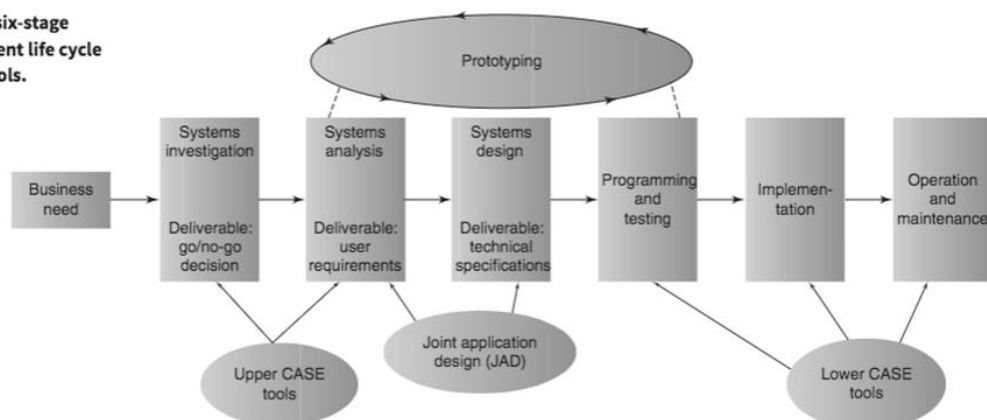
1. **Net present value:** convert future values of benefits to their present-value equivalent by “discounting” them at the organization's cost of funds.
2. **Return on investment:** measures management's effectiveness in generating profits with its available assets.
3. **Break-even analysis:** determines the point at which the cumulative dollar value of the benefits from a project = the investment made in the project.
4. **Business case approach:** system developers write a business case to justify funding one or more specific applications or projects.

DEVELOPING IT SYSTEMS

System Development Live Cycle (SDLC)

The classic process used to acquire information systems (for large-scale IT projects)
- These basic tasks are combine into **phases of systems development**

FIGURE 13.4 A six-stage systems development life cycle with supporting tools.



PHASES IN SDLC:

1. **Systems investigation:** address the business problem/opportunity by its feasibility.
2. **Systems analysis:** gather information about the existing system and determine the requirements for the new system.
3. **Systems design:** Describes how the system will resolve the business problem.
4. **Programming and testing:** *Programming* translates the design specifications into computer code; *testing* checks to see whether the computer code will produce the expected and desired results and detects errors, or bugs, in the computer code.
5. **Implementation:** converting from the old system to the new system via three major conversion strategies: direct, pilot, or phased.
6. **Operation and maintenance:** debugging, updating, and adding new functions.

ALTERNATIVE DEVELOPMENT METHODS

Methods

- **Joint application design:** group-based tool for collecting user requirements and creating system designs.
- **Rapid application development:** systems development method that can combine JAD, prototyping, and ICASE tools to rapidly produce a high-quality system.
- **Agile development:** software development methodology that delivers functionality in rapid iterations, which are usually measured in weeks.
- **End-user development:** organization's end users develop their own applications with little or no formal assistance from the IT department.

Tools to Augment Methods

- **Prototyping approach:** defines an initial list of user requirements, builds a model of the system, and then improves the system in several iterations based on users' feedback.
- **Integrated computer-aided software engineering:** combines upper CASE tools (automate systems investigation, analysis, and design) and lower CASE tools (programming, testing, operation, and maintenance).
- **Component-based development:** uses standard components to build applications.
- **Object-oriented development:** begins with the aspects of the real world that must be modelled to perform that task. Systems developers identify the objects in the new system. Each object represents a tangible, real-world entity, such as a customer, bank account, student, or course. Objects have *properties*, or *data values*. Objects also contain the *operations* that can be performed on their properties.

OUTSOURCING

The use of outside contractors or external organizations to acquire IT services.

The outsourced vendor can be domestic or international.

→ **Offshoring**: when contractor is overseas

Pros: easier to gain expertise, possible cost reductions, reduced development risk.

