ITM 100 Final Exam Review By: Zakeria Q

Chapter 1

- Information Technology (IT) is the acquisition, processing, storage, and dissemination of vocal, pictorial, textual, & numerical info by microelectronics-based combination of computing and telecommunications
- Information systems (IS) reduces costs and improves productivity, improves customer loyalty, creates competitive advantage, and generates growth
- Business Functions:
  - Human resources maintains policies, plans, and procedures for the effective management of employees
  - Sales performs the function of selling goods/services
  - Marketing supports sales by planning, pricing, and promoting goods or services
  - Accounting records, measures, and reports monetary transactions
- Information Systems (IS) are computer-based tools people use to work with info and support the info and info-processing needs of an organization
- Management Information Systems (MIS) is the function that plans for, develops, implements, and maintains IT hardware, software, and applications that people use to support the goals of an organization
  - MIS is a business function, like Human Resources and accounting
- Data is raw facts that describe the characteristic of an event
- Information is data converted into a meaningful and useful context
- Knowledge is information that can be enacted upon (actionable information)
- IS is used to convert data into information and information into knowledge
- Information-functional culture: employees use information as a means of exercising influence or power over others
- Information-sharing culture: employees across departments trust each other to use information to improve performance
- Information-inquiring culture: employees across departments search for information to understand the future and align themselves with current trends
- Information-discovery culture: employees across departments are open to new insights about crisis & radical changes & seek ways for competitive advantages
- Chief information officer (CIO) oversees all uses of IT and ensures the strategic alignment of IT with business goals and objectives
- Chief knowledge officer (CKO) is responsible for collecting, maintaining, and distributing the organization's knowledge
- Chief privacy officer (CPO) ensures the ethical and legal use of information
- Chief security officer (CSO) ensures safety of IT resources including data, hardware, software, and people
- Chief technology officer (CTO) ensures the throughput, speed, accuracy, availability, and reliability of IT
- Business personnel have expertise in functional areas (HR, accounting, sales) and IS personnel have technological expertise
- Competitive advantage: a product or service that an organization's customers place a greater value on than similar offering from a competitor

- First-mover advantage: occurs when an organization can significantly impact its market share by being first to market with a competitive advantage
- Environmental scanning is the attainment and analysis of events and trends in the environment external to an organization
- Five forces model:
  - Buyer power: ability of buyers to affect the price of an item
    - Switching costs: manipulating costs that make customers reluctant to switch to another product
    - Loyalty program: rewards customers based on the amount of business they do with a particular organization
  - Supplier power: high when buyers have few choices to buy from and low when they have many choices
    - Supply chain: all parties involved in the procurement of a product or raw material (reduced when switching costs are high)
  - Threat of substitute products or services: high when there are many alternatives to a product/service and low when there are a few alternatives.
  - Threat of new entrants: high when it's easy for new competitors to enter a market and low when there are significant entry barriers to entering a market
    - Entry barrier: feature or a product/service that customers expect and entering competitors must offer the same for survival in the market
  - Rivalry among existing competitors: high when competition is fierce in a market and low when competition is more complacent
    - Product differentiation is when a company develops unique differences in its products/services with the intent to influence demand
- B2B marketplace: internet-based service that brings together buyers & sellers
  - Private exchange: single buyer posts its needs and then opens the bidding to any supplier to wants to bid
  - Reverse auction: auction format in which increasingly lower bids are solicited from organizations willing to supply the product/service at a very low price
- Three generic strategies
  1. Broad cost leadership: reach a large market segment, focused strategies target a niche market
  2. Broad differentiation
  3. Focused Strategy: concentrates on either cost leadership or differentiation
- Value Chain Analysis
  - Business process is standardized set of activities that accomplish a specific task, such as processing a customer's order
  - Value chain approach views an organization as a series of processes, each of which adding value to the product/service for each customer

Chapter 2

- Operational decision making: employees develop, control, and maintain core business activities required to run day-to-day operations
- Structured decisions: situations where established processes offer potential solutions
- Managerial decision making: employees evaluate company operations to identify, adapt to, and leverage change

- Semi-structured decisions: occur in situations in which a few established processes help to evaluate potential solutions, but not enough to for a recommended decision
- Strategic decision making: managers develop overall strategies, goals, and objectives
- Unstructured decisions: occurs in situations in which no procedures or rules exist to guide decision makers toward the correct choice
- Transactional data: all the raw facts contained within a single business process or unit of work, and their primary purpose is to support performing daily operational tasks
  - Purchasing stocks (stock prices) or ATM withdraws (bank account balance)
- Analytical information: all summarized/aggregated transactional data and its purpose is to support performing analysis tasks (trends or summary of sale amounts by region)
- Online transaction processing (OLTP): tracking transactions and event info using technology to process, store, and update (serves operational level and assists in making structured decisions)
- Online analytical processing (OLAP): manipulation of information to create business intelligence in support of strategic decision making
- Benchmarking: continuously measuring system results, comparing those results to optimal system performance (benchmark values), and identifying steps and procedures to improve system performance
- Consolidation is sum of info and features simple roll-ups to complex groupings of interrelated info
- Drill-down allows users to view details of info (can view monthly, weekly, daily, or even hourly information represents drill-down capability)
- Slice-and-dice is being able to look at info from different perspectives (one slice shows product sales during a promo, other shows one sale for all promos)
- Key performance indicators (KPIs): measurable metrics a company uses to evaluate progress toward critical success factors
  - Turnover rates of employees, number of product returns, number of new customers, average customer spending
  - Efficiency IS metrics: measure the performance of IS itself, such as throughput, transaction speed, and system availability
  - Effectiveness IS metrics: measures the impact IS has on business processes and activities, including customer satisfaction and customer conversation rates
  - Both are interrelated, best operation occurs in upper right corner
- Transaction processing system (TPS): basic business system that serves the operational level and assists in making structured decisions
- Decision support system (DSS): models information to support managers and business professionals during the decision-making process (uses what if, sensitivity, goal-seeking analysis)
- Artificial intelligence (AI) simulates human intelligence such as to reason and learn
  - Expert systems are computerized advisory programs that imitate the reasoning processes of experts in solving difficult problems (ex: playing chess)
  - Neural network attempts to emulate the way the human brain works (patterns)
  - Genetic algorithm mimics the evolutionary, survival-of-the-fittest process to generate increasingly better solutions to a problem
  - Intelligent agent is special-purpose knowledge-based IS that accomplishes specific tasks on behalf its users (shopping bot looks all over and compares all)

- Virtual reality is a computer-simulated environment that can be a simulation of the real world or an imaginary world

- Business process is a standardized set of activities that accomplish a specific task, such as processing a customer's order
- Customer facing process is a result in a product/service that is received by an organization's external customer
- Business facing process are invisible to the external customer but are essential to the effective management of the business
- Business process improvement attempts to understand and measure current processes and upgrade them
- Business process re-engineering (BPR) is the analysis and redesign of workflow within and between enterprises
- Business process modeling (mapping) is creating a detailed flow chart or process map of work process showing its inputs, tasks and activities, in a structured sequence
- Business process model is a graphic description of a process, showing the sequence of process tasks, which is developed for a specific as-is or to-be process model
- As-Is process models represent current state of the operation that has been mapped, without any specific improvements or changes to existing processes
- To-Be process models show the results of applying change improvement opportunities to the current (As-Is) process model
- Business process management (BPM) integrates all of an organizations business processes to make individual process more efficient

