Module 1
Information Systems in Business

Contents:

Introduction, The real world of Information Systems, Networks, What you need to know, The fundamental role of IS in business, Trends in IS, Managerial challenges of IT. System Concepts: A foundation, Components of an Information System, Information System Resources, Information System activities, Recognizing Information Systems. Fundamentals of strategic advantages: Strategic IT, Competitive strategy concepts, The competitive advantage of IT, Strategic uses of IT, Building a customer-focused business, The value chain and strategic IS, Reengineering business processes, Becoming an agile company Creating a virtual company, Building a knowledge-creating company.

Introduction:

- Information technology can help all kinds of businesses improve the efficiency and effectiveness of their business processes, managerial decision making, and workgroup collaboration, thus strengthening their competitive positions in a rapidly changing marketplace.
- Internet-based systems have become a necessary ingredient for business success in today's dynamic global environment.
- Information technologies are playing an expanding role in business.

The real world of Information Systems:

An information system(IS) can be any organized combination of people,hardware,software communications networks and data resources that stores and retrives,transforms and disseminates information in an organization. people have relied on information systems to communicate with each other using an variety of physical

devices(hardware),information processing instructions and procedures(software),communication channels(network)and stored data(data resources)

- Information Systems (IS) – all components and resources necessary to deliver information and information processing functions to the organization
- Information Technology (IT) – various hardware components necessary for the system to operate
- **Computer Hardware Technologies**
  Including microcomputers, midsize servers, and large mainframe systems, and the input, output, and storage devices that support them
- **Computer Software Technologies**

Including operating system software, Web browsers, software productivity suites, and software for business applications like customer relationship management and supply chain management

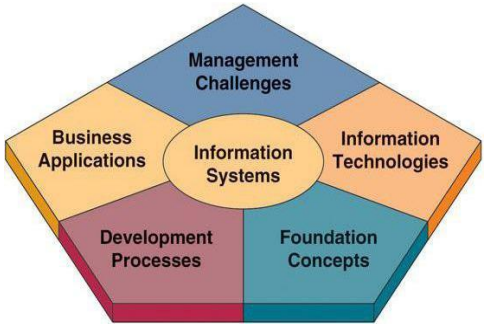
Networks, What you need to know?

- **Telecommunications Network Technologies**

  including the telecommunications media, processors, and software needed to provide wire-based and wireless access and support for the Internet and private Internet-based networks

- **Data Resource Management Technologies**

  including database management system software for the development, access, and maintenance of the databases of an organization



Conceptual Framework of IS Knowledge

An Is frame work for business professionals above fig illustrates a usefull conceptual framework that organizes the knowledge presented in this text nad outlines what you need to know about information systems.

Foundation concepts. Fundamental behaviour, technical, business and managerial concepts about the components and roles of information system. examples include

basic information system concepts derived from general systems theory. **Information technologies**. major concepts ,developments and management issues in

information technology that is hardware,software, networks data management and many internet based technologies.

Business applications.the major uses of information systems for the operations, management, and competitive advantage of a business.

Development process. how business professionals and information specialists plan, develop, and implement information systems to meet business opportunities
Management challenges. The challenges of effectively and ethically managing information technology at the end user,enterprise and global levels of a business

The fundamental role of IS in business:

Roles of IS in Business

There are three fundamental reasons or all bisness applications of information technology
Support of its business processes and operations

Support of decision making by employees and managers
Support of its strategies for competitive advantages

Trends in Information Systems

Until the 1960s, the role of most information systems was simple: transaction processing, record-keeping, accounting, and other electronic data processing (EDP) applications.

Then another role was added, as the concept of management information systems (MIS) was conceived.

By the 1970s, it was evident that the prespecified information products produced by such management information systems were not adequately meeting many of the decision-making needs of management. So the concept of decision support systems (DSS) was born.The new role for information-making processes.

In the 1980s, several new roles for information systems appeared. First, the rapid development of microcomputer processing power, application software packages, and telecommunications networks gave birth to the phenomenon of end user computing. End users could now use their own computing resources to support their job requirements instead of waiting for the indirect support of centralized corporate information services departments.

Executive's information systems (EIS) were developed. These information systems were created to give top executives an easy way to get the critical information they want, when they want it, tailored to the formats they prefer.

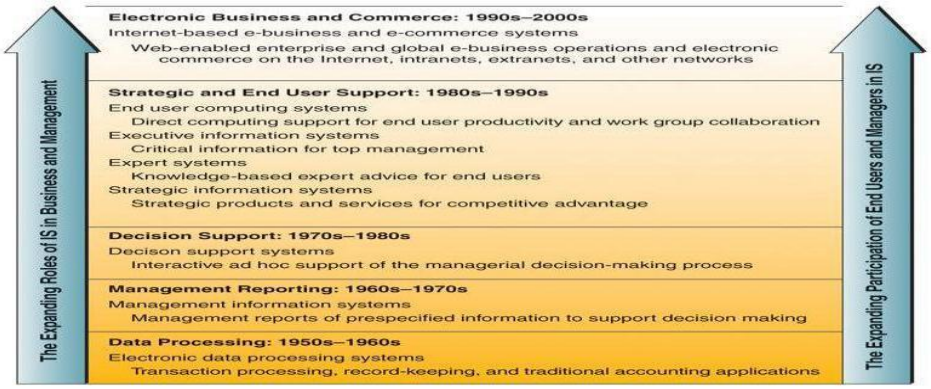
Expert systems (ES) and other knowledge-based systems also forged a new role for information systems. Today, expert systems can serve as consultants to users by providing expert advice in limited subject areas.

