Systems Project Management

Systems Analysis & Design

Author: Eng. Carlos Andrés Sierra, M.Sc.
cavirguezs@udistrital.edu.co

Full-time Adjunct Professor
Computer Engineering Program
School of Engineering
Universidad Distrital Francisco José de Caldas

2025-III

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Outline

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Outline

Information Systems

- An **Information System** is a system that *collects*, *processes*, *stores*, and *disseminates* information.
- **Information systems** are used to support and manage business operations.
- **Information systems** are used to automate and optimize business processes.
- Examples of information systems include transaction processing systems, management information systems, decision support systems, executive information systems, expert systems, and data systems.

Information Systems

- An **Information System** is a system that *collects*, *processes*, *stores*, and *disseminates* information.
- **Information systems** are used to support and manage business operations.
- **Information systems** are used to automate and optimize business processes.
- Examples of information systems include transaction processing systems, management information systems, decision support systems, executive information systems, expert systems, and data systems.

Information Systems

- An **Information System** is a system that *collects*, *processes*, *stores*, and *disseminates* information.
- **Information systems** are used to support and manage business operations.
- **Information systems** are used to automate and optimize business processes.
- Examples of information systems include transaction processing systems, management information systems, decision support systems, executive information systems, expert systems, and data systems.

Data Systems

- A **Data System** is a system that *collects*, *processes*, *stores*, and *retrieves* **data**.
- **Data systems** are used to store and analyze data.
- Examples of data systems include `databases`, `data warehouses`, `data lakes`, `data marts`, `data cubes`, and `data streams`.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Expert Systems

- An **Expert System** is a system that uses knowledge and reasoning to solve problems.
- **Expert systems** are used to automate and optimize `decision-making processes`.
- Examples of expert systems include `diagnostic systems`, `predictive systems`, `prescriptive systems`, `decision support systems`, and `automated reasoning systems`.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

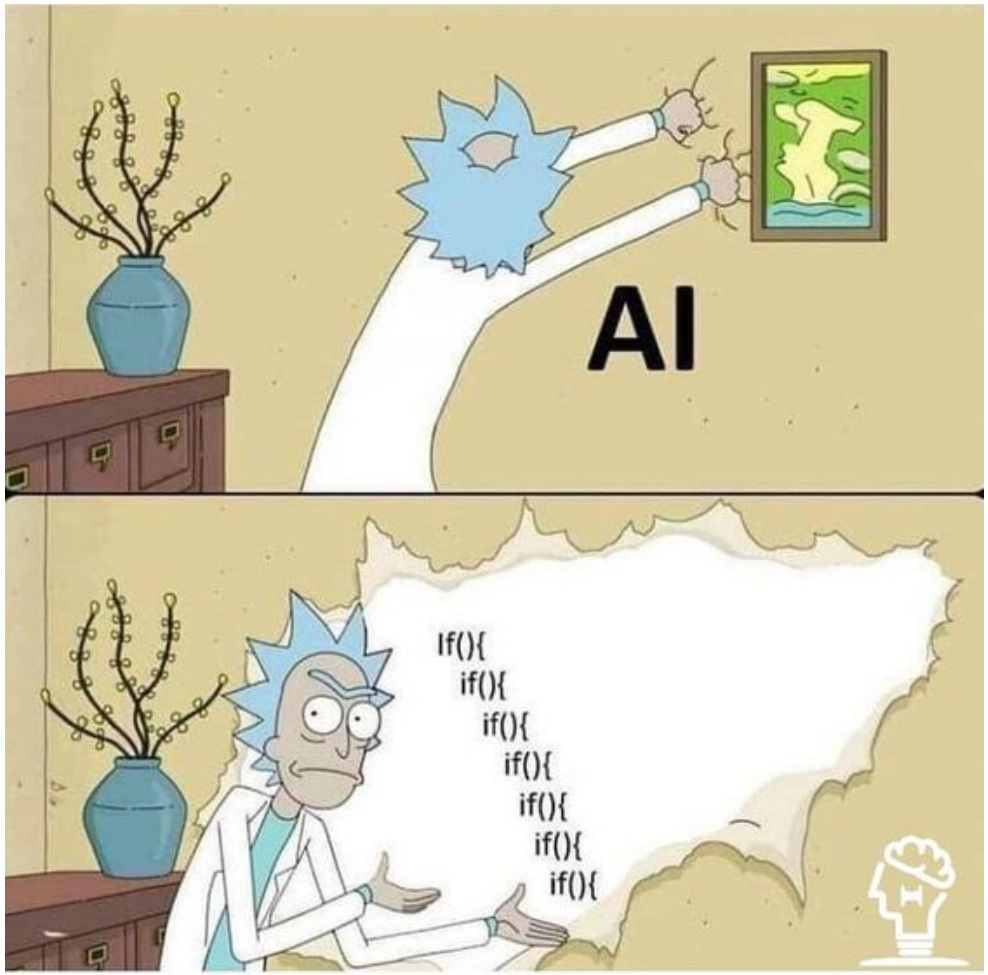
Expert Systems

- An **Expert System** is a system that uses knowledge and reasoning to solve problems.
- **Expert systems** are used to automate and optimize `decision-making processes`.
- Examples of expert systems include `diagnostic systems`, `predictive systems`, `prescriptive systems`, `decision support systems`, and `automated reasoning systems`.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Expert Systems as Classical Artificial Intelligence

Here there is a great example of a diagnostic system.