Chapter 3

- Digital Darwinism implies that an organization that can't adapt to new demands for surviving in the information age are doomed to extinction (ex: polaroid)
- Disruptive technology is a new way of doing things that opens new markets and destroys old ones
- Sustaining technology makes improvements to products that customers want to buy
- The internet:
  - Network composed of computers that are connected together to share resources and information
  - Internet backbone is a high-speed data line connecting major computer systems
  - Internet service provider (ISP) is a company with permanent connection to the internet backbone
- The internet began as an emergency military communications system operated by U.S
- http is hypertext transfer protocol; ftp is file transfer protocol; POP is post office protocol; IMAP internet message access protocol; SMTP is smart mail transfer protocol
- TCP/IP (transmission control protocol/internet protocol), every computer on the internet is identified by an IP address
  - IPv4 is set of 4 different numbers (32bit), new version is IPv6 (128bit)
  - Ex: 141. 117. 101. 22 (IPv4) each is a group of number called an octet and is <255
- URL (uniform resource locator) is the address of a web page
- Syntax is the protocol + domain name/id (domain is textual address and IP is numeric address; ex: http://www.ryerson.ca/itm

- Web browsers are used to browse web pages (Chrome, Mozilla, Opera, Safari)
- FTP is a program used to upload files to a file server (ASCII for html files and binary for graphic files; student web server – http://stw.ryerson.ca/~userid
- Microcomputer revolution made it possible for anyone to own a computer
- Speed, convenience, & low cost of email made it easy for business & personal comm.
- Digital divide is when those with access to technology have greater advantages over those without access to technology
- Web 2.0 is a set of economic, social, and technology trends that form the basis for the next generation of the internet
- Web 3.0 is based on "intelligent" web applications using natural language processing, machine-based learning and reasoning, and intelligence applications
- Web mash-up is a website/web application that uses content from more than one more to create a complete new service
- Semantic web structures data so web pages describe things in a way that computers can "understand" and, thus, find, share and integrate ideas more effectively for people
- E-commerce is buying and selling of goods and services over the internet
- E-business is conducting business on the internet including buying and selling and serving customers and collaborating with business partners (suppliers)
- Mass customization is ability of an organization to tailor its products/services to the customer's specifications
- Personalization occurs when a company knows enough about a customer's likes and dislikes that it can make offers more likely to appeal to that person
- The long tail refers to the tail of a typically sales curve
- Intermediary is agents, software, or businesses that provide a trading infrastructure to bring buyers and sellers together
  - Disintermediation: occurs when a business sells directly to the customer online and cuts out the intermediary
  - Re-intermediation: steps are added to the value chain as new players find ways to add value to the business process
  - Cyber-mediation: refers to the creation of new kinds of intermediaries that simply couldn't have existed before e-business
- E-business reduces costs (processes take less time), improves operations (24/7 customer service), improves effectiveness (website increase revenue), interactivity metrics (measures e-business success: number of visits, time spent on the site, etc.)
- Measuring website success: stickiness (site duration time), raw visits depth (web page exposure), unidentified visitor (no info on visitor), unique visitor (recognized and counted), identified visitor (able to track across sites), hits (requests to view a page)
- Types of businesses: brick and mortar (physical store), pure-play (web site only), click and mortar (physical and website store)
- Forward auction is a seller offers to many buyers, highest bid wins
- Reverse auction is a buyer specifies a product/service and lowest seller bid wins
- Electronic marketplace is an interactive business community providing central market for buyers and sellers to engage in e-business activity
- Online payments include: financial cybermediary, e-cheque, digital wallet, EBPP (electronic bill presentment and payment

- Maintenance, repair, and operations (MRO) materials are necessary for running an organization but do not relate to the company's primary business activities
- E-procurement: B2B purchase and sale of supplies and services over the internet
- Customer service is where the most human contact occurs between buyer and seller
- E-business security includes encryptions, secure socket layer (SSL), and secure electronic transaction (SET)
- E-government is use of strategies and technologies improve the delivery of services and enhance the quality interaction between the citizen-consumer within all branches of government
- Mobile commerce (m-commerce) is purchasing goods and services through a wireless internet-enabled device

Chapter 4

- Corporate responsibility includes everything from hiring minority workers to making safe products
- Innovation leads to cutting costs, while creating a competitive advantage
- Sustainable ("green") IT describes the manufacture, management, use, an disposal of IT in a way to minimize damage to the environment (e-waste)
- Enterprise resource planning (ERP) attempts to take the most critical parts activities of the open organization and puts them under a common system so that employees can make enterprise wide decisions by viewing everything
- Solution to incompatible applications, addresses the need for global information sharing, and avoids the expense of fixing legacy systems
  - Legacy systems are older computer technology still in use
  - Functional systems serve single business departments or units
- Core ERP component –traditional components included in most ERP systems and they have primarily focus on internal operations
- Extended ERP component –extra components that meet the organization needs not covered by the core components and primarily focus on external operations
- Accounting and finance
  - Manages accounting data & financial processes within enterprise with functions like general ledger, accounts payable, accounts receivable, budgets, asset mngmt.
- Production and materials management
  - Handles the various aspects of production planning and execution such as demand forecasting, production scheduling, job cost accounting, quality control
- Human resource
  - Tracks employee info including payroll, benefits, compensation, performance assessment, and assumes compliance with the legal requirements of multiple jurisdictions of authorities
- Extended ERP Components: Business intelligence, Customer relationship management (CRM), and Supply chain management (SCM), and e-business
  - CRM, SCM, and ERP are the backbone of e-business
  - Integration allows the unlocking of info to make it available to any user, anywhere, anytime
- E-business (includes e-logistics and e-procurement)

  - E-logistics manages the transportation and storage of goods
  - E-procurement is the business-to-business (B2B) purchase and sale of supplies and services over the internet
- Integration Tools
  - Middleware is several different types of software that sit between and provide connectivity for two or more software applications
  - Enterprise application integration middleware takes a new approach to middleware by packaging commonly used applications together, reducing the time needed to integrate applications from multiple vendors
- SCM, CRM, ERP are the backbone of e-business

Chapter 5

- Production is the creation of goods and services using land, labour, capital, knowledge
- Production management describes all the activities managers do to help companies create goods
  - Operation replaces production to reflect the manufacturing of goods and services
- Operations management (OM) is the management of systems or processes that convert (including HR) into goods and services (inputs to outputs)
  - Inputs go through transformation process (conversion of inputs to outputs)
- Feedbacks occur in every stage of the transforming process to improve output
- Value-added is difference between cost of inputs and price value of outputs
- Typical OM activities in business include forecasting, capacity planning, scheduling, managing inventory, assuring quality, motivating/training employees, facility locating
- Strategic business unit (SBU) is a stand-alone business under a corporate umbrella
- Strategic planning is the collection of decisions focus in doing the right things over a longer period of time
- Materials requirement planning (MRP) systems use sales forecast to ensure parts and materials are available
- Global inventory management systems (GIMS) locates, tracks and predicts materials and components by using GPS in transportation vehicles
- Operational planning and control (OP&C) deals with day-to-day operations
- Five key competitive priorities:
  - Cost- low cost bidders; quality- error free and balanced; delivery- timeliness and speed; flexibility- variety; service- as a differentiator
- Supply chain consists of all parties involved, directly/indirectly, in the making of a new product or raw material
- Supply chain management (SCM) involves the management of information flows between and among stages in a supply chain to maximize total effectiveness and profit
- Four basic components of SCM: strategy, partners, operations, logistics
- SCM metrics:
  - Back order: unfilled customer order
  - Customer order cycle time: anticipated or agreed upon cycle time of an order
  - Customer order actual cycle time: average time it actually takes to fill an order