This is the concept of a strategic role for information systems, sometimes called strategic information systems (SIS), in this concept; information technology becomes an integral component of business processes, products, and service that help a company gain a competitive advantage in the global marketplace.

The mid –to late 1990s was the revolutionary emergence of enterprise resource planning (ERP) systems. This organization – specific form of strategic information systems integrates all facets of a firm, including its planning, manufacturing , sale, resources, and marketing—virtually every business function .

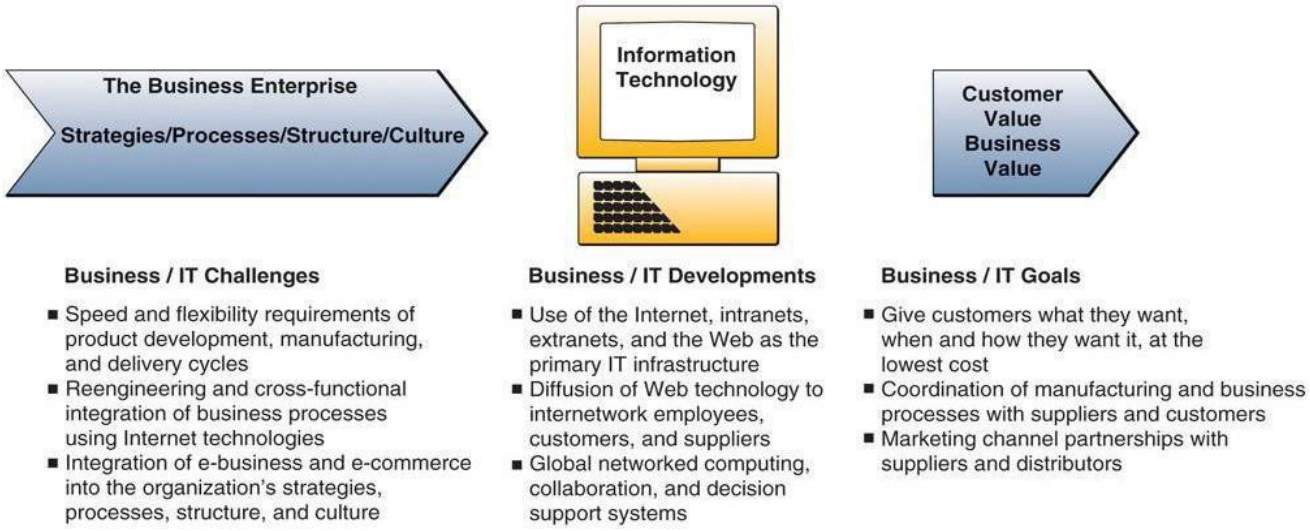
ERP systems lies in their common interface for literally all computer-based organizational function and tight integration and data sharing necessary for flexible strategic decision making.

Finally, the rapid growth of the internet, intranets, extranets, and other interconnected global networks in the 1990s dramatically changed the capabilities of information systems in business at the beginning of the twenty- first century. Internet-based and Web-enabled enterprise and Gloabal electronic business and commerce systems are becoming commonplace in the operations and management of today's business enterprises.



Managerial challenges of IT:

Below fig illustrates the scope of the challenges and opportunities facing business managers and professionals in effectively managing information systems and technologies. Also emphasis that information systems and their technologies must be managed to support the business strategies, business process and organizational structures and culture of a business enterprise. the goal of many companies today is to maximize their customer and business value by using information technology to support their employees in implementing cooperative business process with customer ,suppliers and others.



Measures of Success

IS SHOULD NOT BE MEASURED ONLY BY ITS EFFICIENCY

- Efficiency
    - Minimize costs
    - Minimize time
    - Minimize the use of information resources

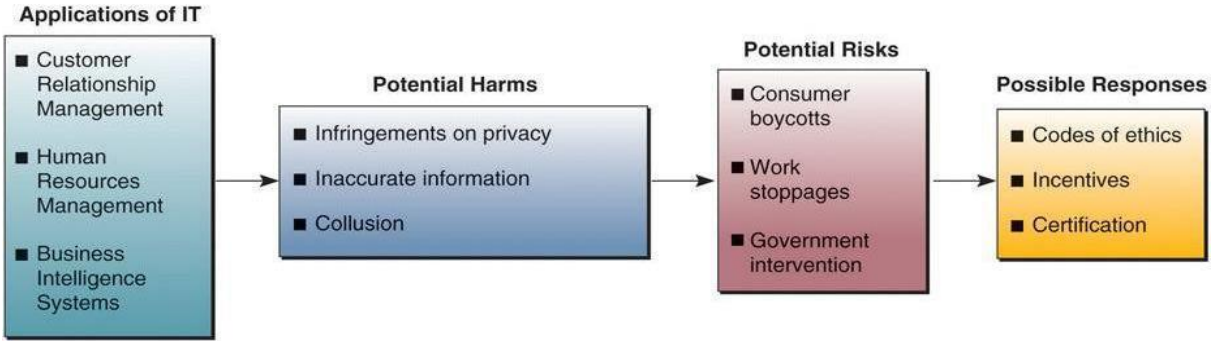
Success should also be measured by its effectiveness of IT

- Effectiveness
    - Support an organization's business strategies
    - Enable its business processes
    - Enhance its organizational structure and culture
    - Increase the customer business value of the enterprise

Developing IS Solutions

The several major activities must be accomplished and managed in a complete IS development cycle. In this development process, end users and information specialists design information system application based on an analysis of the business requirements of an organization. Examples of other activities include investigating the economic or technical feasibility of proposed application, acquiring and learning how t use the software required implementing the new system, and making improvements to maintain the business value of a system

Ethical Challenges of IT



As a prospective managers order you will be challenged by the ethical responsibilities by the use of information technology. For example what uses of IT might be considered improper ,irresponsible or harmful to other individuals to society.