Cons: loss of control, possible hidden costs, less possible quality management.

CHAPTER 18 – ETHICS AND PRIVACY

ETHICS

Ethics: the principles of right and wrong that individuals use to make choices that guide their behaviour.

Fundamental tenets of ethics:

1. **Responsibility:** you accept the consequences of your decisions and actions.
2. **Accountability:** determining who is responsible for actions that were taken.
3. **Liability:** individuals the right to recover the damages done to them by others.

Major ethical issues related to IT:

- Privacy
- Accuracy
- Property (including intellectual property)
- Access to information

Privacy policies: address issues of data collection, data accuracy, and data confidentiality. They help organizations avoid legal problems.

Information Systems Ethics

➔ It's about people involved with the system, not hardware or software. It's about understanding our own behaviour.

PRIVACY & IDENTITY THEFT

Privacy: the right to be left alone and to be free of unreasonable personal intrusions.

Identity Theft: stealing, misrepresenting, or hijacking the identity of another person or business, providing an effective way to commit other crimes. Vital information is required to complete impersonation.

CHAPTER 19 – INFORMATION SECURITY AND CONTROLS

FACTORS INCREASING VULNERABILITY OF IS

1. Today's interconnected, interdependent, wirelessly **networked business environment**.
Example: The Internet.
2. Smaller, faster, **cheaper computers and storage devices**.
Examples: Tablets, thumb drives, smart phones.
3. **Decreasing skills necessary to be a computer hacker**.
Example: Information system hacking programs circulating on the Internet.
4. International **organized crime taking over cybercrime**.
Example: Transnational cybercrime cartels.
5. **Lack of management support**.
Example: Short-sighted management might reduce IT spending.

HUMAN MISTAKES AND SOCIAL ENGINEERING

Human mistakes are **unintentional errors**. However, employees can also make unintentional mistakes as a result of actions by an attacker, such as social engineering.

Example: **Tailgating** (following others' methods).

Social engineering is an attack where the perpetrator uses social skills to trick or **manipulate a legitimate employee** into providing confidential company information.

Example: When an attacker calls an employee on the phone and impersonates a superior in the company.

TYPES OF DELIBERATE SOFTWARE ATTACKS

1. **Espionage** or **trespass**: unauthorized attempt to gain illegal organizational information.
2. **Information extortion**: threatening to steal, or stealing, information from a company.
3. **Sabotage** and **vandalism**: defacing an organization's website.
4. **Theft of equipment and information**: multiplying as devices are more valuable to steal.
5. **Identity theft**: deliberate assumption of another person's identity.
6. **Compromises to intellectual property**: digital forms of intellectual property are more vulnerable for compromises, such as stealing, copying, etc.
7. **Software attacks**: malicious software penetrates an organization's computer system.
8. **Alien software**: clandestine software that is installed through deceitful methods.
9. **Supervisory control and data acquisition (SCADA)**: Attack attempts to compromise SCADA systems (that monitor/control chemical, physical, and transport processes).
10. **Cyberterrorism** and **Cyberwarfare**: attackers use a target's computer systems, particularly via the Internet, to cause physical, real-world harm or severe disruption, usually to carry out a political agenda.

RISK MITIGATION STRATEGIES

1. **Risk acceptance:** the organization accepts the potential risk, continues operating with no controls, and absorbs any damages that occur.
2. **Risk limitation:** the organization limits the risk by implementing **controls** that minimize the impact of threats.
3. **Risk transference:** the organization transfers the risk by using other means to compensate for the loss, such as by purchasing insurance.

TYPES OF CONTROLS (RISK LIMITATION)

General controls include controls for the prevention, deterrence, detection, damage control, recovery, and correction of information systems.

Types:

1. **Physical controls** (e.g., security guards or locks),
2. **Logical controls** (such as passwords or automated calculations),
3. **Access controls** (such as multifactor authentication), and
4. **Communications controls** (such as firewalls).

Application controls include input, processing, and output controls.