- Inventory replenishment cycle time: Measure of the manufacturing cycle time plus time to get product to distribution centre
- Inventory turnover: number of times a company's inventory cycles a year

- IS's primary role is to create integrations or tight process and information knowledge linkages between functions within a firm
- Seven principles of SCM:
  1. Segment customers be service needs, regardless of industry, and tailor service to those segments
  2. Customize the logistics network and focus intensively on the service requirements and on profitability of the pre-identified customer segments
  3. Listen to signals of markets demand and plan accordingly
  4. Differentiate products closer to the customer
  5. Strategically manage sources of supply, working with suppliers to reduce costs of owning materials and services
  6. Develop a supply chain information technology strategy that supports different levels of decision making and provides a clear view of the flow of products, services, and info
  7. Adopt performance evaluation measures that apply to every link in the supply chain and measure true profitability at every stage
- Instrumentation: data will be increasingly machine-generated. GPS and RFID-enabled devices, meters, and actuators
- Interconnectedness is all components from customer to materials source and every element in between (vehicles, containers (GPS), and products (RFID)), can be tracked
- Intelligence is data received from the smart objects in the supply chain will be processed with smart analytics which will create better models to support improved decisions in an increasingly complex world

Chapter 6

- Customer relationship management (CRM) is managing all aspects of a customer's relationship with an organization to increase customer loyalty and retention and an organizations profitability
- Strategy switching is requires organizations to switch from sales-focused to customer-focused strategies (intense competition marketplaces)
- CRM allows organizations to identify customers and design specific marketing campaigns tailored to each customer, to increase customer spending
  - Provides better customer service, make call centers more efficient, cross-sell products effectively, help sales staff close deals faster, discover new customers
  - Businesses that understand the need of individual customers are best positioned to achieve sustainable competitive advantage in the future
- CRM as a business strategy is getting the right product to the right person
- Business benefits of CRM is better customer service, help sales staff close deals faster, improved call centre efficiency, discover new customers, increase customer revenues
- Organization can find its most valuable customers by using the RFM formula:
  - Recency (how recently a customer purchased items)
  - Frequency (how frequently a customer purchased items)
  - Monetary value (the monetary value of each customer purchase)

- Customer strategy starts with understanding company's customers and how the company can meet strategic goals
- Three phases in the evolution of CRM:
  - Reporting (what): identify their customers across their applications
  - Analyzing (why): segment customers in categories such as best/worst customers
  - Predicting (will): make predictions regarding customer behaviour, like which customers are at risk of leaving
- Operational CRM supports traditional transactional processing for day-to-day front-office operations or systems that deal directly with the customers
- Analytical CRM supports back-office operations and strategic analysis and includes all systems that do not deal directly with the customers
- Primary difference is the direct interaction between organization and its customers
- 3 primary operational CRM systems marketing can use increase customer satisfaction:
  1. List generators: compile customer data from a variety of sources and segment the data for different marketing campaigns
  2. Campaign management systems: guide campaign planners through key tasks, can calculate campaign ROI and track results for future fine tuning
  3. Cross-selling and up-selling strategies: identify customers that may have interest in additional products or might respond to increasing value of their purchase
- Sales management CRM system automates each phase of the sales process, helping individual sales representatives coordinate and organize all of their accounts
- Contact management CRM system maintains customer contact information and identifies prospective customers for future sales
- Opportunity management CRM system targets sales opportunities by finding new customers or companies for future sales
- Functional management: existing CRM solution –integrating with one another
- Operational management: tech support provided; metrics are collected and analyzed
- Change management: fielding and prioritizing changes to be made
- Strategic management: working with key shareholders –benefits and value meet with expectations and fulfilling the company's vision
- Supplier relationship management (SRM) focuses on keeping suppliers satisfied by evaluating and categorizing suppliers for different projects
- Partner relationship management (PRM) focuses on keeping vendors satisfied by managing alliance partner, dealer, retailer, and reseller relationships providing customers with an optimal sales channel
- Employee relationship management (ERM) is a management activity that focuses on managing an organizations relationship with its employees
- In the future, CRM will adapt to wireless capabilities and support mobile sites and mobile customers. CRM suites will also incorporate SRM, PRM, and ERM modules

Chapter 7

- Data and Information
  - Data are raw facts that describe the characteristics of an event
  - Information is data converted into meaningful and useful context
  - Granularity refers to the extent of detail within the information

- Timeliness is an aspect of information that depends on the situation
  - Real-time data/info is immediate, up-to-date data/info
  - Real-time system provides real-time data/info in response to requests
- High Quality Information
  - Accuracy: are all values correct?
  - Completeness: are any of the values missing?
  - Consistency: does aggregate or summary info agree with detailed info?
  - Uniqueness: is each transaction, entity, and event represented only once in the information?
  - Timeliness: is the info current with respect to business requirements?
- 4 Primary sources of low-quality information
  - Online customers intentionally enter inaccurate info to protect privacy
  - Data/info from different systems have different entry standards and formats
  - Call centre operators enter abbreviated or erroneous info by accident or to save time
  - Third party and external info contains inconsistencies, inaccuracies, and errors
- Costs of Poor Information?
  - Inability to accurately track customers
  - Difficulty identifying valuable customers
  - Inability to identify selling opportunities
  - Marketing to nonexistent customers
  - Difficulty tracking revenue due to inaccurate invoices
  - Inability to build strong customer relationships
- Benefits of Good Information
  - High-quality information can improve chances of making a good decisions
  - Good decisions can directly impact an organizations bottom line
- Transactional data is stored in databases
  - Database is a collection of records about various business categories such as resources (inventory), events (sales, payroll), people (employees), and places (warehouses, stores)
  - Operation IS such as SCM and CRM maintain and access the transactional data in databases
  - Most common business databases are relational database management systems (DBMS)
- Database Models
  - Hierarchical database model: info is organized into a tree-like structure in a way that it cannot have too many relationships
  - Network database model: flexible way of representing objects and their relationships (multiple parent/child – lattice structure)
  - Relational database model: stores info in the form of logically related two-dimensional tables
- Relational Database
  - Entity class (table): category of person, place, thing or event about which information is stored
  - Entity (record): individual person, place, thing, or an individual occurrence of an event about which info is stored

- In relational database, each table collects data for an entity class (table for customers, one for orders, another for products)
- Each table (entity class) each row or record contains data for each entity belonging to that class
- Attributes (fields): characteristics or properties of an entity class for which we collect data
- Primary keys: field(s) contain values that uniquely identify a given record in a table
- Foreign key: primary key of one table that appears a field in another table (value in foreign of one table matches value in primary key of other table)
- Relationships: data from one table is linked to another when computer finds a match between values in a primary key to the values in the foreign key of another table

- Database advantages from a business perspective:
  - Increased flexibility
    - Well designed database should: handle changes quickly and easily, provide users with different views
    - One physical view – deals with physical storage of info on a storage device
    - Multiple logical views – focuses on how users logically access info
  - Increased scalability and performance
    - Database must increase/decrease in size to meet increased demand, while maintaining acceptable performance levels
    - Scalability – refers to how well a system can adapt its capacity to changing demands
    - Performance – measures ho quickly a system performs a certain process or transaction
  - Reduced Data Redundancy
    - Data redundancy – duplication of info or storing same info in 1+ places
    - It could have inconsistency of data describing same thing, waste of space, time to enter and update, difficulty securing data in many places
  - Increased Integrity (quality)
    - Information integrity – measures quality of information
    - Integrity constraint – rules that help ensure quality of information:
      - Relational integrity constraint – rule that enforces basic and fundamental information-based constraints
      - Business-critical integrity constraint – rule that enforces business rules vital to an organization's success and often requires more insight and knowledge than relational integrity constraints
  - Increased Security
    - Information is an organizational asset and must be protected.
    - Databases offer several security features including:
      - Password – provides authentication of the user
      - Access level – determines who has access to the different types of information
      - Access control – determines types of user access, such as read-only access
  - Data Integration
    - Integration – allows separate systems to communicate directly with each other.