Risks and Failures in Information

- **Information systems** are subject to risks and failures that can impact `business operations`.
- **Risks and failures** can be mitigated through security measures, backup systems, disaster recovery plans, and monitoring tools.
- Examples of risks and failures include `security breaches`, `data loss`, `system downtime`, `performance issues`, and `compliance violations`.

Risks and Failures in Information

- **Information systems** are subject to risks and failures that can impact `business operations`.
- **Risks and failures** can be mitigated through security measures, backup systems, disaster recovery plans, and monitoring tools.
- Examples of risks and failures include `security breaches`, `data loss`, `system downtime`, `performance issues`, and `compliance violations`.

Outline

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Enterprises: Bottom-Up and Top-Down Approaches

- **Bottom-Up Approach**: Analyzes an enterprise by examining its individual units or components, then aggregating them to *understand* the entire organization.
- **Top-Down Approach**: Starts with an overall vision or strategy and decomposes it into subsystems, departments, and processes.

Enterprises: Bottom-Up and Top-Down Approaches

- **Bottom-Up Approach**: Analyzes an enterprise by examining its individual units or components, then `aggregating` them to *understand* the entire organization.
- **Top-Down Approach**: Starts with an overall vision or strategy and decomposes it into `subsystems`, `departments`, and `processes`.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

PIECE Framework for Enterprises

- **P**articipation: *Engaging stakeholders* at every level.
- **I**ndependence of Thought: Encouraging *diverse*, *innovative ideas*.
- **E**laboration: Developing and *refining ideas* and *processes*.
- **C**ommunication: Ensuring clear, *effective exchange* of information.
- **E**xploration: Embracing *continuous innovation* and *improvement*.

Enterprise System Typologies

- **Rational Systems**: Organizations driven by logical, `structured processes` and `clear hierarchies`.
- **Natural Systems**: Organizations viewed as self-organizing entities with `emergent behavior`.
- **Open Systems**: Enterprises that continuously interact with their external environment for `information`, `resources`, and `innovation`.