IT Career Trends

- Rising labor costs have resulting in large-scale movement to outsource programming functions to India, the Middle East and Asia-Pacific countries.
- More new and exciting jobs emerge each day as organizations continue to expand their wide-scale use of IT.
- Frequent shortages of qualified information systems personnel.
- Constantly changing job requirements due to dynamic developments in business and IT ensure long-term job outlook in IT remains positive and exciting.

The IS Function represents

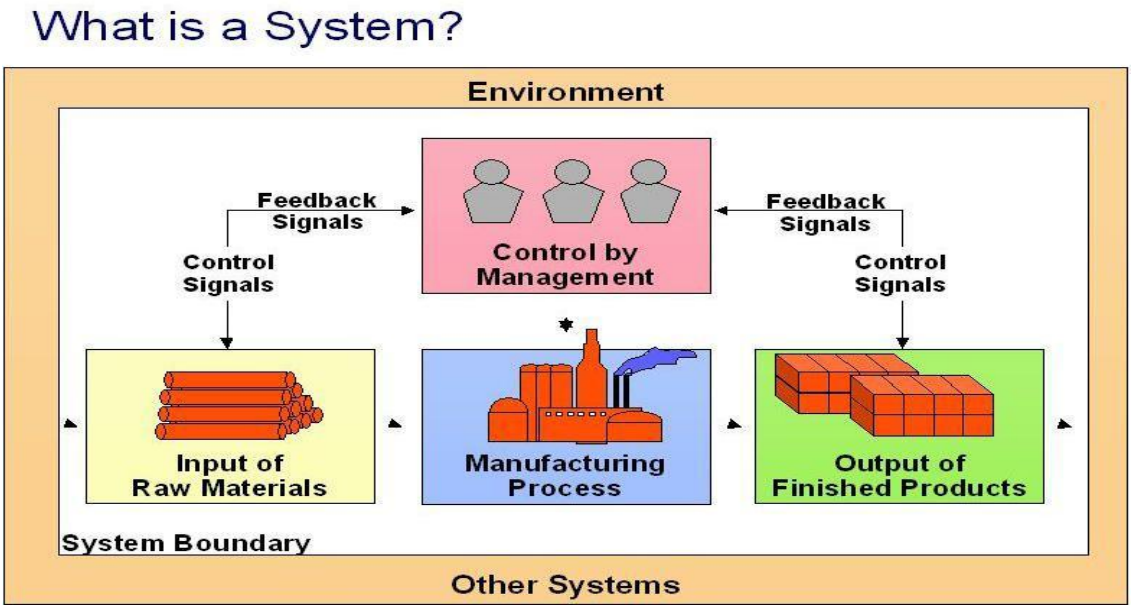
- A major functional area of business equally as important to business success as the functions of accounting, finance, operations management, marketing, and human resource management.
- An important contributor to operational efficiency, employee productivity and morale, and customer service and satisfaction.
- A major source of information and support needed to promote effective decision making by managers and business professionals.
- A vital ingredient in developing competitive products and services that give an organization a strategic advantage in global marketplace.
- A dynamic, rewarding, and challenging career opportunity for millions of men and women.
- A key component of the resources, infrastructure, and capabilities of today's networked business enterprise.

System Concepts: A foundation

What is a System?

Definition:

A group of interrelated components, with a clearly defined boundary, working together toward a common goal by accepting inputs and producing outputs in an organized transformation process.



Components of an Information System

- Input – capturing and assembling elements that enter the system to be processed for example raw materials must be secured and organized for processing.
- Processing – transformation steps that convert input into output examples are a manufacturing process, human breathing process
- Output – transferring elements that have been produced by a transformation process to their ultimate destination for example finished products

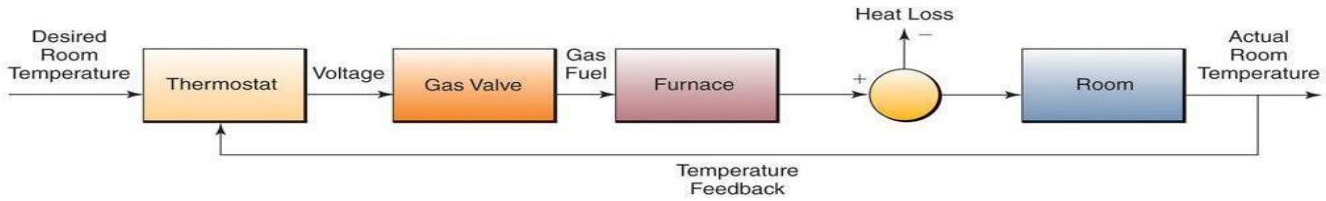
Cybernetic Systems

Definition:

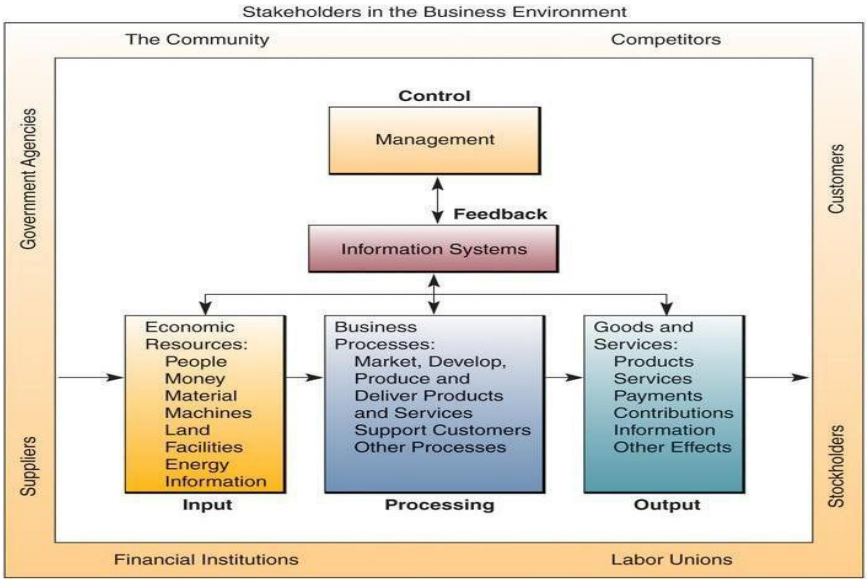
a self-monitoring, self-regulating system.

