MANAGEMENT INFORMATION SYSTEM

Module 1 : Introduction to Information Systems

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Lecture No: 4 Organizational Strategy, Competitive Advantages and IS

Business Process

- A business process is an ongoing collection of related activities that create a product or a service of value to the organization, its business partners, and/or its customers

Inputs	Resources	Outputs
• Materials • Services • Process activities	• People • Equipment	• Product • Service created

Cross-functional Process

Accounting Business Processes
- Managing accounts payable
- Managing accounts receivable
- Reconciling bank accounts
- Managing cash receipts
- Managing invoice billings
- Managing petty cash
- Producing month-end close
- Producing virtual close

Finance Business Processes
- Managing account collection
- Managing bank loan applications
- Producing business forecasts
- Applying customer credit approval and credit terms
- Producing property tax assessments
- Managing stock transactions
- Generating financial cash flow reports

Marketing Business Processes
- Managing post-sale customer follow-up
- Collecting sales taxes
- Applying copyrights and trademarks
- Using customer satisfaction surveys
- Managing customer service
- Handling customer complaints
- Handling returned goods from customers
- Producing sales leads
- Entering sales orders
- Training sales personnel

Production/Operations Management Business Processes
- Processing bills of materials
- Processing manufacturing change orders
- Managing master parts list and files

- Managing packing, storage, and distribution
- Processing physical inventory
- Managing purchasing
- Managing quality control for finished goods
- Auditing for quality assurance
- Receiving, inspecting, and stocking parts and materials
- Handling shipping and freight claims
- Handling vendor selection, files, and inspections

Human Resources Business Processes
- Applying disability policies
- Managing employee hiring
- Handling employee orientation
- Managing files and records
- Applying healthcare benefits
- Managing pay and payroll
- Producing performance appraisals and salary adjustments
- Managing resignations and terminations
- Applying training/tuition reimbursement
- Managing travel and entertainment
- Managing workplace rules and guidelines
- Overseeing workplace safety

Management Information Systems Business Processes
- Antivirus control
- Computer security issues incident reporting
- Training computer users
- Computer user/staff training
- Applying disaster recovery procedures
- Applying electronic mail policy
- Generating Internet use policy
- Managing service agreements and emergency services
- Applying user workstation standards
- Managing the use of personal software

Information Systems and Business Processes

- An information system (IS) is a critical enabler of an organization's business processes.

- Information systems facilitate communication and coordination among different functional areas, and allow easy exchange of, and access to, data across processes. Specifically, ISs play a vital role in three areas:

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

Business Pressures, Organizational Responses, and IT Support

Competitive Advantage: Any assets that provide an organization with an edge against its competitors in some measure such as cost, quality, or speed. It also helps an organization to control a market and to accrue larger-than-average profits.

Business Environment: The combination of social, legal, economic, physical, and political factors in which businesses conduct their operations. Significant changes in any of these factors are likely to create Business Pressures on organizations.
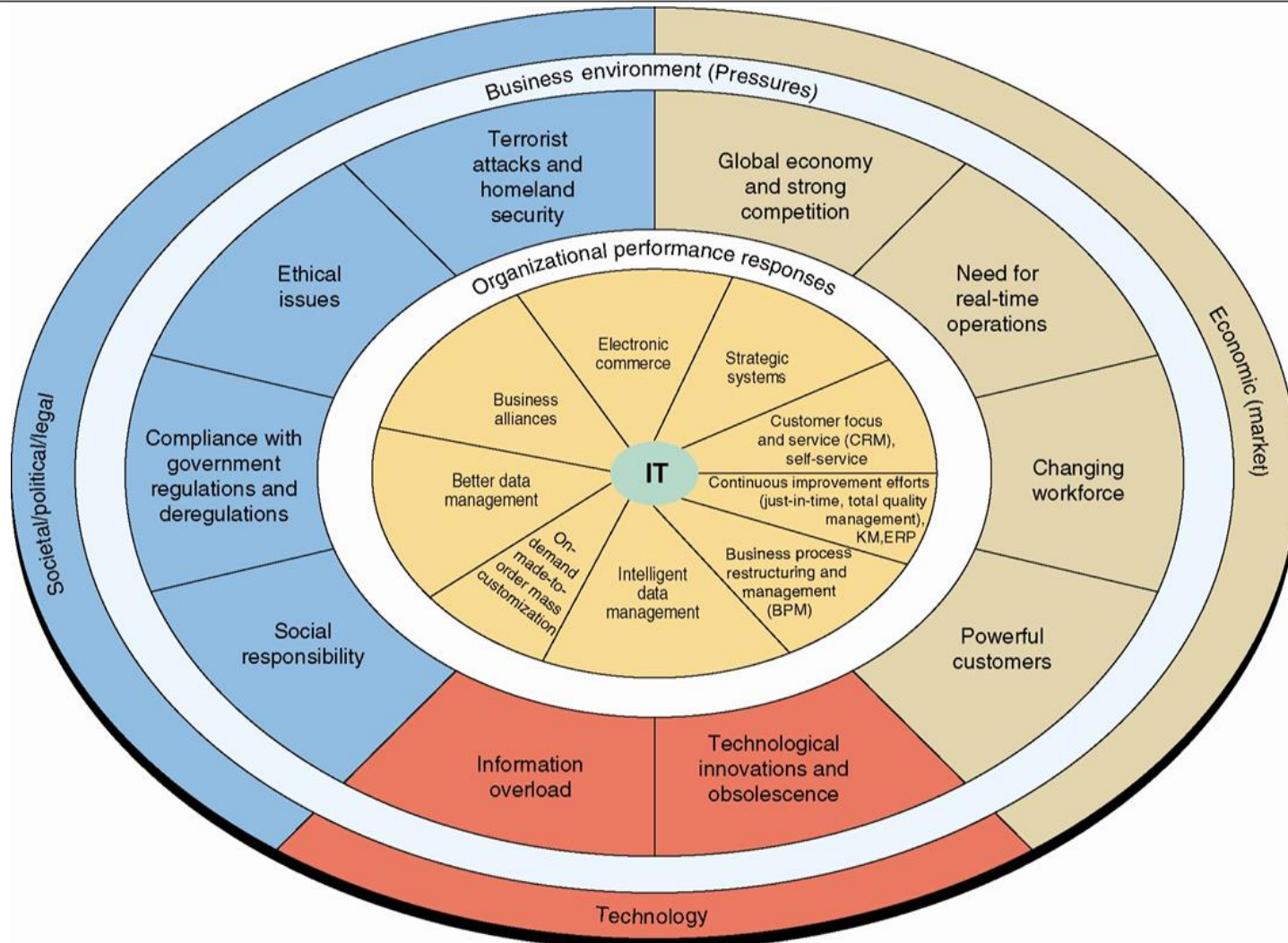
Organizations Responses: Organizations respond to the various pressures by implementing Information Technology (IT) such as strategic systems, customer focus, make-to-order and mass customization, and e-business.