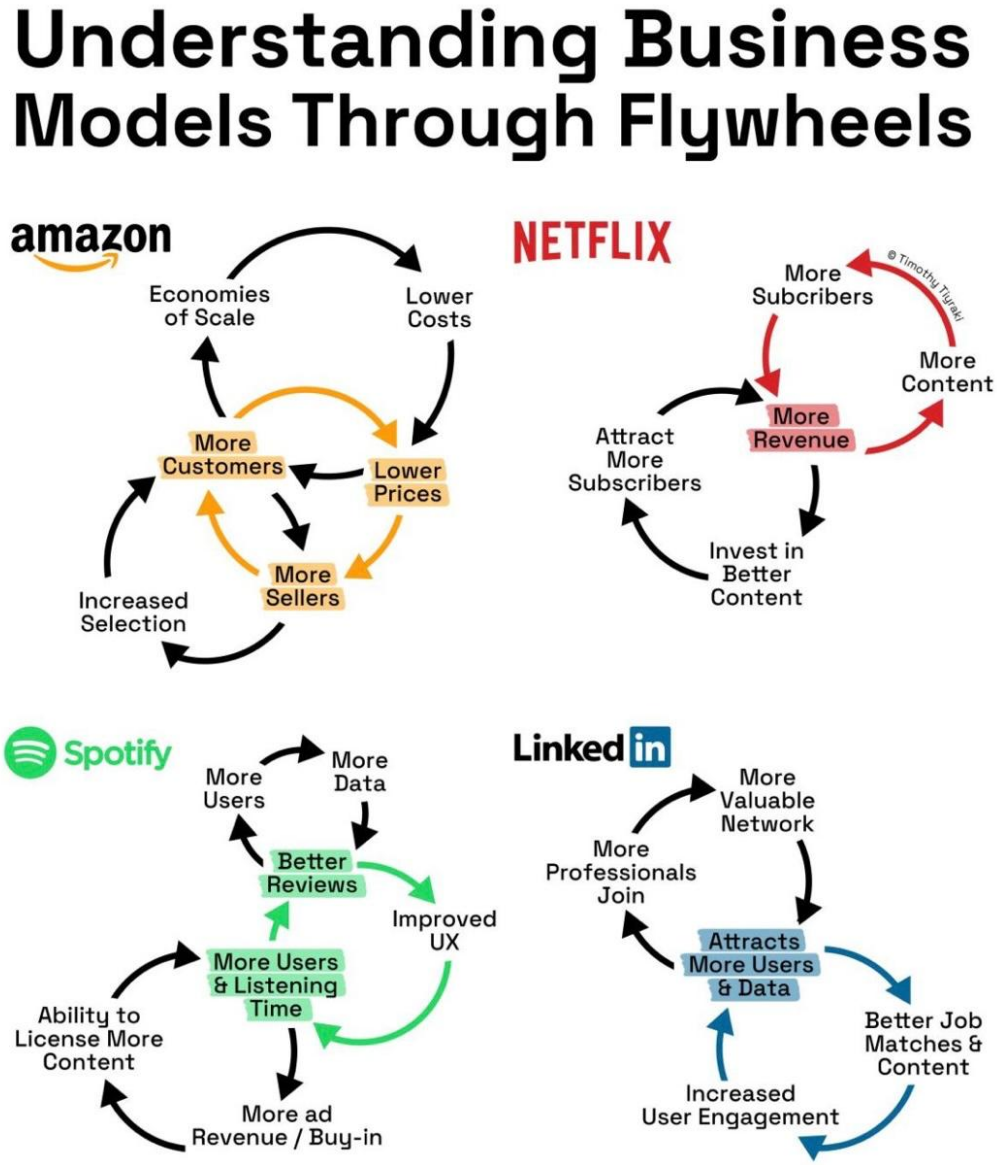
Business Systems and Models

- **Business Systems**: Frameworks that encompass an enterprise's internal processes, operations, and strategies.
- **Examples**: `ERP` systems, `CRM` systems, `SCM` systems.
- **Business Models**: Describe how an organization creates, delivers, and captures value.
  - Examples include `subscription-based`, `freemium`, `platform-based`, and `direct sales` models.

Business Systems and Models

- **Business Systems**: Frameworks that encompass an enterprise's internal processes, operations, and strategies.
- **Examples**: `ERP` systems, `CRM` systems, `SCM` systems.
- **Business Models**: Describe how an organization creates, delivers, and captures value.
  - Examples include `subscription-based`, `freemium`, `platform-based`, and `direct sales` models.

Business Models Examples



Outline

Basic Concepts in Software Methodologies

- **Software methodologies** provide `frameworks` for planning, designing, developing, testing, and maintaining `software projects`.
- They help `teams` manage project complexity and ensure quality deliverables.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Traditional Methodologies

- **Waterfall**: A linear approach where each `phase` must be *completed before moving* to the next.
- Suitable for `projects` with well-defined requirements and *low uncertainty*.
- Emphasize thorough documentation and planning.

Traditional Methodologies

- **Waterfall**: A linear approach where each `phase` must be *completed before moving* to the next.
- Suitable for `projects` with well-defined requirements and *low uncertainty*.
- Emphasize thorough documentation and planning.

Agile Methodologies

- Emphasize iterative development, customer collaboration, and flexibility.
- Based on the **Agile Manifesto**, which values individuals and interactions over processes and tools.
- *Examples* include `Scrum`, `Kanban`, `Extreme Programming` (XP), and `Lean Software Development`.
- **Agile methodologies** are suitable for projects with rapidly changing requirements and high uncertainty.
- Promote adaptive planning, evolutionary development, and early delivery of valuable `software`.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Agile Methodologies

- Emphasize iterative development, customer collaboration, and flexibility.
- Based on the **Agile Manifesto**, which values individuals and interactions over processes and tools.
- *Examples* include `Scrum`, `Kanban`, `Extreme Programming` (XP), and `Lean Software Development`.
- **Agile methodologies** are suitable for projects with rapidly changing requirements and high uncertainty.
- Promote adaptive planning, evolutionary development, and early delivery of valuable `software`.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Agile Methodologies

- Emphasize iterative development, customer collaboration, and flexibility.
- Based on the **Agile Manifesto**, which values individuals and interactions over processes and tools.
- *Examples* include `Scrum`, `Kanban`, `Extreme Programming` (XP), and `Lean Software Development`.
- **Agile methodologies** are suitable for projects with rapidly changing requirements and high uncertainty.
- Promote adaptive planning, evolutionary development, and early delivery of valuable `software`.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Case Study: Scrum

- **Scrum** employs short, time-boxed iterations called sprints.
- Key practices include daily stand-ups, sprint planning, reviews, and retrospectives.
- Focuses on adaptability and continuous improvement.

Case Study: Kanban

- **Kanban** visualizes work items on boards and limits `Work In Progress` (*WIP*).
- Emphasizes gradual improvements, flow management, and continuous delivery.
- Ideal for projects requiring flexibility with *minimal iteration planning*.

Outline

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Thanks!

Questions?

Repo: *https://github.com/EngAndres/ud-public/tree/main/courses/systems-analysis*

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS