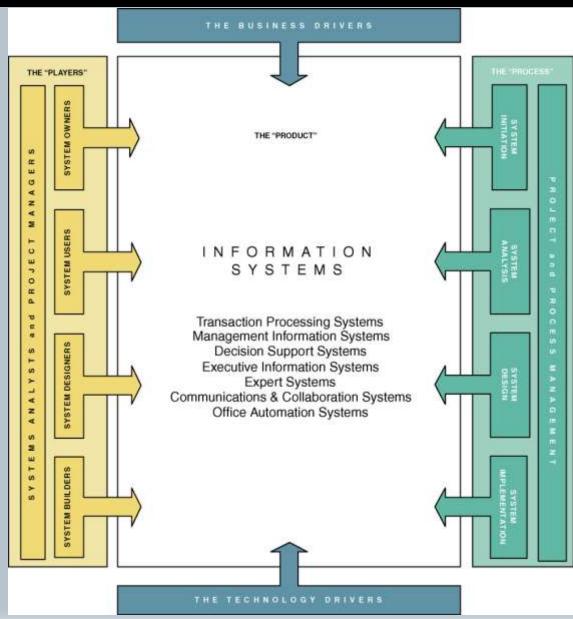


# THE CONTEXT **OF SYSTEMS ANALYSIS AND DESIGN METHODS**

#### **Chapter 1 – The Context of Systems Analysis & Design Methods**

- Define information system and name seven types of information system applications.
- Identify different types of *stakeholders* who use or develop information systems, and give examples of each.
- Define the unique role of systems analysts in the development of information systems.
- Identify those skills needed to successfully function as an information system analyst.
- Describe current business drivers that influence information systems development.
- Describe current technology drivers that influence information systems development.
- Briefly describe a simple *process* for developing information systems.
- Differentiate between the waterfall and the iterative/incremental approaches to systems development.

#### **Chapter Map**



#### A Framework for Systems Analysis and Design

An **information system** (IS) is an arrangement of people, data, processes, and information technology that interact to collect, process, store, and provide as output the information needed to support an organization.

**Information technology** is a contemporary term that describes the combination of computer technology (hardware and software) with telecommunications technology (data, image, and voice networks).

#### A Framework for Systems Analysis and Design

A transaction processing system (TPS) is an information system that captures and processes data about business transactions.

A management information system (MIS) is an information system that provides for management-oriented reporting based on transaction processing and operations of the organization.

A decision support system (DSS) is an information system that either helps to identify decision making opportunities or provides information to help make decisions.

### A Framework for Systems Analysis and Design

An **expert system** is an information system that captures the expertise of workers and then simulates that expertise to the benefit of nonexperts.

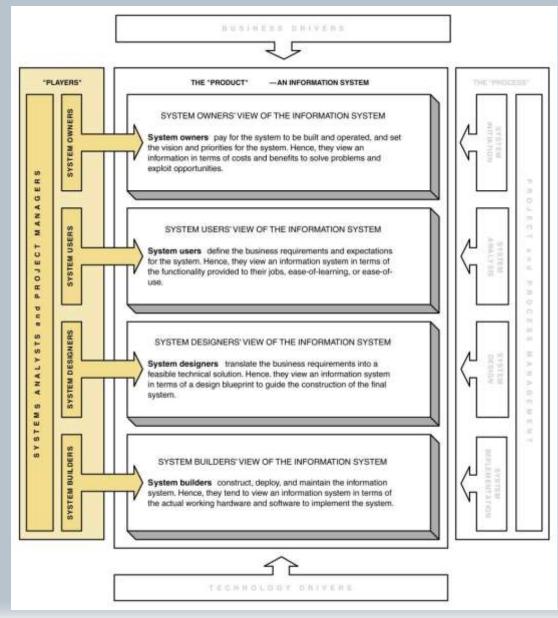
A communications and collaboration system is an information system that enables more effective communications between workers, partners, customers, and suppliers to enhance their ability to collaborate.