- Forward integration – takes info entered into a given system and sends it automatically to all downstream systems and processes.
- Backward integration – takes info entered into a given system and sends it automatically to all upstream systems and processes.
- Ex: Data send upstream to Sales System and downstream to order fulfillment and billing systems.

- Data Warehouse
  - Data warehouse – a logical collection of analytical information – gathered from many different operational databases – that supports business analysis activities and decision-making tasks. It is about extending the transformation of transactional data into analytical information.
  - The primary purpose of a data warehouse is to aggregate information throughout an organization into a single repository for decision-making purposes.
- Multi-Dimensional Analysis
  - Relational Databases contain information in a series of two- dimensional tables. In a data warehouse and data mart, information is multi-dimensional. it contains layers of columns and rows
    - Dimension – a particular attribute of the information.
  - Cube—common term for the representation of multi- dimensional information.
- Information Cleansing (Scrubbing)
  - An organization must maintain high-quality data in the data warehouse.
  - Information cleansing (scrubbing) – a process that weeds out and fixes or discards inconsistent, incorrect, or incomplete information.
  - It occurs first during ETL process and second on the information once it is in the data warehouse.

- Business Intelligence
  - Business intelligence – applications and technologies used to gather, provide access to, and analyze information to support decision- making.
  - The solution to the challenge of making good decisions in an environment that is data rich and information poor
  - Improving business decisions has a direct, positive effect on the bottom line. BI systems can assist in better decisions, a more agile, intelligent enterprise.
- Characteristics of BI Systems
  - Reliable - The information has been documented as the certified or approved information for the enterprise. Can be used with confidence.
  - Consistent - The processes delivering the information are well documented. Information is complete. Processes run with predictable response times.
  - Understandable - The information has been defined in business terms. Calculations and algorithms can be accessed for comprehension. The data dictionary or metadata repository is easy to access and understand.
  - Easily Manipulated - It is easy to change the questions or set different parameters to turn and twist the information in new ways.
- Operational BI
- Tactical BI
- Strategic BI
- Shorten Latencies – Speed of decision making

- Data latency is the time needed to make
- Transactional data ready for analysis.
- Analysis latency is the time from which data is made available and analysis of it is completed.
- Decision latency is the time it takes a human to comprehend the analysis and take appropriate action.

- Data Mining
  - Data mining – the process of analyzing information to extract insights not necessarily evident from the information alone.
    - Drilling Down –increasing levels of detail.
    - Drilling Up—increasing summarization.
    - Data-mining tools – use a variety of techniques to find patterns and relationships in large volumes of information and infers rules that predict future behaviour and guide decision making
  - Data mining techniques
    - Cluster analysis: A statistical technique used to divide an information set into mutually exclusive groups such that the members of each group are as close together as possible to one another and the different groups are as far apart as possible.
    - Association Detection: Reveals the relationship between variables along with the nature and frequency of the relationships
    - Statistical Analysis: Performs such functions as information correlations, distributions, calculations, and variance analysis
      - Forecast – Predictions made on the basis of time-series information
      - Time-series information – Time-stamped information collected at a particular frequency
- Business Benefits of BI
  - Single Point of Access for all Users.
  - BI across Organizational Departments.
  - Up-to-the-Minute Information for Everyone
  - Categories of BI benefits:
    - Direct quantifiable benefits.
    - Indirect quantifiable benefits.
    - Unpredictable benefits.
    - Intangible benefits.

Chapter 8

- Data is described as “raw facts” that portray characteristics of an event, such as date, item number
- Information is described as data converted into meaningful and useful context (info is “meaningful data”, such as best-selling item or work-selling item)
- Knowledge is “actionable information”, info becomes knowledge that can be acted upon
- Knowledge management (KM) involves capturing, classifying, evaluating, retrieving, and sharing info assets in a way that provides context for effective decisions and actions

- Knowledge management system (KMS) is supporting the capturing, organization, and dissemination of knowledge ("know-how") throughout
- Knowledge based assets fall into two categories:
  - Explicit knowledge consists of anything that can be documented, achieved, and codified, often with help of IT (patents, trademarks, customer lists)
  - Tacit knowledge is knowledge contained in people's heads
- Two practices for transferring or recreating tacit knowledge
  - Shadowing is less experienced staff observing more experienced staff to learn how the work is done and approached
  - Joint problem solving is a novice and expert work together on a project
  - Shadowing is more passive, in joint-problem solving, expert and novice work hand in hand on a task
- KM systems include:
  - Knowledge repositories (databases)
  - Expertise tools
  - E-Learning applications
  - Discussing and chat technologies
  - Search and data-mining tools
- Crowdsourcing is the wisdom of the crowd
  - Asynchronous communication is communications that occur at the same time (Instant messaging)
  - Synchronous communication
- KM and social networking
  - Social networking analysis (SNA) is a process of mapping a groups contacts to identify who knows whom and who works with whom
  - Social media – websites that rely on user participation and user-contributed content
  - Social network – application connecting people by matching profile info
  - Social networking – practice of expanding your business and/or social contacts by a personal network
- Organizations form alliances and partnerships with other organizations based on good fit with each other's core competency
  - Core competency – organization's key strength, a business function that it does better than any of its competitors
  - Core competency strategy – organization chooses to focus specifically on its core competency and forms partnerships with other organizations to handle nonstrategic business processes
- IT can make a business partnership easier to establish and manage
  - Info partnership – occurs when two or more organizations cooperate by integrating their IT systems, thereby providing customers with best of each
- Internet has dramatically increased the ease and availability for IT-enabled organizational alliances and partnerships
- Collaboration system: an IT-based set of tools that supports the work of teams by facilitating the sharing and flow of information
- Two categories of collaboration:
  - Unstructured collaboration (info collaboration): document exchange, shared whiteboards, discussion forms, and e-mail, generally ad hoc

  - Structured collaboration (process collaboration): shared participation in business processes such as workflow in which knowledge is seen as rules
- Content management systems provides tools to manage creating, storing, editing, and publishing information in a collaborative environment
  - Common types of content management systems:
  - Document management system (DMS): supports electronic capturing, storage, distribution, archiving, and accessing of documents
  - Digital assets management system (DAM): works with binary rather than text files, converting GIF files to JPEG
  - Web content management system (WCM): adds layer to document & digital asset management enabling publishing of content to intranet and public
- Wikis are web-based tools that make it easy for users to add, remove, and change online contents
- Business wikis are collaborative web pages allowing users to edit documents, share ideas, or monitor status of a project
- Employees also use wikis to collaborate
- Work defines all the steps or business rules, from start to end, required for a business process
- Workflow management systems facilitate automation and management of business processes and control movement of work through business process
- Messaging-based work flow systems send work assignments through an email system
- Database-based workflow systems store documents in a central location and automatically ask the team members to access the document when it is their turn to edit the document
- Groupware (software) supporting team interaction and dynamics including calendaring, scheduling, and videoconferencing
  - To communicate, cooperate, coordinate, solve issues, compete, or negotiate
  - Users can work together at same time (synchronous) or different times (asynchronous), work in same place (co-located) or different (distance)
  - Advantages: facilitating communication (faster, easier), enabling telecommuting, reducing travel costs, sharing expertise, forming groups with common interests, saving time and cost in coordinating group work, facilitating group problem solving
- Video conference is interactive telecommunication technologies allowing two or more locations to interact via two-way video and audio transmissions
  - Can be two people in private offices (point-to-point) or several sites (multi-point) with more than one person in large rooms at different sites
- Web conferencing blends audio, video, and document-sharing technologies to create virtual meeting rooms
  - Everyone can each what is on anyone else's screen, despite application
  - Skype, WebEx, SameTime, and Elluminate Live are examples
- Instant messaging (IM) enables someone to create a private chat room with someone else to communicate in real time over the internet
  - Web Links (share links to favorite sites), sounds (play sounds), iMessage
- M-learning uses portable computing devices with wireless capability to enable mobility and mobile learning
  - Allows learning and teaching to extend beyond traditional classrooms