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Business Pressures

➢ Market Pressures: Business pressures generated by the global economy, intense competition, the changing nature of the workforce, and powerful customers.

➢ Technology Pressures: Business pressures caused by technological innovation and information overload.

➢ Societal/Political/Legal Pressures: Business pressures related to social responsibility, government regulation/deregulation, spending for social programs, spending to protect against terrorism, and ethics.

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Business Pressures, Organizational Performance & Responses, and IT Support

Lecture 1 – Introduction to MIS and Information System

Market Pressures

Globalization: The integration and interdependence of economic, social, cultural, and ecological facets of life, made possible by rapid advances in information technology.

Changing Nature of the Workforce: The workforce, particularly in developed countries, is becoming more diversified. Increasing numbers of women, single parents, minorities, and persons with disabilities are now employed in all types of positions.

Powerful Customers: Consumer sophistication and expectations increase as customers become more knowledgeable about the products and services they acquire. Customers can use the Internet to find detailed information about products and services, to compare prices, and to purchase items at electronic auctions.

Lecture 1 – Introduction to MIS and Information System

Globalization: Thomas Friedman: Three eras of Globalisation

Globalization 1.0:
Timeframe: 1492 to 1800 Distinct Focus: Countries Driver: Brute Force, Braun

Globalization 2.0:
Timeframe: 1800 to 2000
Distinct Focus: International Companies Driver:
-- first half of this period --> Falling Transportation Costs (Steam Engine/Railroads)
-- second half of this period --> Falling Telecommunication Costs (Telegraph, Telephone, Computer, Satellite, Fiber Optics, Internet)

Globalization 3.0:
Timeframe: 2000 to Present
Distinct Focus: Groups and Individuals
Driver: Convergence of 10 forces (or Flatteners)

Thomas Freidman: Ten Flatteners

- Fall of the Berlin Wall on November 9, 1989: Shifted the world toward free-market economies and away from centrally planned economies.

- Led to the emergence of the European Union and early thinking about the world as a single, global market.

- Netscape goes public on August 9, 1995: Popularized the Internet and the World Wide Web.

- Development of workflow software: Enabled computer applications to work with one another without human intervention.

- Enabled faster, closer collaboration and coordination among employees,

- regardless of their location.

- Uploading: Empowered all Internet users to create content and put it on the Web.

- Led the transition from a passive approach to content to an active, participatory, collaborative approach.

Thomas Freidman: Ten Flatteners

- Outsourcing: Contracting with an outside company to perform a specifi c function that your company was doing itself and then integrating their work back into your operation; for example, moving customer call centers to India.

- Offshoring: Relocating an entire operation, or certain tasks, to another country; for example, moving an entire manufacturing operation to China.

- Supply chaining: Technological revolution led to the creation of networks composed of companies, their suppliers, and their customers, all of which could collaborate and share information for increased efficiency.

- Insourcing: Delegating operations or jobs within a business to another company that specializes in those operations; for example, Dell hires FedEx to "take over" Dell's logistics process.

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Thomas Freidman: Ten Flatteners

- Informing: The ability to search for information, best illustrated by search engines.
- The Steroids (computing, instant messaging and file sharing, wireless technologies, Voice over Internet Protocol, videoconferencing, and computer graphics):
- Technologies that amplify the other flatteners.
- Enable all forms of computing and collaboration to be digital, mobile, and personal.

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Technology Pressures

➢ Technological Innovation and Obsolescence: Few and improved technologies rapidly create or support substitutes for products, alternative service options, and superb quality. As a result, today's state-of-the-art products may be obsolete tomorrow.

➢ Information Overload: Internet and other telecommunications networks are bringing a flood of information to managers. To make decisions effectively and efficiently, managers must be able to access, navigate, and utilize these vast stores of data, information, and knowledge

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Societal/Political/Legal Pressures

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

Compliance with Government Regulations:
Government regulations regarding health, safety, environmental protection, and equal opportunity. Businesses tend to view government regulations as expensive constraints on their activities. In general, government deregulation intensifies competition.

Protection Against Terrorist Attacks:
Since September 11, 2001, organizations have been under increased pressure to protect themselves against terrorist attacks. In addition, employees who are in the military reserves have been called up for active duty, creating personnel problems. Information technology can help protect businesses by providing security systems and possibly identifying patterns of behavior associated with terrorist activities, including cyberattacks.

Ethical Issues:

Ethics relates to general standards of right and wrong. Information ethics relates specifically to standards of right and wrong in information processing practices. Ethical issues are very important because, if handled poorly, they can damage an organization's image and destroy its employees' morale

Social Responsibility

- IT is instrumental in organizational efforts to "go green" in three areas:
- Facilities design and management
- Carbon management
- International and U.S. environmental laws

- Digital Divide: refers to the wide gap between those individuals who have access to information and communications technology and those who do not

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Organizational Responses

Organizational Responses

Strategic Systems: provide organizations with advantages that enable them to increase their market share and/or profits, to better negotiate with suppliers, and to prevent competitors from entering their markets.

Customer Focus: Organizational attempts to provide superb customer service can make the difference between attracting and retaining customers versus losing them to competitors. Numerous IT tools and business processes have been designed to keep customers happy.

Make-to-Order: a strategy of producing customized (made to individual specifications) products and services.

Mass Customization: a company produces a large quantity of items, but it customizes them to match the needs and preferences of individual customers. Mass customization is essentially an attempt to perform make-to-order on a large scale (Example: Bodymetrics <www.bodymetrics.com>).

E-Business and E-Commerce: Conducting business electronically is an essential strategy for companies that are competing in today's business environment.

Electronic commerce (EC or e-commerce): describes the process of buying, selling, transferring, or exchanging products, services, or information via computer networks, including the Internet.

E-business: a somewhat broader concept than EC that includes servicing customers, collaborating with business partners, and performing electronic transactions within an organization.

Competitive Advantage and Strategic IS's

- Fast data processing and information retrieval – this is one of the biggest advantages of a computerized information system. It processes data and retrieves information at a faster rate. This leads to improved client/customer service

- Improved data accuracy – easy to implement data validation and verification checks in a computerized system compared to a manual system.

- Improved security – In addition to restricting access to the database server, the computerized information system can implement other security controls such as user's authentication, biometric authentication systems, access rights control, etc.

- Reduced data duplication – database systems are designed in such a way that minimized duplication of data. This means updating data in one department automatically makes it available to the other departments

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Competitive Advantage and Strategic IS's

- Porter's Competitive Forces Model Porter's Value Chain Model
- Strategies for Competitive Advantage
- Business – Information Technology Alignment

Lecture 1 – Introduction to MIS and Information System

Porter's Competitive Forces Model

Lecture 1 – Introduction to MIS and Information System
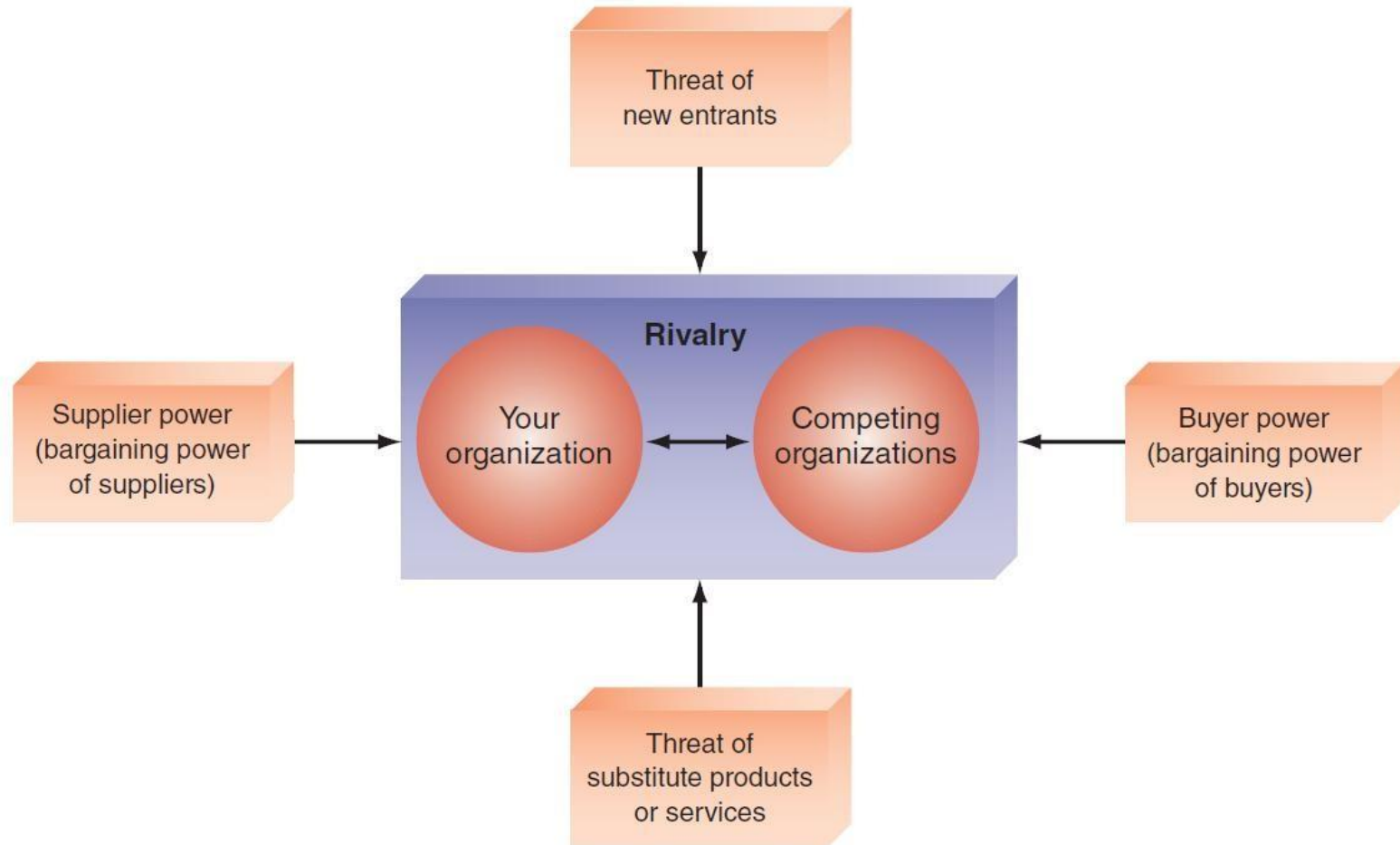
Porter's Five Forces Model

Threat of Entry of New Competitors: The threat that new competitors will enter your market is high when entry is easy and low when there are significant barriers to entry.

Bargaining Power of Suppliers: Supplier power is high when buyers have few

choices from whom to buy and low when buyers have many choices.

Bargaining Power of Customers (Buyers): Buyer power is high when buyers have many choices from whom to buy and low when buyers have few choices.

Threat of Substitute Products or Services: If there are many alternatives to an organization's products or services, then the threat of substitutes is high. If there are few alternatives, then the threat is low.

Rivalry Among Existing Firms: The threat from rivalry is high when there is intense competition among many firms in an industry. The threat is low when the competition is among fewer firms and is not as intense.

Barrier to Entry: a product or service feature that customers have learned to expect from organizations in a certain industry. A competing organization must offer this feature in order to survive in the marketplace (e.g., legal requirements such as admission to the bar to practice law).

Switching Costs: the costs, in money and time, imposed by a decision to buy elsewhere (e.g., contracts with smartphone providers).

Porter's Value Chain Model

- Value Chain: A sequence of activities through which the organization's inputs, are transformed into more valuable outputs.

- Value System: Includes the suppliers that provide the inputs necessary to the firm along with their value chains. After the firm creates products, these products pass through the value chains of distributors (which also have their own value chains), all the way to the customers. All parts of these chains are included in the value system.

- Two Categories of Organization Activities in the Value Chain:

- Primary Activities: relate to the production and distribution of the firm's products and services. These activities create value for which customers are willing to pay.

- Support activities: contribute to the firm's competitive advantage by supporting the primary activities, but do not add value directly to the firm's products or services.

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Primary Activities

Five Sequenced Primary Activities of Typical Manufacturing Companies:

Inbound logistics (inputs)

Operations (manufacturing and testing)

Outbound logistics (storage and distribution)

Marketing and sales

Services

Support Activities

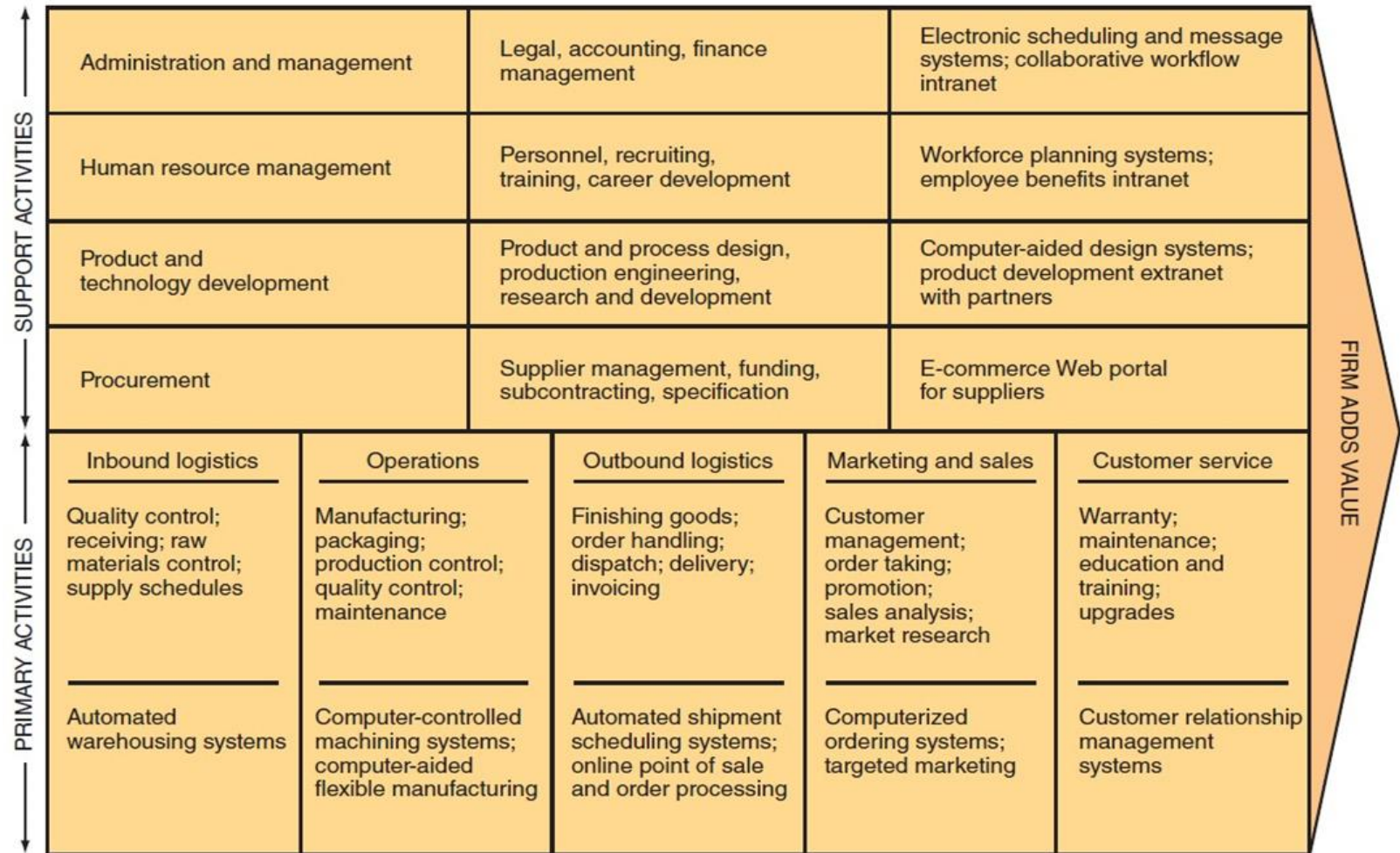Value Chain Support Activities Typically Include:

The firm's infrastructure (accounting, finance, management)

Human resources management

Product and technology development (R&D)

Procurement

Porter's Value Chain Model

Administration and management	Legal, accounting, finance management	Electronic scheduling and message systems; collaborative workflow intranet
Human resource management	Personnel, recruiting, training, career development	Workforce planning systems; employee benefits intranet
Product and technology development	Product and process design, production engineering, research and development	Computer-aided design systems; product development extranet with partners
Procurement	Supplier management, funding, subcontracting, specification	E-commerce Web portal for suppliers

SUPPORT ACTIVITIES

FIRM ADDS VALUE

Inbound logistics	Operations	Outbound logistics	Marketing and sales	Customer service
Quality control; receiving; raw materials control; supply schedules	Manufacturing; packaging; production control; quality control; maintenance	Finishing goods; order handling; dispatch; delivery; invoicing	Customer management; order taking; promotion; sales analysis; market research	Warranty; maintenance; education and training; upgrades
Automated warehousing systems	Computer-controlled machining systems; computer-aided flexible manufacturing	Automated shipment scheduling systems; online point of sale and order processing	Computerized ordering systems; targeted marketing	Customer relationship management systems

PRIMARY ACTIVITIES

Strategies for Competitive Advantage

Cost leadership strategy: Produce products and/or services at the lowest cost in the industry (e.g., Walmart's automatic inventory replenishment system).