An **office automation system** is an information system that supports the wide range of business office activities that provide for improved work flow between workers.

#### Stakeholders: Players in the Systems Game

- A **stakeholder** is any person who has an interest in an existing or proposed information system. Stakeholders can be technical or nontechnical workers. They may also include both internal and external workers.
- **Information workers** are those workers whose jobs involve the creation, collection, processing, distribution, and use of information.
- **Knowledge workers** are a subset of information workers whose responsibilities are based on a specialized body of knowledge.

#### Stakeholders' Perspectives on an Information System



**System owners** – an information system's sponsor and executive advocate, usually responsible for funding the project of developing, operating, and maintaining the information system.

**System users** – a "customer" who will use or is affected by an information system on a regular basis – capturing, validating, entering, responding to, storing, and exchanging data and information.

- Internal users
  - Clerical and service workers
  - Technical and professional staff
  - Supervisors, middle managers, and executive managers
  - Remote and mobile users (internal but disconnected)
- External users
  - Customers
  - Suppliers
  - Partners
  - Employees

System designer – a technical specialist who translates system users' business requirements and constraints into technical solution. She or he designs the computer databases, inputs, outputs, screens, networks, and software that will meet the system users' requirements.

#### **Technical Specialties of System Designers**

- Database administrators
  - -Specialist in database technologies who design and coordinate changes to corporate databases
- Network architects
  - -Specialists in networking and telecommunications technologies who design, install, configure, optimize and support local and wide area networks, including connections to the Internet and other external networks
- Web architects
  - -Specialists who design complex Web sites for organizations, including public Web sites for the Internet, internal web sites for organizations (Intranets) and private business to business Web sites (extranets)

#### **Technical Specialties of System Designers**

- Graphic artists
  - -Specialists in graphics technology and methods used to design and construct compelling and easy-to-use interfaces to systems, including interfaces to PCs, the web, handhelds ans smart phones
- Security experts
  - -Specialists in the technology and methods used to ensure data and network security (and privacy)
- Technology specialists
  - -Experts in the application of specific technologies that will be used in a system (eg a specific commercial software package or for a specific software)

**System builders** – a technical specialist who constructs information systems and components based on the design specifications generated by the system designers.

#### **Technical Specialties of System Builders**

- Applications programmers
  - -Specialists who convert business requirements and statements of problems and procedures into computer languages. They develop and test computer programs to capture and store data and to locate and retrieve data for computer applications
- Systems programmers
  - -Specialists who develop, test and implement operating systemslevel software, utilities, and services. Increasingly, they also develop reusable software 'components' for use by applications programmers
- Database programmers
  - -Specialists in database languages and technology who build, modify, and test database structures and the programs that use and maintain them

#### **Technical Specialties of System Builders**

- Network administrators
  - specialists who design, install, troubleshoot, and optimize computer networks
- Security administrators
  - specialist who design, implement, troubleshoot, and manage security and privacy controls in a network.
- Webmasters
  - -Specialists who code and maintain Web servers
- Software integrators
  - -Specialists who integrate software packages with hardware, networks and other software packages

