Analisis dan Desain Sistem Informasi

Information Engineering
• **Review:** Information System and Information System in Organization
• **Review:** System Development Life Cycle
• Information Engineering
• Information Engineering in Software Engineering
• Information system (IS) is a set of interrelated elements that:
  • Collect (input)
  • Manipulate (process)
  • Store
  • Disseminate (output) data and information
  • Provide a corrective reaction (feedback mechanism) to meet an objective
Information System Role in Business Functions

Service in Organization → Business Functions → Processes and Activities

Input → Process → Output

Data Storage → Feedback

Done manually by hand or supported by computer software?

Can it be automated?
Review: Why Computer-based Information System?

• Sebagai alat bantu untuk mencapai tujuan/goal organisasi
• Meningkatkan keuntungan, meningkatkan layanan kepada pelanggan dan mengurangi biaya.
• Mengubah data menjadi informasi yang berguna untuk stakeholder di organisasi
Accounting: Transform daily transaction into financial statements

Finance: Organize budgets, manage cashflow, analyze investments and make decisions to reduce interest payments and increase revenues in financial transactions

Marketing: Support marketing in decision making, providing data, people, equipments, and procedures

Human Resources: recruitment, record keeping, workforce management, and employee evaluations

Academic: Organize courses and classes, distance learning, automated scoring and grading
The activity of creating or modifying existing business systems

- **Outsourcing**: Allows a company to focus on what it does best and delegate other functions to companies with expertise in systems development

- **In-house development**: Have their own Information System development team to develop Information System that always in-line with organization’s business process and requirements

System development often *outsourced* by business owner
System Development Life Cycle

1. Investigation
2. Analysis

3. Design
4. Construction

Implement .5
6. Integrate and Test

Operations and .7
Maintenance
8. Disposition

• Define the problem or opportunity to be addressed
• Define user and business requirements that must meet

• Define how the system will meet user and business requirements
• Convert and design into a complete information system

• Operate and run system with on-going reviews of how well the system meets user and business need.
• Conduct end-of-system-life activities (cut-over)

• Demonstrate that system meets user and business requirements
• Move into production environment, resolve problem uncovered during integration and testing

• Operate and run system with on-going reviews of how well the system meets user and business need.
• Conduct end-of-system-life activities (cut-over)
Information Engineering
“Information technology plays a crucial role in business reengineering, but one that is easily miscast. Modern, state-of-the-art information technology is part of any reengineering effort, an essential enabler [that] permits companies to reengineer business processes.”

"Reengineering the corporation" Hammer and Champy (1993)
Business automation was first introduced in the early 1960s. Companies looked for areas of opportunity and simply automated business functions that were previously performed in a manual fashion.

Individual computer programs were combined to encompass business applications.

The applications were usually grouped into major information systems that served specific business areas.

- Marketing, Production, Human Resources, etc.
Information Engineering Global Objectives

• Mengimplementasikan "information technology" dengan cara terbaik untuk melayani semua kebutuhan bisnis
• Melakukan transisi ke domain yang lebih teknis dalam Rekayasa Perangkat Lunak
Problems Solved? Not Really!

- Systems were difficult to ‘connect’ to one another;
- Redundant data was everywhere;
- The impact of changes to applications difficult to project and even more difficult to implement;
- Old programs outlived their usefulness, but lack of resources causes them to be used long past their prime.

So that's why organization requires Information Engineering!
Information Engineering Steps

1. Information Strategy Planning
2. Enterprise Modelling
3. Process Modelling
4. Information Flow Modelling
Information Strategy Planning (ISP)

Tujuan ISP:

- Menentukan tujuan dan sasaran strategi bisnis
- Menentukan faktor-faktor kesuksesan kritis (critical success factors) untuk mencapai tujuan dan sasaran bisnis.
- Menganalisa dampak teknologi dan otomatisasi terhadap tujuan dan sasaran bisnis,
- Menganalisa informasi yang dimiliki untuk menentukan perannya dalam mencapai sasaran dan tujuan bisnis.
ISP Analysis

Technology impact analysis:
• examines objectives and goals
• direct or indirect impact of technologies

Addresses the following questions:
• How critical is the technology to the achievement of a business objective? Is the technology available today?
• How will the technology change the way business is conducted?
• What are the direct and indirect costs?
• How should the business adapt or extend objective and goals to accommodate the technology?
Enterprise Modelling (EM): Business Functions

- Business functions are the processes that are required to implement the organization services/goals.
- Each of the business functions is then related to the business area that has responsibility for it.
In general a **business function** is some on-going activity that must be accomplished to support the overall business. It can **usually be described as a noun phrase**.

E.g. (obtaining) product, service, academic transcript

A **business process** is a transformation activity that accepts specific inputs and produces specific outputs. It can generally be described as a **verb phrase**.
• **Business-level data modeling** is an enterprise modeling activity that focuses on identifying and defining the data objects (also called entities) that are required to achieve the business functions.
EM: Business Level Data Objects

• producers and consumers of information (e.g., a customer),
• things (e.g., a report),
• occurrences of events (e.g., a sales conference),
• organizational roles (e.g., a Vice President of Engineering);
• organizational units (e.g., Sales and Marketing),
• places (e.g., manufacturing cell),
• or information structures (e.g., an employee file).
Process Modelling

• The work performed within a business area encompasses a set of business functions that are further refined into business processes.

• Activities in Business Processes were modelling into system and business process models and are often modelled using Business Process Model and Notation (BPMN)

• Activities in a Business Process were also often modelled using Flowchart or Activity Diagram
Information Flow Modelling

• The process flow model is integrated with the data model to provide an indication of how information flows through a business area.

• Input and output data objects are shown for each process, providing an indication of how the process transforms information to accomplish a business function.

• The flow is usually modelled using Data Flow Diagram

• The data and information are usually modelled using ER Diagram
Information Engineering in Software Engineering

Requirement Elicitation

Information Engineering Models

Analisis
Design
Implementation and Testing
Deployment

SDLC

Increasing system and software specification quality
Information Engineering steps are actually part of the software engineering process especially in the
● Requirement Engineering,
● System Analysis, and
● High-level System Design phases.
Questions?