- Enterprise portals are single-point web browser interfaces used within an organization to promote gathering, sharing, and disseminating info across the enterprise
  - Primary purpose is to provide a transparent directory of info located throughout an organization, not as a separate source of info itself
- Enterprise taxonomy or classification of info categories that helps organize information for easy retrieval
- Search engines facilitate more specific and exact information requests
- Hypertext links to both internal and external web sites and info sources
- Vertical enterprise portals focus on accessing specific applications or business functions (accounting or purchasing)
- Horizontal enterprise portals seek to integrate and aggregate info from multiple cross-enterprise applications (deliver info on product/service)
- Content space is to facilitate information access and retrieval
- Communication space supports discussion among employees, and shared meanings about information access and retrieved
- Coordination space supports cooperative work action between employees, facilitate workflow process and accomplishment of work tasks
- None of major factors affecting degree to which enterprise portals would be used were technical in nature
  - Information politics surrounding design and development of the portal
  - System development process by which the system portal was maintained
  - Information culture of the organization
    - Info sharing: sharing documents plants and repots between colleagues
    - Info overload: users frustrated in trying to search for info within portal
    - Info access: desire to make enterprise portal primary vehicle for distributing info and gateway to thousands of departmental web sites
    - Info control: standardization of info
    - Attitudes toward using the portal: changing nature of use of portal
- Computer-supported cooperative work (CSCW) is a field of research concerned with development & use of software to help groups increase their competency
- Insights from CSCW on adoption and use of enterprise portals:
  - Ensure that everyone benefits, create incentives for use, promote multiple perspectives, and understand current work practice

Chapter 9

Information Ethics and Information Privacy

- Ethics is the principles and standards that guide our behaviour towards other people
- Privacy is a major ethical issue
  - Privacy is the right to be left alone when you want to be, to have control over your own personal possessions, and not to be observed without your consent
  - Confidentiality is assurance that messages and information are available only to those who are authorized to view them
- Technology related ethical issues:
  - Intellectual property: intangible creative work embodied in physical form

  - Copyright: legal protection of an idea (game/song) and some type of proprietary documents
  - Fair dealing: in some situations, it is legal to use copyrighted material
  - Pirated software: unauthorized use, duplication, distribution, or sale of copyrighted software
  - Counterfeit software: software manufactured to look like the real thing and sold as such
- Individuals form the only ethical component of MIS
  - Individuals copy, use, and distribute software
  - Search organizational databases for sensitive and personal information
  - Individuals create and spread viruses
  - Individuals hack into computer systems to steal information
  - Employees destroy and steal information
- Workplace monitoring is a concern for many employees
  - May be unprecedented or intrusive and violating basic privacy and personal freedom
  - Employees may not even be aware of it
- Organizations can be held financially responsible for their employees' actions, may be liable for the risks the employees take. Monitoring is required
  - Must communicate with employees regarding monitoring
- Employee Absenteeism
  - Taking care of personal business (give a few hours instead of losing a day)
- Lower job satisfaction
  - People believe the quantity of work is important than the quality
- "Psychological resistance"
  - If employees are told they can't do something, they will want to do it
- Information privacy concerns the legal right or general expectation of individuals, groups, or institutions to determine for themselves when, and what to extent, information about them is communicated to others
  - Legislation varies from Canada, USA, and Europe
- PIPEDA
- Ethical Information Management
  - Figure 9.8
- Ethical computer use policy
  - ePolicies: organizations strive to build a corporate culture based on ethical principles that employees can understand and implement
  - Ethical computer use policy: contains general principles to guide computer user behaviour
  - Ethical computer user policy ensures users are informed of rules and by the agreeing to use the system on that basis, consent to abide by the rules
- Information Privacy Policy
  - Contains general principles regarding information privacy
  - Guidelines for creating an Information Privacy Policy:

1. Adoption and implementation of a privacy policy
2. Notice and disclosure
3. Choice and consent
4. Information security

5. Information quality and access

- Acceptable use policy (AUP) is a policy that a user must agree to follow in order to be provided access to a network or to the internet
- Nonrepudiation Clause is a contractual stipulation to ensure that e-business participants do not deny (repudiate) their online actions
- Acceptable use policy (figure 9.10)
  1. Not using technologies in violating any law
  2. Not attempting to break the security of any computer network or user
  3. Not posting commercial messages to groups without prior permission
  4. Not performing any non-repudiation
  5. Not attempting to send junk email or spam to anyone who does not want to receive it
- Email privacy policy stipulations (figure 9.12)
  1. Is complementary to the ethical use policy
  2. Defines who legitimate email users are
  3. Explains backup procedure so users know that at some point, even if a message is deleted from their computer, its still on their back up tapes
  4. Describes legitimate grounds for reading someone's email and process required before action be taken
  5. Informs that the organization has no control of email once its transmitted outside organization
  6. Explains what will happen if user severs his/her connection with organization
  7. Asks employees to be careful when making organizational files and documents available to others
- Internet use policy (figure 9.13)
  1. Describe available internet services
  2. Define organizations position on purpose of internet access and what restrictions, if any, are placed on that access
  3. Complement ethical computer use policy
  4. Describe user responsibility for citing sources, properly handing offensive material, and protecting the organization's good name
  5. State, in clear terms, the ramifications if they policy is violated
- Spam prevention tips (figure 9.14)
  1. Disguise email addresses posted in a public electronic place
  2. Opt out of member directories that may place an email address online
  3. Use a filter
- Employee monitoring polices (figure 9.15)
  1. Be as specific as possible
  2. Always enforce policy
  3. Enforce policy in same way for everyone
  4. Expressly communicate that company has right to monitor employees
  5. Specifically state when monitoring will be performed
  6. State what will be monitored (email, IM, internet, etc.)
  7. Describe types of information that will be collected
  8. State the consequences for violating the policy
  9. State all provisions that allow for updates to the policy
  10. Specify the scope and manner of monitoring for any info system