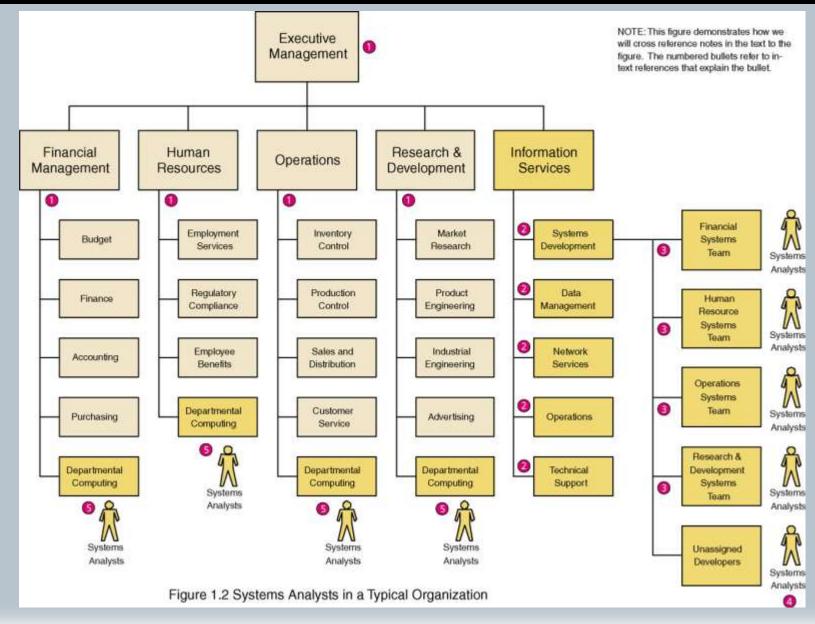
#### **Systems Analysts**

**Systems analyst** – a specialist who studies the problems and needs of an organization to determine how people, data, processes, and information technology can best accomplish improvements for the business.

- A programmer/analyst (or analyst/programmer) includes the responsibilities of both the computer programmer and the systems analyst.
- A business analyst focuses on only the nontechnical aspects of systems analysis and design.

- True problem situations, either real or anticipated, that require corrective action
- Opportunities to improve a situation despite the absence of complaints
- Directives to change a situation regardless of whether anyone has complained about the current situation

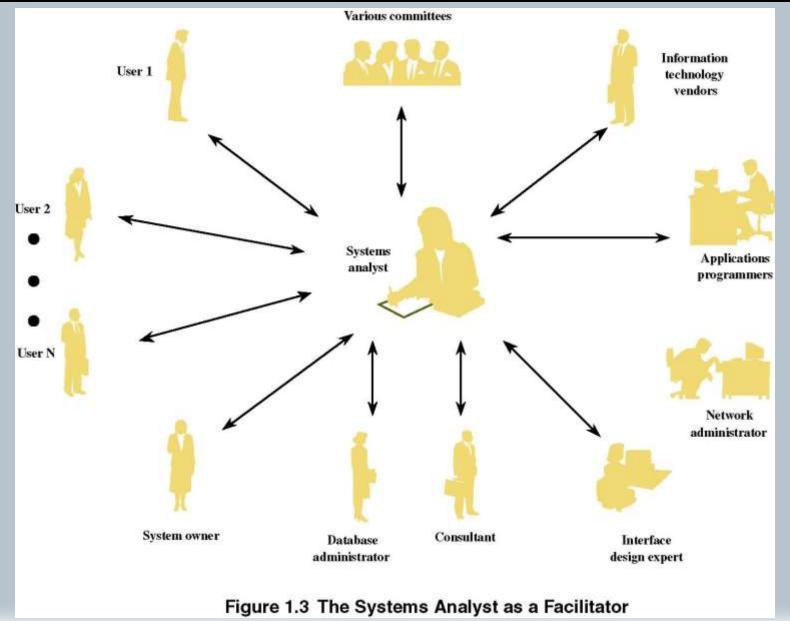
#### Where Do Systems Analysts Work?



#### **Skills Needed by the Systems Analyst**

- Working knowledge of information technology
- Computer programming experience and expertise
- General business knowledge
- General problem-solving skills
- Good interpersonal communication skills
- Good interpersonal relations skills
- Flexibility and adaptability
- Character and ethics

#### The Systems Analyst as a Facilitator



- 1. Thou shalt not use a computer to harm other people.
- 2. Thou shalt not interfere with other people's computer work.
- 3. Thou shalt not snoop around in other people's computer files.
- 4. Thou shalt not use a computer to steal.
- 5. Thou shalt not use a computer to bear false witness.
- 6. Thou shalt not copy or use proprietary software for which you have not paid.
- 7. Thou shalt not use other people's computer resources without authorization or proper compensation.
- 8. Thou shalt not appropriate other people's intellectual output.
- 9. Thou shalt think about the social consequences of the program you are writing or the system you are designing.
- 10. Thou shalt always use a computer in ways that insure consideration and respect for your fellow human

# External Service Provider (ESP) – a systems analyst, system designer, or system builder who sells his or her expertise and experience to other businesses to help those businesses purchase, develop, or integrate their information systems solutions; may be affiliated with a consulting or services organization.