- Feedback – data about the performance of a system
- Control – monitoring and evaluating feedback to determine whether a system is moving toward the achievement of its goal

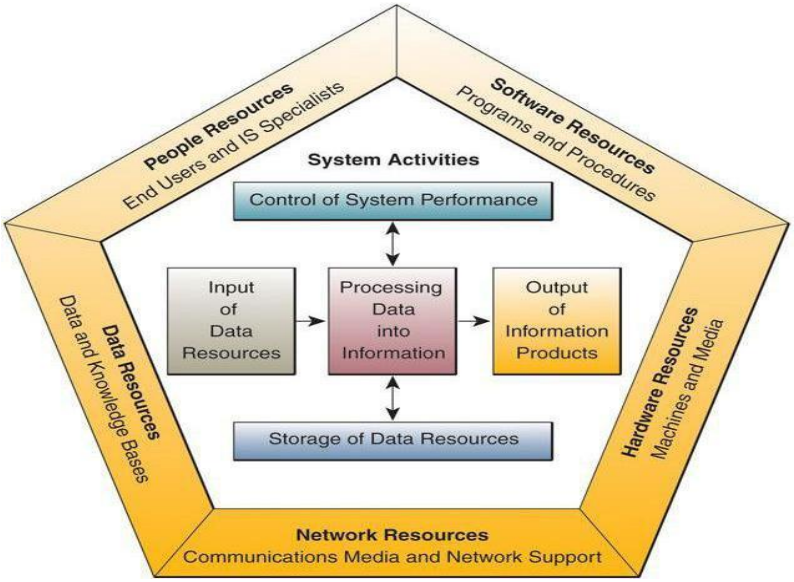
Example of a Cybernetic System



A Business System



Information System Resources



Information System Resources

- People – end users and IS specialists
- Hardware – physical devices and materials used in information processing including computer systems, peripherals, and media
- Software – sets of information processing instructions including system software, application software and procedures
- Data – facts or observations about physical phenomena or business transactions
- Network – communications media and network infrastructure

People resources

End users

People are the essential ingredient for the successful operation of all information system

End users (also called users or clients) are the people who use an information system or the information it produces. They can be customers, salespersons, engineers, clerks, mangers.most end users are knowledge workers that is people who spend most of their time communicating and collaborating in teams and workgroups and creating using and distributing information

Is specialist

People who develop and operate information systems. they include systems analysists,software developers, system operators and other managerial ,technical and clerical IS personal software developers create computer programs based on the specifications of system analysts

Hardware resources

The concept of hardware resources includes includes all physical devices and materials used in information processing, it includes not only machines such as computers and other equipment but also data media data ar recorded from sheets of paper to magnetic disk

Computer systems which consist of central processing units containing microprocessors and a variety of interconnected peripheral devices. Example laptop

Computer peripherals which are devices such as a keyboard or electronic mouse for input of data and commands

Software resources

The concept of software resources includes all sets of information processing instructions. this concepts includes not only the sets of operating instructions called programs which direct and control the hardware but also sets the information processing instructions called procedures

The following are the examples of software resources

System software. Such as an operating system program, which controls and supports the operation of a computer system Data vs. Information

Application software which are the programs that direct processing for a particular use of a computers by end users

Procedures which are operating instructions for the people who will use an information system

Data resources

Data are more than a raw material of information systems

Data that were previously captured as a result of common transaction are now stored, processed and analyzed using sophisticated software applications that can reveal complex relationships about sales, customers, competitors and market.

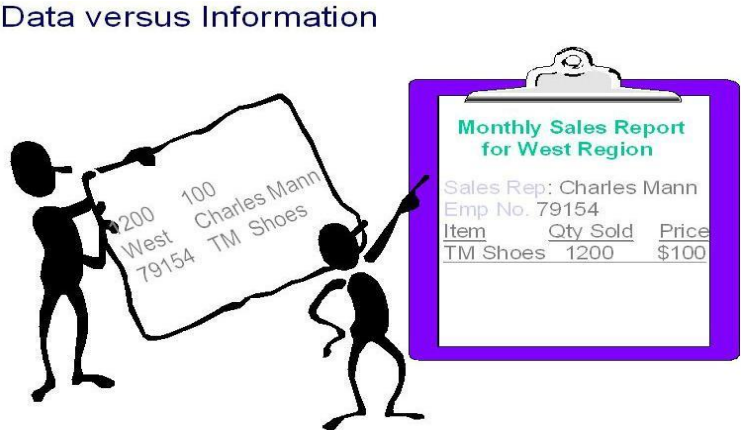
Text data consisting of sentences and paragraphs used n written communications image data, such as graphic shapes and figures and video images and audio data, the human voice and other sounds are also important forms of data

- Data – raw facts or observations typically about physical phenomena or business transactions
- Information – data that have been converted into a meaningful and useful context for specific end users.