Information Security

- Sources of unplanned IS downtime (figure 9.16)
- The cost of downtime (figure 9.17)
- Protecting Enterprise Information
  - Information security is the protection of information from accidental or intentional misuse by persons inside or outside an organization
  - Info must be protected to maintain a company's competitive advantage
  - Information must be protected to maintain customer policy
- First line of defence –people
  - The greatest threat to a business information system are insiders, employees and authorized users of the IS:
    - Negligence, mistakes and ignorance of the consequences of risky behaviour.
    - Victims of social engineering, the use, by hackers, of social skills to acquire passwords and personal data.
- Information security plan
  - Information security policies – identify the rules required to maintain information security.
  - Information security plan – how an organization will implement the information security policies.
- Information security plan considerations
  - Security plans should identify and asses risks to customer info, provide ways to identify and assess risk, identify mechanisms to implement
  - Areas that should be addressed by an info security plan: employee management and training, safeguards, service providers
- Creating an information security plan
  - Develop information security policies
  - Communicate the information security policies
  - Identify critical information assets and risks
  - Test and re-evaluate risks
  - Obtain stakeholder support
- Second line of defence –technology
  - There are three primary information technology security areas
    - Authentication and authorization
    - Prevention and resistance
    - Detection and response
- Authentication and Authorization
  - Authentication – A method for confirming users' identities
  - Authorization – The process of giving someone permission to do or have something
  - The most secure type of authentication involves
    - Something the user knows
    - Something the user has
    - Something that is part of the user
- User ID and password
  - This is the most common way to identify individual users and typically contains a user ID and a password

- This is also the most ineffective form of authentication
- Over 50 percent of help-desk calls are password related

- Threats to user ID and password
  - Identity theft – the forging of someone's identity for the purpose of fraud
  - Phishing – a technique to gain personal information for the purpose of identity theft, usually by means of fraudulent e-mail
- Tokens and Smart Cards
  - Smart cards and tokens are more effective than a user ID and a password.
    - Tokens – Small electronic devices that change user passwords automatically.
    - Smart card – A device that is around the same size as a credit card, containing embedded technologies that can store information and small amounts of software to perform some limited processing.
- Biometrics
  - This is by far the best and most effective way to manage authentication.
    - Biometrics – The identification of a user based on a physical characteristic, such as a fingerprint, iris, face, voice, or handwriting.
  - Unfortunately, this method can be costly and intrusive.
- Prevention and Resistance
  - Downtime can cost an organization anywhere from $1000$1 million/hour
  - Technologies available to help prevent and build resistance to attacks include
    - Content filtering, Encryption, Firewalls
- Content Filtering
  - Content filtering - prevents emails containing sensitive information from transmitting and stops spam and viruses from spreading.
  - Spam – is a form of unsolicited email.
- Encryption
  - Encryption—is a method of transforming a message into an alternative form that requires a key or password to make it readable.
  - Public key encryption (PKE)—is a method where the key to scramble the message is known to everyone but the key to unscramble it is held by the recipient only.
- Firewalls
  - One of the most common defenses for preventing a security breach is a firewall
  - Firewall – Hardware and/or software that guards a private network by analyzing the information leaving and entering the network
- Detection and Response
  - If prevention and resistance strategies fail and there is a security breach, an organization can use detection and response technologies to mitigate the damage
  - Antivirus software is the most common type of detection and response technology.
- Hackers
  - Hackers—are experts in technology who use their knowledge to break into computers and computer networks, either for profit or just motivated by the challenge
    - Black-hat hacker
    - Cracker
    - Cyber terrorist
    - Hactivist

    - Script kiddies or script bunnies
    - White-hat hacker
- Computer viruses and worms
    - Virus—malicious software that spreads from computer to computer by a user activating the file in which it resides.
        - Backdoor program, Denial-of-service (DoS), distributed denial-of-service (DDoS), Polymorphic virus, Trojan-horse virus
    - Worm—a type of malicious software that spreads across networks and does not need a user to activate it.
- Security threats to e-business
    - Security threats to e-business include, elevation of privilege, hoaxes, malicious code, packet tampering, sniffer, spoofing, spyware

Chapter 10

Developing Information Systems

- Information systems (IS) that are built correctly can transform as the organization and its business transform
- IS that effectively meet employee needs will help an organization become more productive and enhance decision making
- IS that does not meet employee needs may have a damaging effect on productivity and can even cause a business to fail

Information Systems Development

- As organizations' reliance on IS grows, so do the business-related consequences of IS development successes and failures including:
    - Increase or decrease revenue
    - Repairs or damage to brand reputation
    - Prevention or incurring of liabilities
    - Increase or decrease productivity

Global IS development

- Global IS must support a variety of customers, users, products, languages, laws, etc.
- Efficient, effective, and responsive IS to support global e-commerce must promote the involvement and ownership of all local system users
- Global standardization of data definitions allow for sharing data among international businesses
- Global IS development strategies
    1. Transform and customize home office system into a global application to support all end0users
    2. Set up multinational development teams to represent local sites as well as corporate HQ
    3. User centres of excellence where development is sent to the subsidiary with the expertise
    4. Outsource development offshore to take advantage of experience in building global IS

Systems Development Lifecycle (SDLC)

- Overall process for developing IS from planning and analysis through implementation and maintenance
    - Planning: establishes high-level plan of intended project & determines project goals

- Analyzing: involves analyzing end-user business requirements and refining project goals into defined functions and operations of the intended system
  - Business requirement – specific business requests the system must meet to be successful
- Design: establishes descriptions of the desired features and operations of the system including screen layouts, business rules, process diagrams, pseudo code, and others
- Development: involves taking all of detailed design documents from the design phase and transforming them into the actual system
- Testing: brining all the project pieces together into special testing environment to eliminate errors and bugs, and verify that the system meets all business requirements defined in the analysis phase
- Implementation: placing the system into production so users can begin to perform actual business operations with it
- Maintenance: performing changes, corrections, additions, and upgrades to ensure the system continues to meet its business goals

System Development Methodologies

- Methodology is a set of policies, procedures, standards, processes, practices, tolls, techniques, and tasks that people apply to technical management challenges
- Systems development methodologies include:
  - Waterfall: a sequential, activity based process in which each phase in the SDLC is performed sequentially from planning through implementation and maintenance
  - Agile: aims for customer satisfaction with early and continuous delivery of useful system or software components meeting bare minimum requirements
  - Iterative development: series of fast, efficient, short, lower cost projects that achieve rapid feedback and acceptance
  - Rapid application development methodology (RAD) emphasizes extensive user involvement in the rapid and evolutionary construction of working prototypes
    - Smaller-scale representation or working model of users' proposed design
- Extreme programming methodology
  - Software project is broken down into small phases
  - Four parts: planning, designing, coding, testing, which advance rapidly after each other
  - Users are embedded in process narrowing the communications gap between developer and user
  - Method responds to changing customer requirements as the system is developed
- Rational Unified Process Methodology
  - Rational Unified Process (RUP) provides a framework for breaking down development of software into four gates
    - Gate 1: inspection; Gate 2: elaboration; Gate 3: construction; Gate 4: transition
  - Scrum methodology uses small teams to produce small pieces of deliverable software using sprints, or 30-day intervals, to achieve an appointed goal
    - In SCRUM, each day ends or begins with a stand-up meeting to monitor and control the development effort

Participatory Design

- Views the users, not the developers as experts
  - Create opportunities for mutual learning
  - Utilize design tools familiar to users
  - Use language familiar to users

- Start the design with current practice
- Encourage users to envision future situations of working with the final system

Modeling

- Promotes better understanding of requirements. Visual modeling helps us understand and organize complex endeavors
- Unified Modeling Language (UML) provides a very robust notation, which grows from analysis to design. Language used to specify, visualize, and document the artifacts of an object-oriented system under development
- Natural fit for object-oriented languages and environments but you an use it to model non-object-oriented applications as well

Object-Oriented Development

- Modern programming usually requires an object oriented approach to software development
  - Attempt to use the classifications, relationships, and properties of objects to aid in program development
- Object can be any item or concept
  - Contain both attributes and operations that interact to meet a specific need
  - Attributes are properties that relate to the object and operations are methods/actions that the object can platform to modify itself or data

Information System Project Failures

- Analysts estimate $50-$80 billion are lost in failed systems development projects
- Consequences of failed projects include: damaged brand, lost goodwill, low morale

Project management terms

- Project: temporary activities undertaken to create a unique product or service
- Project management: application of knowledge, skills, tools, and techniques to project activities to meet project requirements
- Project manager: individual who is an expert in project planning and management, defines and develops the project plan, and tracks the plan to ensure the project is on time and budget
- Project deliverable: any measurable, tangible, verifiable outcome, result, or item that is produced to complete a project or part of a project
- Project milestone: key dates when a certain group of activities must be performed
- Project management institute: organization that supports the profession of PM

Choosing Strategic Projects

- Organizations choose among possible projects that could be undertaken
- Techniques for choosing strategic projects:
  1. Focus on organizational goals
  2. Categorize projects
  3. Perform a financial analysis

Project Charter

- Document issued by the project initiator/sponsor that formally authorizes existence of a project and typically includes:
  - Project scope that defines the work to be done
  - Project objectives are the quantifiable criteria that must be met
  - Project constraints are the factors that can limit the project options
  - Project assumptions are factors believed to be true that impact the project

Project Plan

- Formal, approved document that manages and controls project execution
- Well-defined project plan should have:
  - Description of project scope, list of activities, schedule, time and cost estimates, risk factors, assignments and responsibility, kill switch
  - Easy to understand, easy to read, communicated to all key participants (stakeholders), appropriate to the project's size and complexity, and prepared by the team (not individual project manager)

Setting Project Scope

- Project scope defines the work that must be completed to deliver a product with the specified features and functions and typically includes:
  - SMART criteria are useful reminders on how to ensure that project has created understandable and measurable objectives

PERT and Gantt Charts

- Two diagrams that provide visual support to a project:
  - PERT (Program evaluation and review technique) chart: graphical network model that depicts a projects tasks and the relationships between those tasks
  - GANTT chart is a simple bar chart that depicts project tasks against a calendar

Managing Projects

- Managing a project includes
  - Identifying requirements
  - Establishing clear and achievable objectives
  - Balancing the competing demands of quality, scope, time, and cost
  - Adapting the specifications, plans, and approach to the different concerns and expectations of the various stakeholders
- Project manager must focus on managing three primary areas to ensure success
  1. People
  2. Communications
  3. Change

Measuring Project Value

- Difficult to measure all the benefits as well as all the costs to determine ROI
  - Not everything is quantifiable such as morale
  - Not every cost or benefit is visible
  - How to measure problems that were prevented
- Designing metrics requires expertise
  - How to define success?
  - How to apply quantitative measures to business processes and qualitative deliverables?
  - What information reflects progress or lack of it?

Outsourcing

- Insourcing (in-house development): common approach using the professional expertise within an organization to develop and maintain the organization's IT systems
- Outsourcing: arrangement by which one organization provides a service or services for another organization that chooses not to perform them in-house
- Onshore outsourcing: engaging another company within the same country for services
- Nearshore outsourcing: contracting an outsourcing arrangement with company in nearby countries

- Offshore outsourcing: using organizations from developing countries to write code and develop systems

Benefits to Outsourcing IS development

- Core competencies: allow a company to maintain an up-to-date infrastructure and invest in what it does best
- Financial savings: often cheaper to hire labour offshore
- Acquire best practices: instead of keeping up with technology buy the benefits from a company that has
- Industry changes: keep managers busy with their own businesses and outsource to better focus on their own issues
- Globalization and the internet: make off shore outsourcing easy and comfortable and can deliver international services

Challenges to Outsourcing

- Contract length:
  1. Difficulties in getting out of a contract
  2. Problems in foreseeing future needs
  3. Problems in reforming an internal IS department after the contract is finished
- Competitive edge
- Confidentiality
- Scope definition

Chapter 11

Enterprise Architecture

- Enterprise architecture (EA)—includes the plans for how an organization will build, deploy, use, and share its data, processes, and IT assets
- Enterprise architect—a person grounded in technology, fluent in business, a patient diplomat, and provides the important bridge between IT and the business

Goals of Enterprise Architecture

- Reduce costs and improve productivity
- Improve customer satisfaction
- Create competitive advantages
- Generate growth
- Generate new revenue streams
- Optimize the supply chain

Global Enterprise Architectures

- The internet creates a borderless global environment with enormous opportunity for low cost communication and exchange with all parties involved in international business.
- Managing a global EA includes, not only technology issues, but political and cultural considerations.
- More than two dozen countries attempt to restrict citizens' access to the Internet.
- Estimating operational expenses with international IT operations is a global challenge. Deciding on in sourcing or out-sourcing.

Building Blocks of EA

- Information Architecture: identifies where and how important information, like customer records, is maintained and secured.

- Back up and recovery, disaster recover, information security
- Infrastructure Architecture: includes hardware, software, and telecommunications equipment that, when combined, provide foundation to support organizations goals
  - Flexibility, scalability, reliability, availability, performance
- Application Architecture: determines how applications integrate and relate to each other
  - Web services, open systems

Data Architecture

- Identifies where and how important data, like customer records, are maintained & secured
  - Back Up: A copy is made of data.
  - Recovery: ability to get a system up and running in the event of a crash or failure. It includes restoring backed up data
  - Fault tolerance: computer system designed that in the event a component fails, a backup component or procedure can immediately take its place with no loss of service
  - Failover: backup operational mode in which the functions of a computer component is assumed by another when the first becomes unavailable
  - Security: Preventing unauthorized access, copying, deletion and modification of data, ensuring continuity of operations, and managing user access
- Disaster recovery
  - Disaster recovery plan: detailed process for recovering information or an IT system in case of a disaster (ex: fire or flood)
  - Disaster recovery cost curve: charts cost of the unavailability of info and technology, and, cost of recovering from a disaster over time
  - Hot site: separate, fully equipped facility that the company moves into after a disaster
  - Cold site: separate, facility lacking computer equipment where employees can move after a disaster

Business Continuity Planning (BCP)

- BCP indicates how an organization will restore interrupted critical functions within a pre-determined time
  - Key elements: response itself, communications management, and operations
  - Then, critical services must continue, followed by restoration and recovery

Security

- Preventing unauthorized access, copying, deletion and modification of data, ensuring continuity of operations, and managing user access
- Managing user access is preventing unauthorized access to the IS and its data
- Anti-virus software and patches are applications that prevent hackers, spammers, and other malcontents from entering the network

Infrastructure Architecture

- Flexibility – systems must meet all types of business changes.
- Scalability – refers to how well a system can adapt to increased demands.
- Reliability – ensures all systems are functioning correctly and providing accurate information
- Availability – addresses when employees, customers, and partners can access systems.
- Performance – measures how quickly a system performs a certain process or transaction in terms of efficiency IT metrics of both speed and throughput

Application Architecture

- Determines how applications integrate and relate to each other

- Web services contain web-based data and procedures that use the same standards permitting different applications to relate to each other
- Interoperability means that two or more systems share data and resources even though they were made by different manufacturers

Types of Web Services

- Event is the type of application that monitors a business process for threats and opportunities and alerts those who can act on the information.
- Service is a software component that, not only provides code to be used by developers to create specific functionality in a larger program being developed, but also can be used by other applications to perform a task across a wide range of clients.