**Project Manager** – an experienced professional who accepts responsibility for planning, monitoring, and controlling projects with respect to schedule, budget, deliverables, customer satisfaction, technical standards, and system quality.

- Globalization of the Economy
- **Electronic Commerce and Business**
- Security and Privacy
- Collaboration and Partnership
- Knowledge Asset Management
- Continuous Improvement and Total Quality Management
- Business Process Redesign

#### Globalization of the Economy

#### Global Economy brings

- New and expanded international markets
- New international competitors

#### Impact on information systems

- Require support of multiple languages, currency exchange rates, business cultures
- Require consolidation of international data
- Demand for players who can communicate, orally and in writing,
  with management and users that speak different languages

#### **E-Commerce** – the buying and selling of goods and services by using the Internet.

**E-Business** – the use of the Internet to conduct and support day-today business activities.

Types of e-commerce and e-business

- Marketing of corporate image, products, and services
- Business-to-consumer (B2C)
- Business-to-business (B2B)

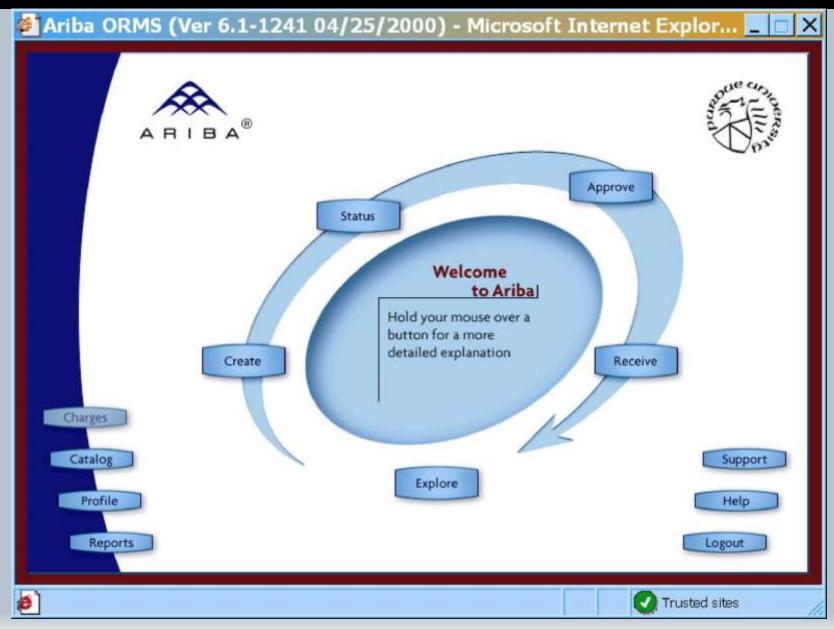
#### Impact on information systems

- Most new information systems are being designed for an Internet (or intranet) architecture
- Since the only client-side software is a web browser, the choice of client operating system is becoming less important

#### **An Electronic Commerce Storefront**



#### **An Electronic Commerce Procurement Storefront**



#### **Security and Privacy**

#### Security

- How will the business continue in the even of a security breach, terrorist attack, or disaster?
- How can the business protect its digital assets from outside threats?

#### Privacy

- Consumer demands for privacy in e-commerce transactions
- Government requirements

#### Impact on information systems

 Need to incorporate stringent security and privacy controls

#### **Collaboration and Partnership**

Organizations seek to break down the walls that separate organizational departments and functions.

Organizations collaborate with outside business partners and even competitors.

#### **Knowledge Asset Management**

**Data** – raw facts about people, places, events, and things that are of importance in an organization.

**Information** – data that has been processed or reorganized into a more meaningful form for someone.

**Knowledge** – data and information that is further refined based on the facts, truths, beliefs, judgments, experiences, and expertise of the recipient.

#### **Knowledge Asset Management**

- Recognizes that data, information, and knowledge are critical business resources
- Asks: "How can the organization manage and share knowledge for competitive advantage?"
- Strives to integrate the data and information that can create and preserve knowledge

#### Continuous Improvement and Total Quality Management

**Business Processes** – Tasks that respond to business events (e.g., an order). Business processes are the work, procedures, and rules required to complete the business tasks, independent of any information technology used to automate or support them.

Continuous process improvement (CPI) – The continuous monitoring of business processes to effect small but measurable improvements in cost reduction and value added.

**Total quality management** (TQM) – a comprehensive approach to facilitating quality improvements and management within a business.

## Business process redesign (BPR) is the study, analysis, and redesign of fundamental business processes to reduce costs and/or improve value added to the business.

- More substantial changes and improvements than CPI
- Usually complemented by CPI

- Networks and the Internet
- Mobile and Wireless Technologies
- Object Technologies
- Collaborative Technologies
- **Enterprise Applications**

#### **Networks and the Internet**

Networks include mainframe time-sharing systems, network servers, and a variety of desktop, laptop, and handheld client computers.

The most pervasive networking technologies are based on the Internet.

- xHTML and XML
- Scripting languages
- Web-specific programming languages
- Intranets
- Extranets
- Portals
- Web services

#### Some mobile and wireless technologies

- PDAs
- Smart phones
- Bluetooth
- Wireless networking

#### Impact on information systems

- Wireless connectivity must be assumed
- Limitations of mobile devices and screen sizes must be accommodated



**Object technology** – a software technology that defines a system in terms of objects that consolidate data and behavior (into objects).

- Objects are reusable
- Objects are extensible
- Object-oriented programming languages include C)), java, Smalltalk, and Visual Basic.net
- Object-oriented analysis and design a collection of tools and techniques for systems development that will utilize object technologies to construct a system and its software.

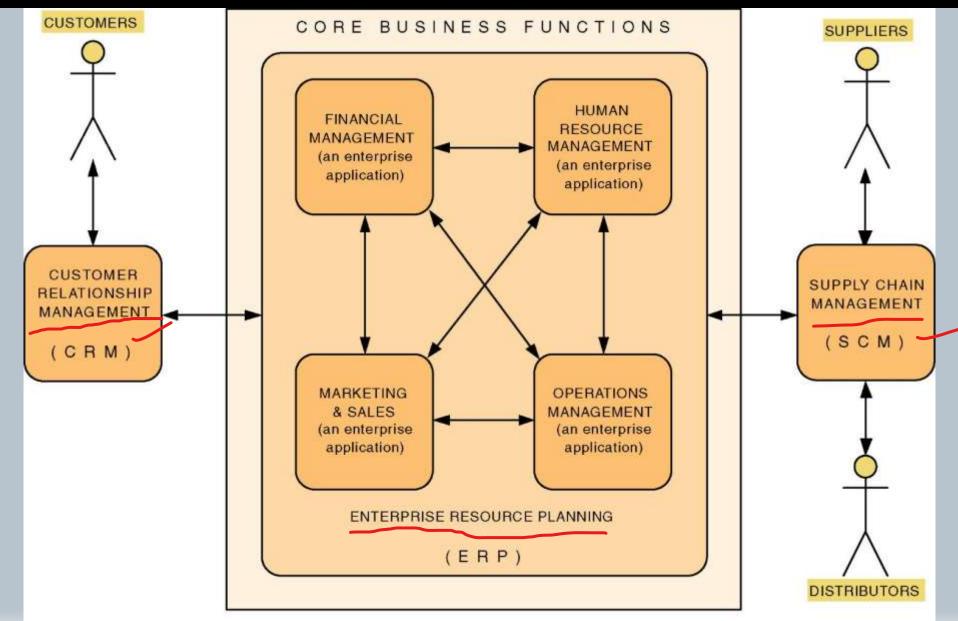
Agile development a system development strategy in which system developers are given the flexibility to select from a variety of tools and techniques to best accomplish the tasks at hand.