Differentiation Strategy: Offering different products, services, or product features than your competitors (e.g., Southwest Airlines has differentiated itself as a low-cost, short-haul, express airline).

Innovation Strategy: Introduce new products and services, add new features to existing products and services, or develop new ways to produce them (Classic Example: the first introduction of automated teller machines (ATMs) by Citibank).

Operational Effectiveness Strategy: Improve the manner in which a firm executes its internal business processes so that it performs these activities more effectively than its rivals. Such improvements increase quality, productivity, and employee and customer satisfaction while decreasing time to market.

Customer Orientation Strategy: Concentrate on making customers happy. Web-based systems are particularly effective in this area because they can create a personalized, one-to-one relationship with each customer.

Strategies for Competitive Advantage

Cost Leader

I can sell at a lower cost than you can.

Differentiation

I am better because I am different.

Innovation

I'm doing something new and you can't catch up.

Operational Effectiveness

I can do the same thing more efficiently than you can.

Customer Oriented

I treat my customers better than you do.
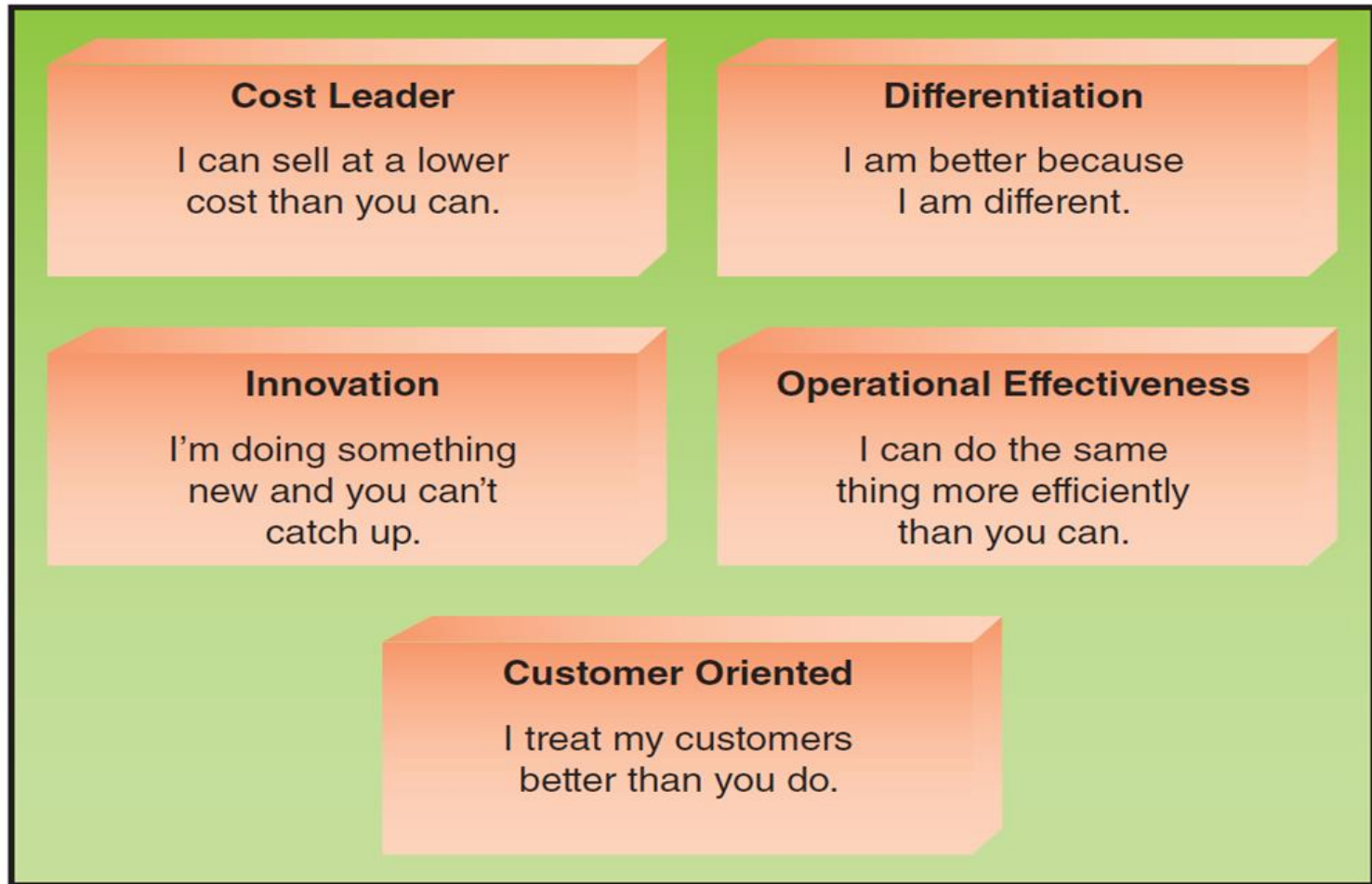
Business-Information Technology Alignment

Business–Information Technology Alignment : IT function directly supports the business objectives of the organization through the tight integration of the IT function with the organization's strategy, mission, and goals.

Six Characteristics of Excellent Business-IT Alignment:

- Organizations view IT as an engine of innovation that continually transforms the business, often creating new revenue streams.

- Organizations view their internal and external customers and their customer service function as supremely important.

- Organizations rotate business and IT professionals across departments and job functions.

- Organizations provide overarching goals that are completely clear to each IT and business employee.

- Organizations ensure that IT employees understand how the company makes (or loses) money.

- Organizations create a vibrant and inclusive company culture

Data and Knowledge Management - Database Approach

Module 2 Contents

➢ Managing Data

➢ The Database Approach Big Data

➢ Data Warehouses and Data Marts

➢ Knowledge Management

➢ Managers and Decision Making

➢ Business Intelligence

➢ BI for Data Analysis & Presenting Results

Lecture 5 – Database Approach

Managing Data

- All IT applications require data.

- These data should be of high quality, meaning that they should be accurate, complete, timely, consistent, accessible, relevant, and concise.

- Unfortunately, the process of acquiring, keeping, and managing data is becoming increasingly difficult.

Internal Data Sources

Personal Data Sources

External Data Sources

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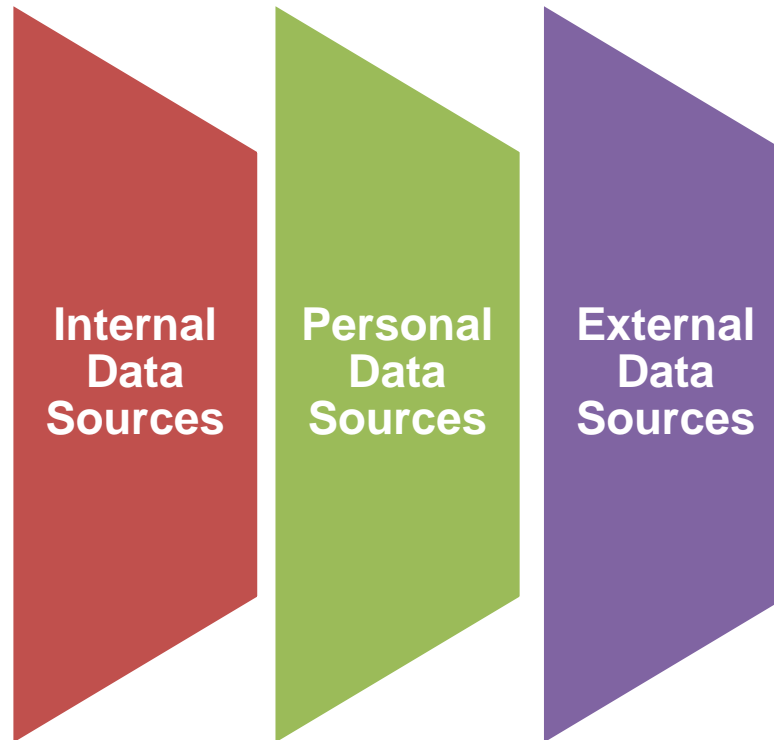
Difficulties of Managing data

- The amount of data increases exponentially over time.

- Data are scattered throughout organizations.

- Data are generated from multiple sources (internal, personal, external).

- New sources of data (e.g., blogs, podcasts, video casts, and RFID tags and other wireless sensors)

- Data Degradation (e.g., customers move to new addresses, change their names, etc.)

- Data Rot : refers primarily to problems with the media on which the data are stored. Over time, temperature, humidity, and exposure to light can cause physical problems with storage media and thus make it difficult to access the data.

- Data security, quality, and integrity are critical

- Legal requirements change frequently and differ among countries and industries

| Lecture 5 – Database Approach

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Data Governance

- ➤ **Data Governance**: is an approach to managing information across an entire organization involving a formal set of unambiguous rules for creating, collecting, handling, and protecting its information.

- ➤ **Master Data Management**: a strategy for data governance involving a process that spans all organizational business processes and applications providing companies with the ability to store, maintain, exchange, and synchronize a consistent, accurate, and timely for the company's master data.

- ➤ **Master Data**: a set of core data (e.g., customer, product, employee, vendor, geographic location, etc.) that span the enterprise information systems.

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Database Approach

➢ Data File

➢ Database Systems Minimize & Maximize Three Things

➢ The Data Hierarchy

➢ The Relational Database Model

Data File

➢ A data fi le is a collection of logically related records. In a fi le management environment, each application has a specific data fi le related to it.

➢ This file contains all of the data records, the application requires.

➢ Over time, organizations develops numerous applications, each with an associated, application-specific data file

Database Systems Minimize & Maximize Three Things

- Data redundancy: The same data are stored in multiple locations.

- Data isolation: Applications cannot access data associated with other applications

.

- Data inconsistency: Various copies of the data do not agree.

database systems maximize the following:

- Data security: Because data are "put in one place" in databases, there is a risk of losing a lot of data at once. Therefore, databases have extremely high security measures in place to minimize mistakes and deter attacks.

Database Systems Minimize & Maximize Three Things

➢ Data integrity: Data meet certain constraints; for example, there are no alphabetic characters in a Social Security number field.