Data resources of IS are typically organized, stored,and accessed by a variety of data resources management technologies into:

Databases that hold processed and organized data

Knowledge bases that hold knowledge in a variety of form such as facts,rules

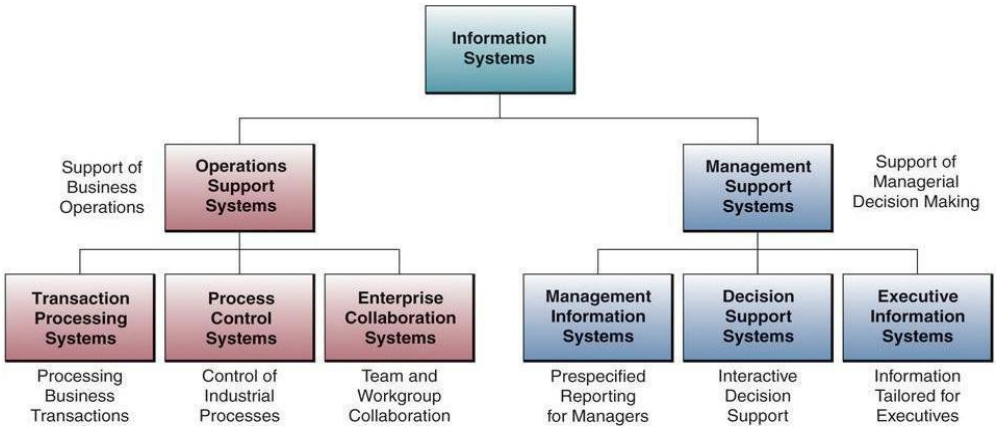


Network Resources

- Communications Media – examples include twisted-pair wire, coaxial and fiber-optic cables, microwave, cellular, and satellite wireless technologies

- Network Infrastructure – examples include communications processors such as modems and internet work processors, and communications control software such as network operating systems and Internet browser packages.

Types of Information Systems



Operation Support Systems

- Information systems that process data generated by and used in business operations

- Goal is to efficiently process business transactions, control industrial processes, support enterprise communications and collaboration, and update corporate databases

Examples of Operations Support Systems

- Transaction Processing Systems (TPS) – process data resulting from business transactions, update operational databases, and produce business documents. They process data in two ways .In batch processing, transactions data are accumulated over a period of time and processed periodically. In real time processing data are processed immediately after a transaction occurs
- Process Control Systems (PCS) – monitor and control industrial processes. for example, a petroleum refinery uses electronic sensors linked to computers to continually monitor chemical processes and make instant adjustments that control the refinery process.

- Enterprise Collaboration Systems – support team, workgroup, and enterprise communications an collaboration. for example ,knowledge workers in a project

team may use electronic mail and receive electronic messges,and videoconferencing to hold electronic meetings to coordinate their activities.

Management Support Systems

Information systems that focus on providing information and support for effective decision making by managers

- Management Information Systems (MIS) – provide information in the form of pre-specified reports and displays to support business decision making.
- Decision Support Systems (DSS) – provide interactive ad hoc support for the decision making processes of managers and other business professionals. for example ,an advertising managers may use a DSS to perform a what if analysis as a part of a decision to determine where to spend advertising dollars
- Executive Information Systems (EIS) – provide critical information from MIS, DSS, and other sources tailored to the information needs of executives. for example top executives may use touch screen terminals to instantly view text and graphics displays that highlights key areas of organizational and competitive performance

Operational & Managerial IS

- Expert Systems – provide expert advice for operational chores or managerial decisions example: credit application advisor, process monitor
- Knowledge Management Systems – support the creation, organization, and dissemination of business knowledge to employees and managers Example: Internet access to best business practices, and customer problem resolution system

IS Classifications by Scope

- Functional Business Systems – support basic business functions. Examples information systems that support applications in accounting,finance,marketing,operations management and human resource management
- Strategic Information Systems – support processes that provide a firm with strategic products, services, and capabilities for competitive advantage
- Cross-functional Information Systems – integrated combinations of information systems

<u>Information Systems Activities</u>

- Input of Data Resources
- Processing of Data into Information
- Output of Information Products
- Storage of Data Resources
- Control of System Performance

Input of data resources data about business transactions and other events must be captured and prepared for processing by the input activity. Input typically takes the form of data entry activities such as recording and editing. end user typically enter data directly into a computer system. This usually includes a variety of editing

activities to ensure that they have recorded data correctly. Once entered, data may be transferred onto a machine-readable medium such as magnetic disk until needed for processing.

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Processing of data into information

Data are typically subjected to processing activities such as calculating, comparing, sorting, classifying and summarizing. These activities organize, analyze, and manipulate data, thus converting them into information for end users.

For example. Data received about a purchase can 1) added to a running total of sales results 2) compared to a standard to determine eligibility for a sales discount 3) sorted in numerical order based on product identification numbers 4) classified into product categories 5) summarized to provide a sales manager with information about various product categories and finally 6) used to update sales record

Output of information products

Information in various forms is transmitted to end users and made available to them in the output activity. the goal of information systems is the production of appropriate information products for end users common information products include messages, reports,forms,and graphic images. for example, a sales manager may view a video display to check on the performance of a sales persons .

Storage of data resources

Storage is basic system component of information systems. storage is the information system activity in which data and information are retained in an organized manner for use. For example text material is organized into words, sentences, paragraphs and documents, stored data are commonly organized into a variety of data elements and databases

Control of system performance control of system performance. An information system should produce feedback about its input, processing, output, and storage activities. This feedback must be monitored and evaluated to determine if the system is meeting established performance.

Fundamentals of strategic advantages

Strategic IT

Competing with Information Technology

To know the role of information systems applications in business to provide effective support of companies strategies for gaining competitive advantage. This strategic role of information systems involve using information technology to develop products, services, and capabilities that give a company major advantages over the competitive forces it faces in the global marketplace.