### **Collaborative Technologies**

Collaborate technologies are those that enhance interpersonal communications and teamwork.

- E-mail
- Instant messaging
- Groupware
- Work flow

# **Enterprise Applications**



# **Enterprise Resource Planning** (ERP) – a software application that fully integrates information systems that span most or all of the basic, core business functions.

An ERP solution is built around a common database shared by common business functions.

#### Representative ERP vendors:

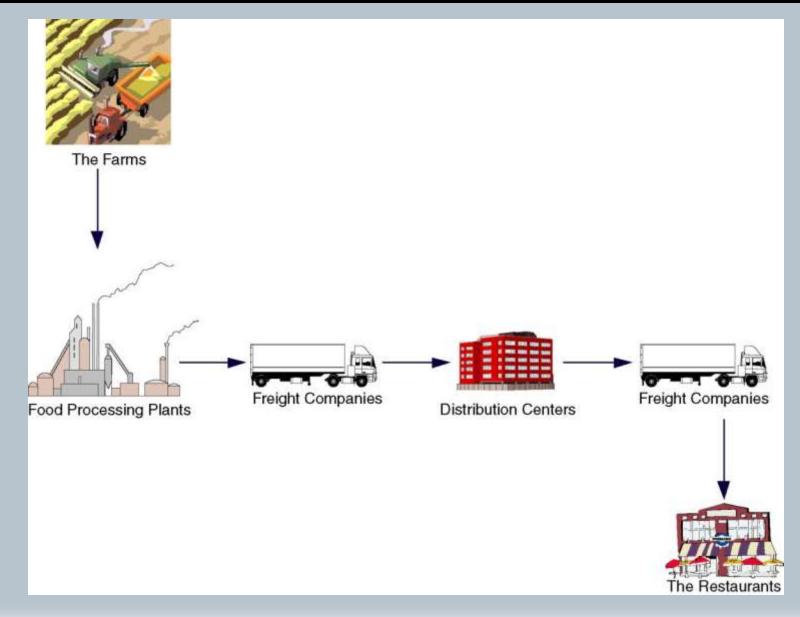
- Baan
- J. D. Edwards
- Oracle
- Peoplesoft
- SAP AG (the market leader)

**Supply Chain Management** (SCM) – a software application that optimizes business processes for raw material procurement through finished product distribution by directly integrating the logistical information systems of organizations with those of their suppliers and distributors.

Representative SCM vendors:

- i2 Technologies
- Manugistics
- SAP
- SCT

# **Supply Chain**



Customer Relationship Management (CRM) – a software application that provides customers with access to a business's processes from initial inquiry through postsale service and support.

#### Representative CRM vendors:

- BroadVision
- E.piphany
- Kana
- Nortel/Clarity
- Peoplesoft/Vanitive
- Siebel (the market leader)