➢ Data independence: Applications and data are independent of one another; that is, applications and data are not linked to each other, so all applications are able to access the same data.
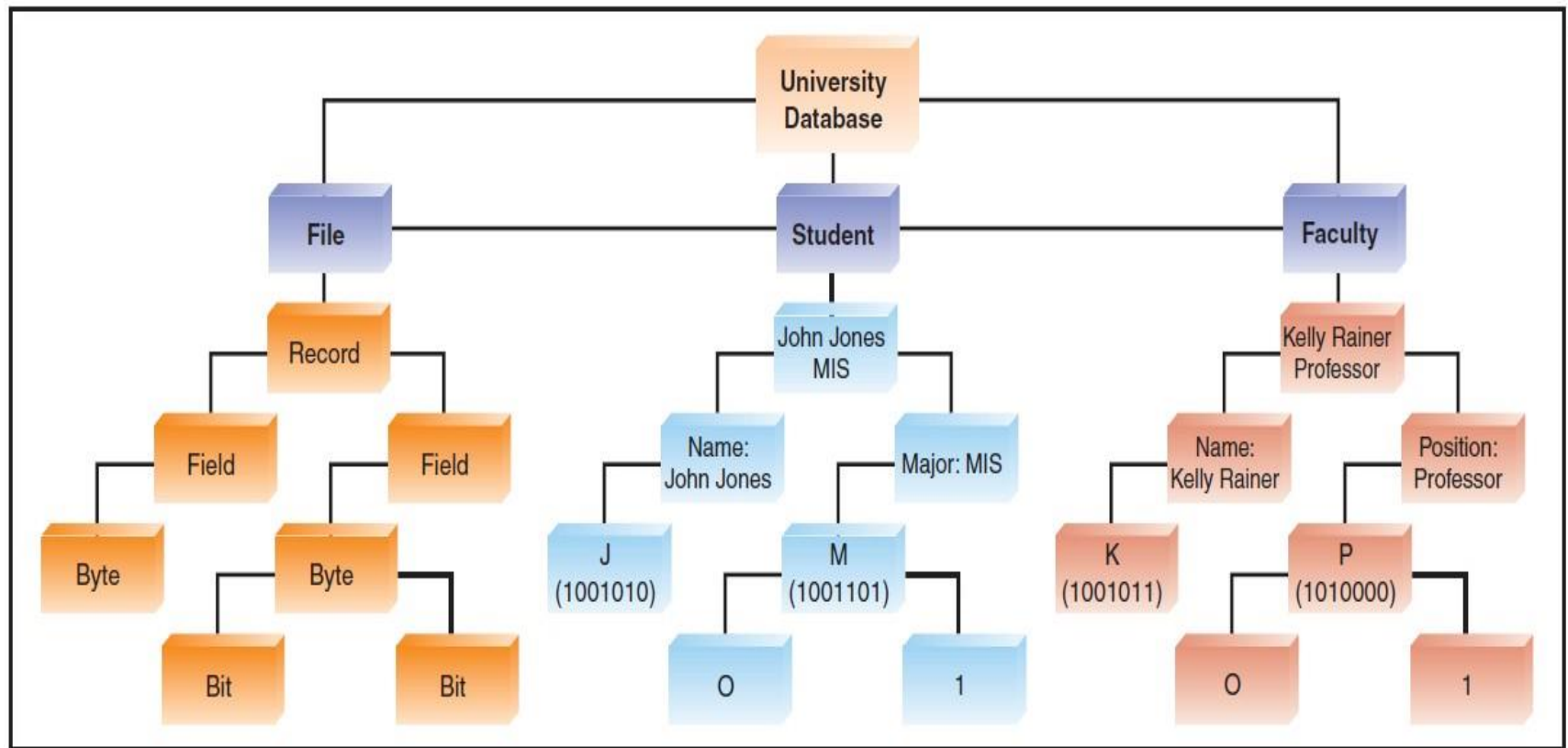
Database Management System

Lecture 2 – Computer based Information System
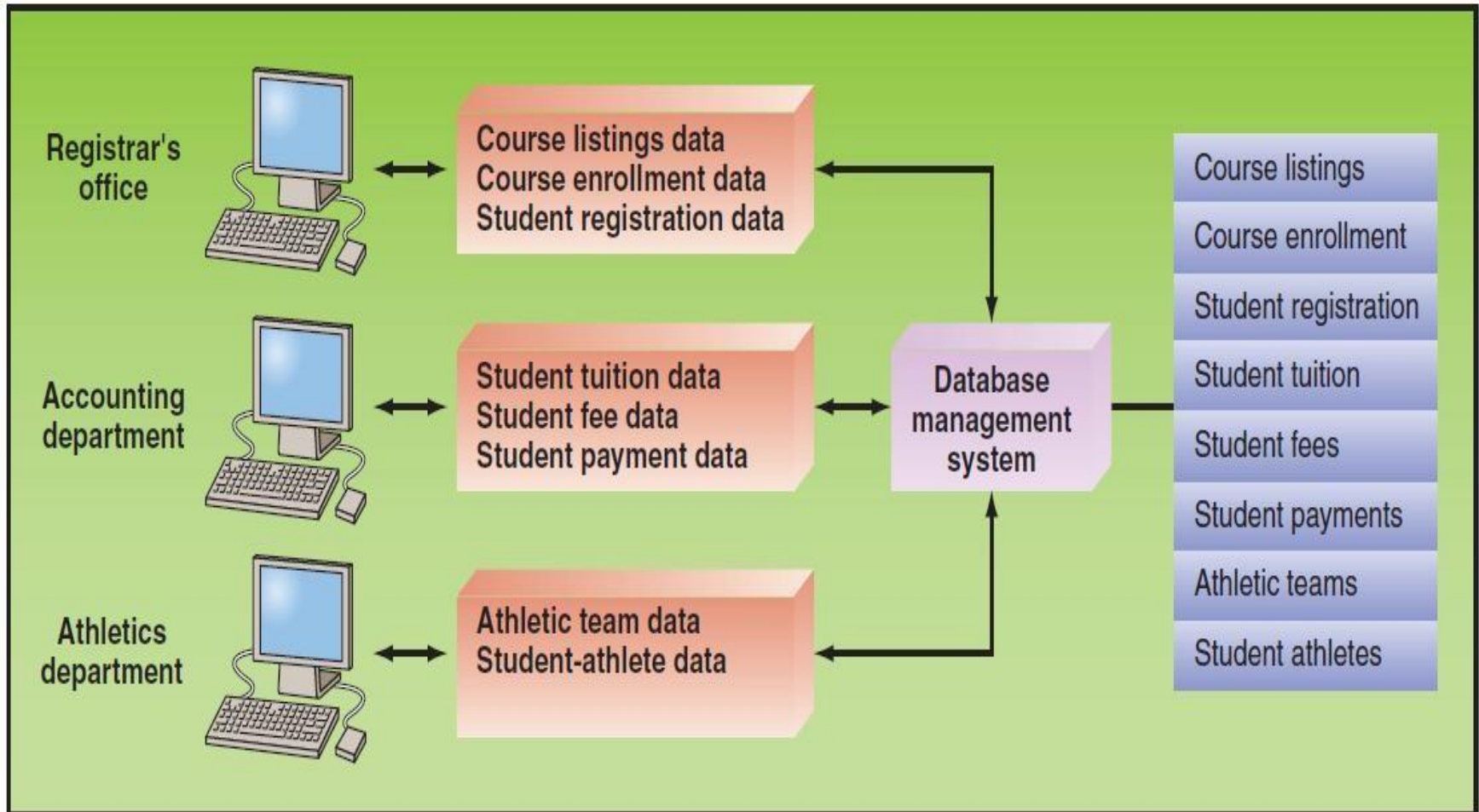
The Data Hierarchy

Figure 3.2 Hierarchy of data for a computer-based file.