Open Systems

- Open system is a broad, general term that describes nonproprietary IT hardware and software where the standards and procedures by which the products work is made publicly available.
- Open Source refers to any program whose source code is made available for use or modification.
- Ex: Linux OS and Mozilla Firefox Browser

Service Oriented Architecture (SOA)

- SOA is an approach to IT architecture, which creates connections among a variety of applications, and information sources so that the system can adapt quickly and easily
- SOA service is a business task (determining list of customers who have overdue balance)
- Interoperability is sharing of data and resources (bringing together orders and shipping to see which has been ordered and shipped or not)
- Loose coupling is joining together or disassembling of services (bring together service applications to query list of customers with overdue balances and calculate interest on it finally find customer records for addresses and email secure messages)

Virtualization

- Virtualization software—runs on one machine but emulates multiple pieces of hardware.
- Emulator—hardware or software that duplicates the functions of one device in another

Benefits of Virtualized Computing

- With an exponential increase in capacity for every generation of processor improvement, there is capacity in most hardware to run multiple operating systems.
- Data Centres are running out of space. Collaborative projects, collection of transaction data, downloads from the Internet escalate the problem. By hosting multiple guests on single systems, the space utilization drops significantly.
- Benefits to sustainability arise as a single computer is supporting multiple users and consuming the energy for one computer instead of many

Grid Computing

- A collection of computers, often geographically dispersed, that are coordinated to solve a common problem

Cloud Computing

- Refers to the use of resources and applications hosted remotely on the Internet
- Advantages include:
  - Convenient access to application programs and data.
  - Cost savings for data storage and software and client computers.
  - “Pay as you pay” rather than large capital expenditures.

- Disadvantages include:
  - No control over applications, lack of customization.
  - Must trust a 3rd party with confidential information.
  - Possible data access issues

Chapter 12

Network Basics

- Telecommunication system—enables the transmission of data over public or private networks.
- Network—a system created by linking two or more computers and establishing standards, or protocols, so that they can work together.
- The three types of networks include:
  - Local area network (LAN): computer network that uses cables or radio signals to link two (+) computers within an area (school or home)
  - Metropolitan area network (MAN): computer network providing connectivity in an area or region larger than area covered by LAN but small than WAN (university has many LAN networks in one MAN network)
  - Wide area network (WAN): computer network providing data communication services for business in huge areas (across country or world – internet is WAN)

Data Sharing Through Networks

- The key advantage of providing data communication links between a company and its suppliers or customers is the sharing of data.
- Data communication links enable data sharing allowing companies to be competitive.
- Topics in this area include:
  - Voice over IP: uses TCP/IP technology to transmit calls over long-distance lines
  - Networking businesses
    - Virtual Private Network (VPN) is a way to use public telecommunication infrastructure (internet) to provide secure access to an organizations network
    - Value-added network (VAN) is a private network, provided by 3rd party, for exchanging info through a high capacity, secure connection
  - Increasing the speed of business
  - Securing business networks

Mobile Technology

- Mobile and wireless are often used synonymously, but actually denote two different technologies
- Mobile technology means the technology can travel with the user, but it is not necessarily in real-time
- Wireless technology gives users a live (Internet) connection via satellite or radio transmitters. The signal is carried on radio waves, microwaves and satellites.
- Wireless technology refers to any type of electrical or electronic operation that is accomplished without the use of a “hard wired” connection

Drivers of Wireless Technology Growth

- Universal access to information and applications
  - People are mobile and have access to information than ever before, but they still need to get to the point where they can access all information anytime, anywhere, anyplace.
- The automation of business processes

  - Wireless technologies have the ability to centralize critical information and eliminate redundant processes.
- User convenience, timeliness, and ability to conduct business 24x7x365
  - People delayed in airports no longer have to feel cut off from the world or their office. Through wireless tools and wireless solutions such as a RIM BlackBerry device, they can access their information anytime, anywhere, anyplace

Mobile Devices Changing Business

- Wireless local area network (wLAN): uses radio waves rather than wires to transmit information across a local area network
- Smartphone's: provide connectivity for mobile applications, both personal and business
- Cordless computer peripherals: connect wirelessly to a computer (wireless printer/mouse)
- Satellite television: allow viewers in almost any location to select from 100's of channels
- WiMax wireless broadband: enables wireless networks to extend as far as 48 kilometers and transfer information, voice, and video at faster speeds than cable. It is perfect for Internet service providers (ISPs) that want to expand into sparsely populated areas, where the cost of bringing in cable wiring or DSL is too high.
- Security sensor: alerts customers to break-ins and errant pop flies. Its dual sensors record vibration and acoustic disturbances—a shattered window—to help avoid false alarms.

Mobile Strategy

- Mobile applications can track materials and shipments from suppliers and distributors to customers; manage inventory; support point of scale; immediate analysis of data

Cellular Technologies

- Today 3G cellular networks are designed for high-speed transmission of multi-media data and voice.
- 4G networks are set up to integrate radio and television transmission and to consolidate the world's phone standards into one high-speed technology.
- Convergence of voice, video, and data allow users to make calls, surf the Web, use touch controls, access music, audiobooks, videos, TV shows and movies.
- Personal digital assistants (PDA)—are small, handheld computers capable of entirely digital communications transmission.
- Smartphone—combines the functions of a cellular phone and a PDA in a single device.
- Tablets—is a mobile computer that is larger than a mobile phone, with an integrated flat touch screen. Recent improvements in memory and functionality have seen tablet sales sky-rocket.
- Bluetooth is a telecommunications industry specification that describes how mobile phones, computers, and PDAs can be easily interconnected using a short-range wireless connection.

Satellite Technology

- Satellite--A space station that orbits the Earth receiving and transmitting signals from Earth-based stations over a wide area.
- Location based services (LBS) are wireless mobile content services that provide location-specific data to mobile users moving from location to location.
- Global position systems (GPS) is a constellation of 24 well-spaced satellites that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographical location.
- Geographic information system (GIS) is designed to work with data that can be shown on a map

- Consists of hardware, software, and data that provide location info for display on a multidimensional map (routing info, finding what is nearby –Yelp)

Wireless Fidelity (Wi-Fi)

- Wireless LAN **(**WLAN): local area network that uses radio signals to transmit and receive data over distances of a few hundred feet
- Wireless fidelity (Wi-Fi) : means by which portable devices can connect wirelessly to a local area network, using access points that send and receive data via radio waves

Wireless Metropolitan Area

- Metropolitan area network that uses radio signals to transmit and receive data
- Worldwide interoperability for Microwave access (WiMax) is a communications technology aimed at providing high-speed wireless data over metropolitan area networks

Radio Frequency Identification (RFID)

- RFID uses active or passive tags in the form of chips or smart labels that can store unique identifiers and relay this information to electronic readers
- RFID tag contains a microchip and an antenna, and typically works by transmitting a serial number via radio waves to an electronic reader, which confirms the identity of a person or object bearing the tag

RFID Privacy Issues

- A specific customer can link RFID codes to the purchase of a particular product.
  - A loyalty promotion code identifies the customer and the purchase is saved towards a discount but also becomes data in the customer's record.
- RFID codes can be read at greater distances than bar codes allowing surveillance. For example, reading what is in someone's shopping bag in a mall can be done without the target being aware
- There are proposals to require all RFID products to be labeled.
- RSA Blocker Tags are used to restrict reading of the tags to within the store's premises

Mobile Trends

- Social networking gets mobilized as social networking applications are pre-loaded on many mobile devices
- Mobile TV is a reality with 4G devices.
- Convergence of technology and user demand is make multi-function devices cheaper and more versatile.
- Marketing and logistics applications are growing to take advantage of Location-based services.
- As wireless security and device functionality increases, enterprise mobility grows.