#### **Enterprise Applications - EAI**

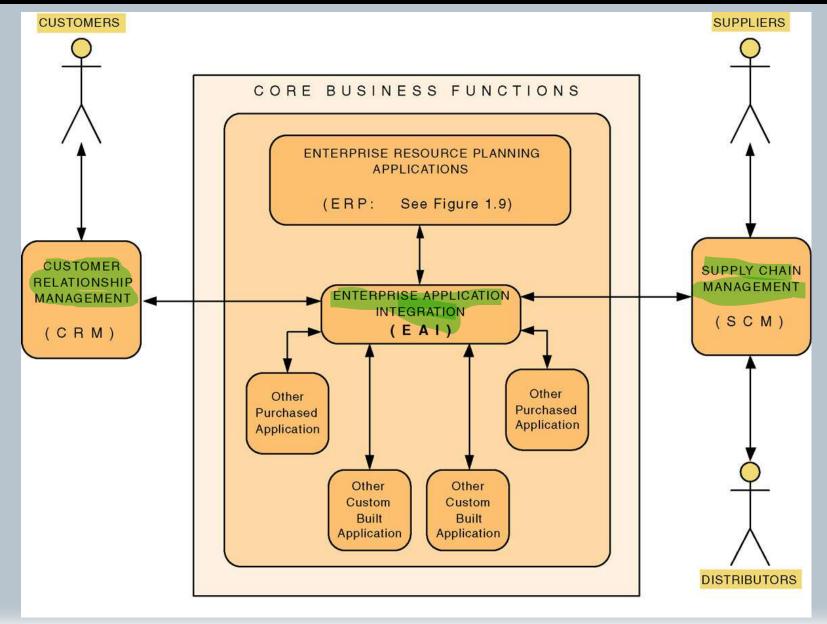
Enterprise Application Integration (EAI) – the process and technologies used to link applications to support the flow of data and information between those applications.

**Middleware** – software (usually purchased) used to translate and route data between different applications.

Representative EAI vendors:

- BEA Systems
- IBM (MQSeries)
- Mercator Software
- TIBCO Software

## **Enterprise Application Integration**



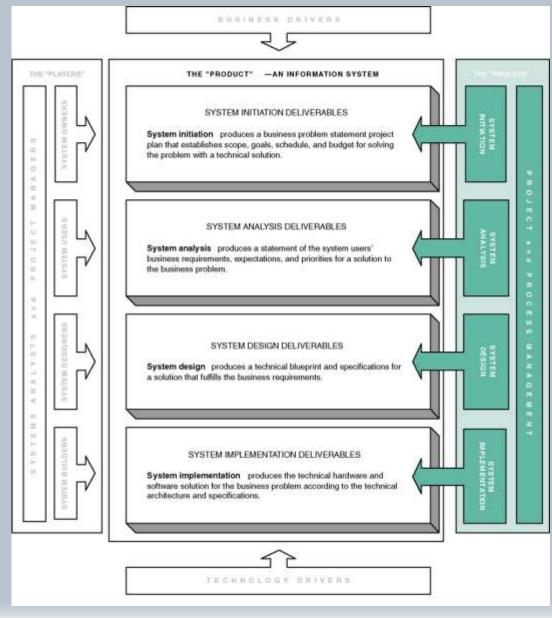
## **A Simple System Development Process**

**System development process** – a set of activities, methods, best practices, deliverables, and automated tools that stakeholders use to develop and maintain information systems and software.

#### A general problem-solving approach

- Identify the problem.
- Analyze and understand the problem.
- Identify solution requirements or expectations.
- Identify alternative solutions and choose the "best" course of action.
- Design the chosen solution.
- Implement the chosen solution.
- Evaluate the results. If the problem is not solved, return to step 1 or 2 as appropriate.

#### **Systems Development and Problem Solving**



**System initiation** – the initial planning for a project to define initial business scope, goals, schedule, and budget.

**System analysis** – the study of a business problem domain to recommend improvements and specify the business requirements and priorities for the solution.

**System design** – the specification or construction of a technical, computer-based solution for the business requirements identified in a system analysis.

**System implementation** – the construction, installation, testing, and delivery of a system into production.

## **Project and Process Management**

**Project management** – the activity of defining, planning, directing, monitoring, and controlling a project to develop an acceptable system within the allotted time and budget.

**Process management** – the ongoing activity that defines, improves, and coordinates the use of an organization's chosen methodology (the "process") and standards for all system development projects.

# Sequential versus Iterative Development