Lecture 2 – Computer based Information System

The Data Hierarchy

➢ Bit (binary digit): represents the smallest unit of data a computer can process and it consists only of a 0 or a 1.

➢ Byte: A group of eight bits represents a single character (letter, number, or symbol).

➢ Field: A column of data containing a logical grouping of characters into a word, a small group of words (e.g., last name, social security number, etc.).

➢ Record: A logical grouping of related fields in a row (e.g., student's name, the courses taken, the date, and the grade).

➢ Data File: logical grouping of related records is called a data file or a table similar in appearance to a spread sheet in Excel consisting of multiple columns and multiple rows.

➢ Database: logical grouping of related data files (aka database tables).

The Relational Database Model

- Database Management System (DBMS): a set of programs that provide users with tools to create and manage a database.

- Relational Database Model: is based on the concept of two-dimensional tables and is usually designed with a number of related tables with each of these tables contains records (listed in rows) and attributes (listed in columns).

- Data Model: a diagram that represents entities in the database and their
- relationships.

- Entity: a person, place, thing, or event (e.g., customer, an employee, or a product).
- Record: generally describes an entity and an instance of an entity refers to each row in a relational table.

- Attribute: each characteristic or quality of a particular entity.

- Primary Key: a field in a database that uniquely identify each record so that it can
- be retrieved, updated, and sorted.

The Relational Database Model

- Secondary Key: a field that has some identifying information, but typically does not identify the record with complete accuracy and therefore cannot serve at the Primary Key.

- Foreign Key: a field (or group of fields) in one table that uniquely identifies a row of another table. It is used to establish and enforce a link between two tables.

Student Database Example

Lecture 2 – Computer based Information System

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Big Data

Big Data

- ➢ Defining Big Data

- ➢ Characteristics of Big Data

- ➢ Issues with Big Data

- ➢ Managing Big Data

- ➢ Putting Big Data to Use

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Defining Big Data

➢ **Gartner (www.gartner.com):** defines Big Data as diverse, high volume, high- velocity information assets that require new forms of processing to enable enhanced decision making, insight discovery, and process optimization.

➢ **Big Data Institute (TBDI; www.the-bigdatainstitute.com):** defines Big Data as vast data sets that:

- Exhibit variety;
- Include structured, unstructured, and semi-structured data;
- Are generated at high velocity with an uncertain pattern;
- Do not fit neatly into traditional, structured, relational databases; and
- Can be captured, processed, transformed, and analyzed in a reasonable amount of time only by sophisticated information systems.

Big Data Consists of the following

• Traditional enterprise data—examples are customer information from customer relationship management systems, transactional enterprise resource planning data, Web store transactions, operations data, and general ledger data.

• Machine-generated/sensor data—examples are smart meters; manufacturing sensors; sensors integrated into smartphones, automobiles, airplane engines, and industrial machines; equipment logs; and trading systems data.

• Social data—examples are customer feedback comments; microblogging sites such as Twitter; and social media sites such as Facebook, YouTube, and LinkedIn.

• Images captured by billions of devices located throughout the world, from digital cameras and camera phones to medical scanners and security cameras.

Lecture 7: Big Data

Characteristics of Big Data

➢ Volume: Incredible volume of data.

➢ Velocity: The rate at which data flow into an organization is rapidly increasing and it is critical because it increases the speed of the feedback loop between a company and its customers.

➢ Variety: Big Data formats change rapidly and can include satellite imagery, broadcast audio streams, digital music files, Web page content.
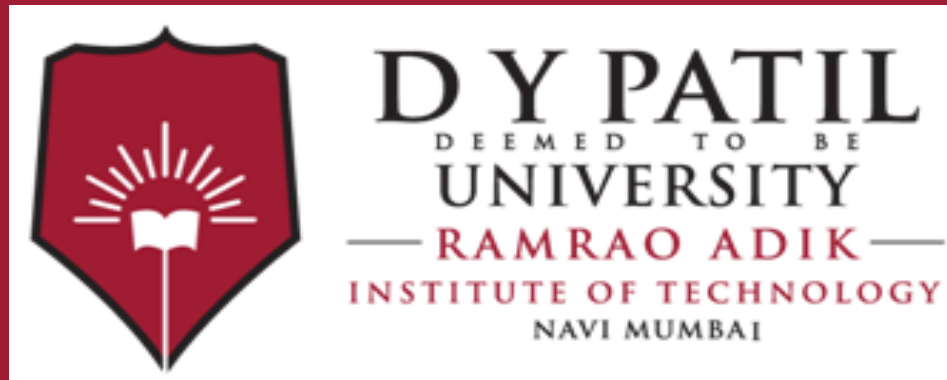
Issues with Big Data

➢ Big Data can come from untrusted sources.

➢ Big Data is dirty: Dirty data refers to inaccurate, incomplete, incorrect, duplicate, or erroneous data.

➢ Big Data changes, especially in data streams: Organizations must be aware that data quality in an analysis can change, or the data itself can change, because the conditions under which the data are captured can change.

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Managing Big Data

➢ Big Data can reveal valuable patterns, trends, and information that were previously hidden:
- • Tracking the spread of disease
- • Tracking crime
- • Detecting fraud

➢ Steps for organization to manage Big data

▪ First Step: Integrate information silos into a database environment and develop data warehouses for decision making.

▪ Second Step: making sense of their proliferating data.

▪ Information Silo: Information system that does not communicate with other, related information systems in an organization.

▪ NoSQL Database: Manipulate structured as well as unstructured data and inconsistent or missing data providing an alternative for firms that have more and different kinds of data (Big Data) in addition to the traditional, structured data that fit neatly into the rows and columns of relational databases

Thank You