Need of Strategic IT

- Technology is no longer an afterthought in forming business strategy, but the actual cause and driver.
- IT can change the way businesses compete.

Strategic View of Information Systems

Strategic information system can be any kind of information system, that uses information technology to help an organization gain a competitive advantage, reduce a competitive disadvantage, or meet other strategic enterprise objectives.

- Information systems are vital competitive networks.
- Information systems are a means of organizational renewal.
- IS are a necessary investment in technologies that help a company adopt strategies and business processes that enable it to reengineer or reinvent itself in order to survive and succeed in today's dynamic business environment

Information Technology: definition

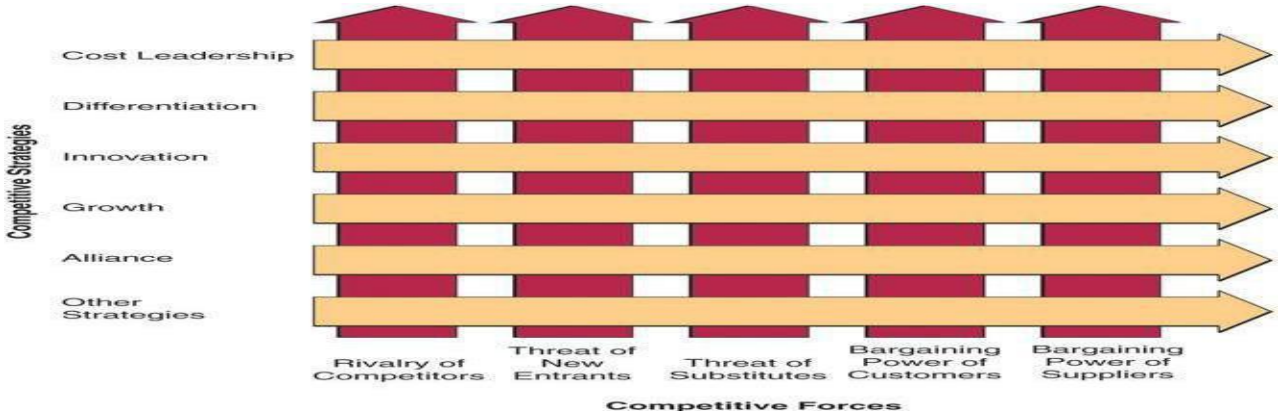
- An information technology can be defined as. A bunch of networks and computers or It is a group of Hardware plus the software that mediates and manages human knowledge or information..

Strategic Information Systems

Definition:

- Any kind of information system that uses information technology to help an organization gain a competitive advantage, reduce a competitive disadvantage, or meet other strategic enterprise objectives.

Competitive Forces Strategies: This important conceptual frame work for understanding and applying competitive strategies.



Competitive Forces: A company can survive and succeed in the long run only if it successfully develops strategies to confront five competitive forces.

Definition:

- These forces Shape the structure of competition in its industry.

Porter's Competitive Forces Model

To survive and succeed, a business must develop and implement strategies to effectively counter the:

- Rivalry of competitors within its industry
- Threat of new entrants into an industry and its markets
- Threat posed by substitute products which might capture market share
- Bargaining power of customers
- Bargaining power of suppliers

The competitive advantage of IT

Competitive Strategies: There are five different strategies to gain competitive advantages in business.

- 1)Cost Leadership
- 2)Differentiation
- 3)Innovation
- 4)Growth
- 5)Alliance

1)Cost Leadership Strategy

- Becoming a low-cost producer of products and services in the industry, or finding ways to help its suppliers or customers reduce their costs or to increase the costs of their competitors.

2) Differentiation Strategy

- Developing ways to differentiate a firm's products and services from its competitors'
- Reduce the differentiation advantages of competitors

- Development of unique products and services
- Entry into unique markets or market niches
- Making radical changes to the business processes for producing or distributing products and services that are so different from the way a business has been conducted that they alter the fundamental structure of an industry

- Significantly expanding a company's capacity to produce goods and services
- Expanding into global markets

- Diversifying into new products and services
- Integrating into related products and services

- Establishing new business linkages and alliances with customers, suppliers, competitors, consultants, and other companies

Competitive Strategy Examples: this example shows how companies have used information technology to implement five competitive strategies for strategic advantage.

Strategy	Company	Strategic Use of Information Technology	Business Benefit
Cost Leadership	Dell Computer	Online build to order	Lowest cost producer
	Priceline.com	Online seller bidding	Buyer-set pricing
	eBay.com	Online auctions	Auction-set prices
Differentiation	AVNET Marshall	Customer/supplier e-commerce	Increase in market share
	Moen Inc.	Online customer design	Increase in market share
	Consolidated Freightways	Customer online shipment tracking	Increase in market share
Innovation	Charles Schwab & Co.	Online discount stock trading	Market leadership
	Federal Express	Online package tracking and flight management	Market leadership
	Amazon.com	Online full-service customer systems	Market leadership
Growth	Citicorp	Global intranet	Increase in global market
	Wal-Mart	Merchandise ordering by global satellite network	Market leadership
	Toys 'Я' Us Inc.	POS inventory tracking	Market leadership
Alliance	Wal-Mart/Procter & Gamble	Automatic inventory replenishment by supplier	Reduced inventory cost/increased sales
	Cisco Systems	Virtual manufacturing alliances	Agile market leadership
	Staples Inc. and Partners	Online one-stop shopping with partners	Increase in market share

Strategic uses of IT

Other Competitive Strategies: there are other competitive strategies in addition to the five basic strategies. They are locking in customers or suppliers, building switching costs, raising barriers to entry and leveraging investment in information technology.

- Locking in customers or suppliers by building valuable new relationships with them.

- Building switching costs so a firm's customers or suppliers are reluctant to pay the costs in time, money, effort, and inconvenience that it would take to switch to a company's competitors**.**

- Raising barriers to entry that would discourage or delay other companies from entering a market.

- Leveraging investment in information technology by developing new products and services that would not be possible without a strong IT capability.

Advantage vs. Necessity

- Competitive Advantage – developing products, services, processes, or capabilities that give a company a superior business position relative to its competitors and other competitive forces

- Competitive Necessity – products, services, processes, or capabilities that are necessary simply to compete and do business in an industry

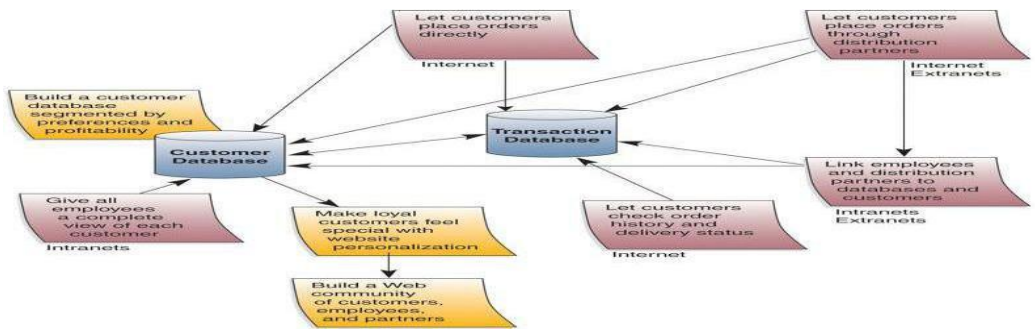
Customer-Focused Business: In many companies, the chief business value of becoming a customer focused business lies in its ability to help them keep customers loyal, anticipate their future needs, respond to customer concerns, and provide top quality customer service.

This strategic focus on customer value recognizes that quality, rather then price. so companies need to keep track customer preferences, keep up their market trends, supply products and information anytime.

Internet technologies can make customers the focal point of customer relationship management and other e-business applications

Building a customer-focused business

IS in a Customer-Focused Business



This diagram illustrates the interrelationships in a customer focused business. Intranets, extranets, e-commerce websites, and web enabled internal business processes from the invisible IT platform that supports this e-business model.

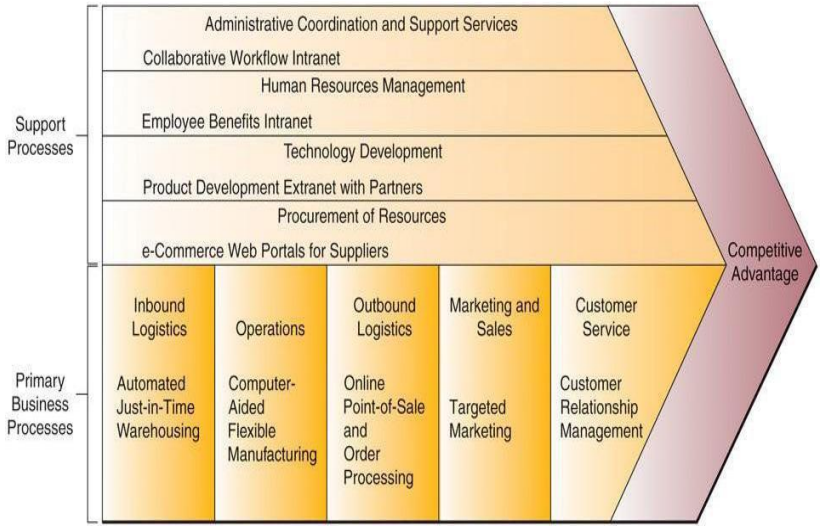
The value chain and strategic IS

Value Chain

The value chain concept was developed by Michael porter. This framework can highlight where competitive strategies can best be applied in a business. Managers and business professionals should try to develop a variety of strategic uses of internet and other technologies for those basic processes that add the most value to a company's products or services.

Definition:

- View of a firm as a series, chain, or network of basic activities that add value to its products and services, and thus add a margin of value both to the firm and its customers.



- This gives a view of value chain of a firm. Note the examples of the variety of strategic information systems that can be applied to a firm's basic business process for competitive advantage.

Reengineering business processes

Business Process Reengineering: One of the most important implementations of competitive strategies is BPR. Most often it is called business reengineering.
Definition:

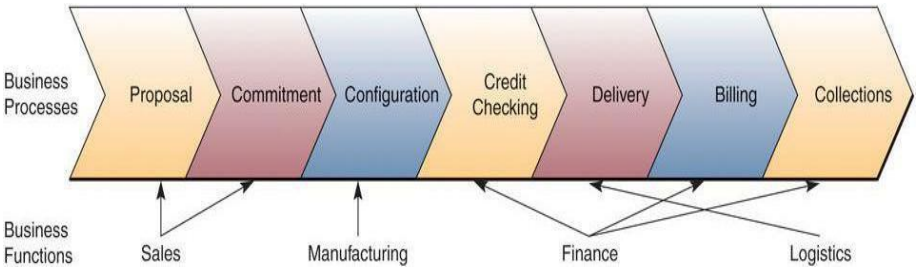
- Fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in cost, quality, speed, and service.

BPR vs. Business Improvement

	Business Improvement	Business Process Reengineering
Level of Change	Incremental	Radical
Process Change	Improved new version of process	Brand new process
Starting Point	Existing processes	Clean slate
Frequency of Change	One-time or continuous	Periodic one-time change
Time Required	Short	Long
Typical Scope	Narrow, within functions	Broad, cross functional
Horizon	Past and present	Future
Participation	Bottom-up	Top-down
Path to Execution	Cultural	Cultural, structural
Primary Enabler	Statistical control	Information technology
Risk	Moderate	High

The above list shows some of the ways that BPR differs from business improvement. Cross-Functional Processes**:** Information technology plays a major role in BPR.the speed, information processing capabilities, and connectivity of computers and internet technologies can substantially increase the efficiency of business processes, as well as communications and collaboration among the people for their operation and management.

Example: the order management process.



Becoming an agile company Creating a virtual company

Agility

Definition:

- The ability of a company to prosper in rapidly changing, continually fragmenting global markets for high-quality, high performance, customer-configured products and services.

Agile Company

Definition:

- A company that can make a profit in markets with broad product ranges and short model lifetimes, and can produce orders individually and in arbitrary lot sizes.

Mass Customization

Definition:

- Providing individualized products while maintaining high volumes of production

Agile Competitor

Type of Agility	Description	Role of IT	Example
Customer	Ability to co-opt customers in the exploitation of innovation opportunities • as sources of innovation ideas • as cocreators of innovation • as users in testing ideas or helping other users learn about the idea	Technologies for building and enhancing virtual customer communities for product design, feedback, and testing	eBay customers are its de facto product development team because they post an average of 10,000 messages each week to share tips, point out glitches, and lobby for changes.
Partnering	Ability to leverage assets, knowledge, and competencies of suppliers, distributors, contract manufacturers, and logistics providers in the exploration and exploitation of innovation opportunities	Technologies facilitating interfirm collaboration, such as collaborative platforms and portals, supply-chain systems, etc.	Yahoo! has accomplished a significant transformation of its service from a search engine into a portal by initiating numerous partnerships to provide content and other media-related services from its website.
Operational	Ability to accomplish speed, accuracy, and cost economy in the exploitation of innovation opportunities	Technologies for modularization and integration of business processes	Ingram Micro, a global wholesaler, has deployed an integrated trading system allowing its customers and suppliers to connect directly to its procurement and ERP systems.

Virtual Company: in today's dynamic global business environment, forming a virtual company can be one of the most important strategic uses of information technology.

Definition:

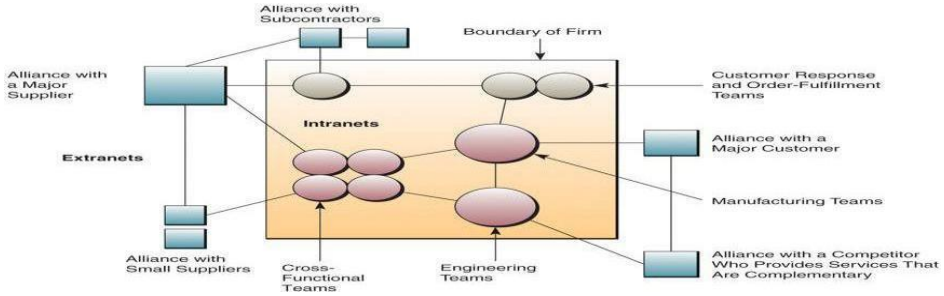
- An organization that uses information technology to link people, organizations, assets, and ideas.

Inter enterprise Information Systems

Definition:

- Information systems implemented on an extranet among a company and its suppliers, customers, subcontractors, and competitors with whom it has formed alliances.

  Virtual Company: It illustrates that virtual companies typically form virtual workgroups and alliances with business partners that are interlinked by the internet, intranets, and extranets. This company has organized internally into clusters of process and cross functional teams linked by intranets. It also developed alliances and extranet links that form inter enterprise information systems with suppliers, customers, subcontractors, and competitors.



Virtual Company Strategies

- Share infrastructure and risk with alliance partners.
- Link complementary core competencies.

- Reduce concept-to-cash time through sharing.
- Increase facilities and market coverage.

- Gain access to new markets and share market or customer loyalty.
- Migrate from selling products to selling solutions.
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Building a knowledge-creating company

Knowledge-Creating Companies

Definition

- Consistently creating new business knowledge, disseminating it widely throughout the company, and quickly building the new knowledge into their products and services.

Types of Knowledge

- Explicit Knowledge – data, documents, things written down or stored on computers

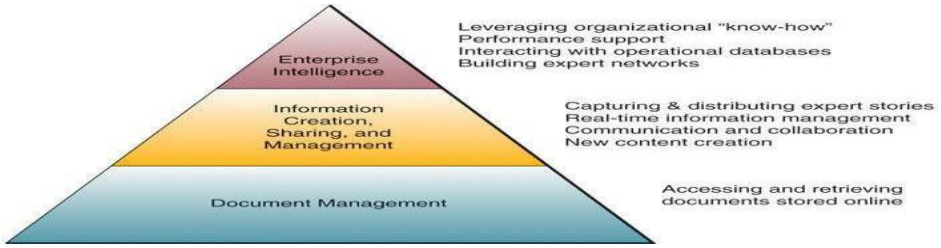
- Tacit Knowledge – th e —h ow-tos of knowledge, which reside in workers Knowledge Management

Definition:

- Techniques, technologies, systems, and rewards for getting employees to share what they know and to make better use of accumulated workplace and enterprise knowledge.

Knowledge Management Systems – manage organizational learning and business know

Levels of Knowledge Management



- Information technologies can support many competitive strategies including cost leadership, differentiation, innovation, growth and alliance.

- IT can help

    - Build customer-focused businesses
    - Reengineer business processes

    - Businesses become agile companies
    - Create virtual companies
    - Build knowledge-creating companies