SOOAD

UNIT 1

THE SYSTEM ANALYST AND INFORMATION SYSTEM DEVELOPMENT

The System Analyst and Information Systems

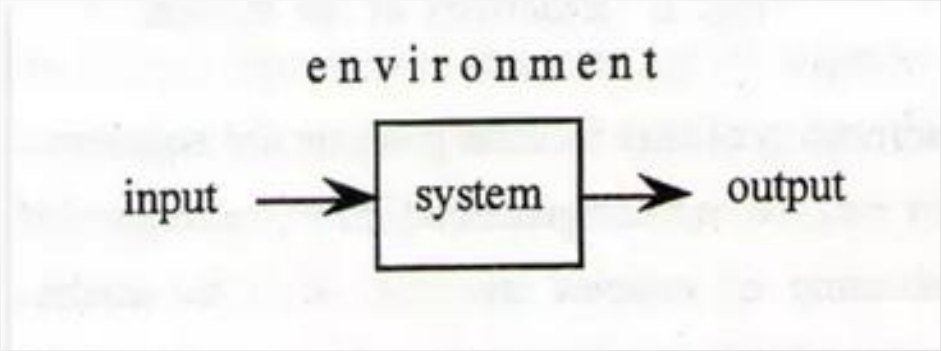
- Introduction
- The System Analyst
- The Software Development Life Cycle & Deliverables
- Feasibility Analysis
- Introduction to Requirements Determination
- Reqirement elicitation techniques

Introduction

What is a system?

- A system is “An organized collection of parts (or subsystems) that are highly integrated to accomplish an overall goal”.

- The system has various inputs, which go through certain processes to produce certain outputs, which together, accomplish the overall desired goal for the system.



Introduction

System Analysis:

- It is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components.

- It is conducted for the purpose of studying a system or its parts in order to identify its objectives.

- It is a problem solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose.

Introduction

System Design:

- It is a process of planning a new business system or replacing an existing system by defining its components or modules to satisfy the specific requirements.
- System Design focuses on how to accomplish the objective of the system.
- System Analysis and Design (SAD) mainly focuses on −
  - Systems
  - Processes
  - Technology

Introduction

Information System (IS):

- An information system is defined as the software that helps organize and analyze data.
- The purpose of an information system is to turn raw data into useful information that can be used for decision making in an organization.

Introduction

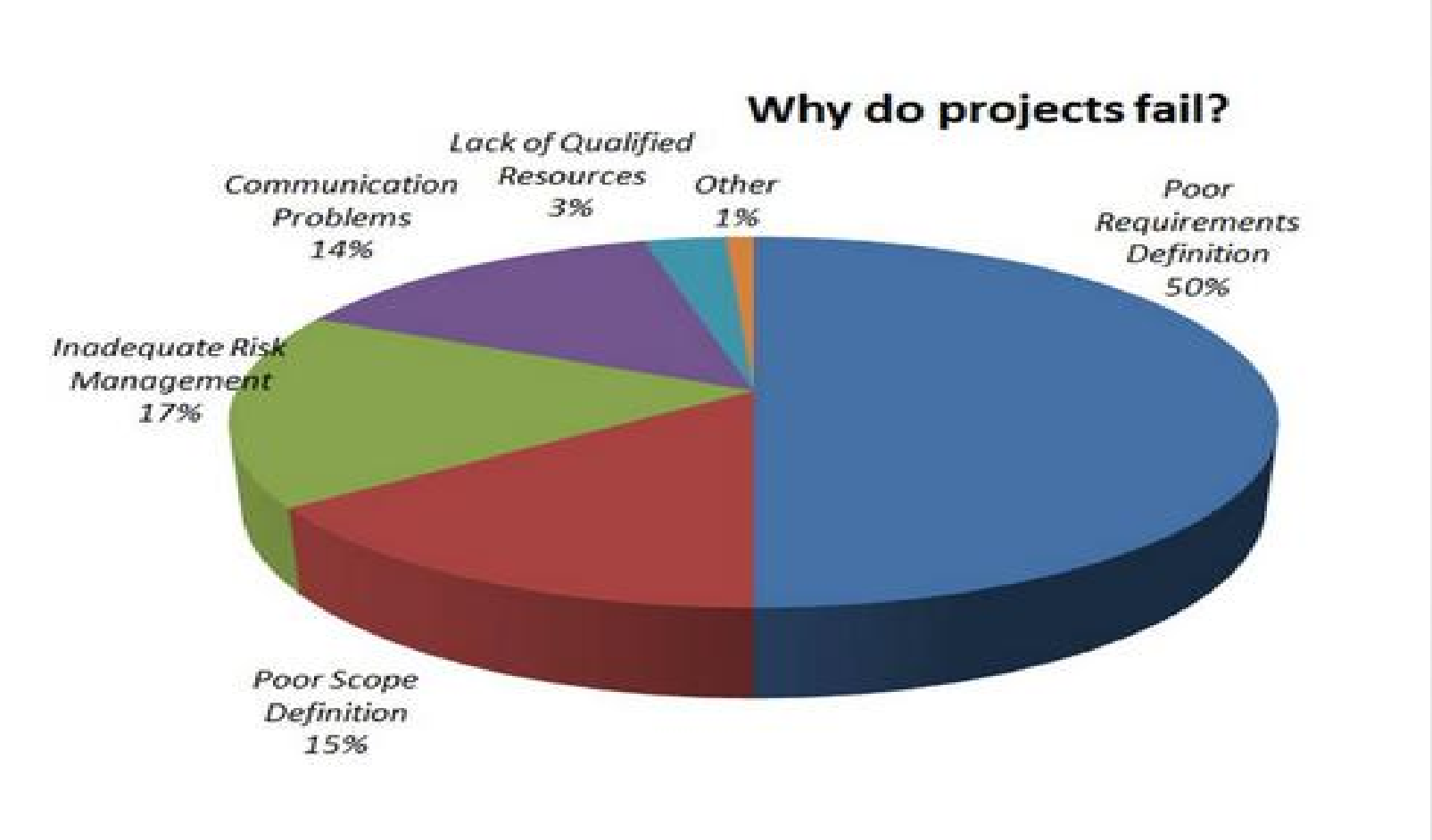
Systems Development Life Cycle (SDLC):

- A process of determining how an Information System (IS) can support business needs, designing the system, building it, and delivering it to users.

Introduction

- The fundamental four-stage systems development life cycle (planning, analysis, design, and implementation) is established as the basic framework for the IS development process.
- The first steps in the process are to identify a project that will deliver value to the business and to create a system request that provides the basic information about the proposed system.
- Next, the analysts perform a feasibility analysis to determine the technical, economic, and organizational feasibility of the system.

Introduction



Introduction

- **Examples of Project Failures:**
  - More than 100 flights to and from London's Heathrow airport were disrupted on 16th Feb, 2020 due to technical issues affecting departures and check-in systems.
  - In the first week of July 2019, users across the globe where not able to upload photos on Facebook, Instagram or Whatsapp due to technical gliches. They announced then it was a routine maintainance.
  - On 6th Dec 2018, more than 30 million O2 users in UK lost access to their data services after a software issue that happened due to unable to use 3G and 4G services.

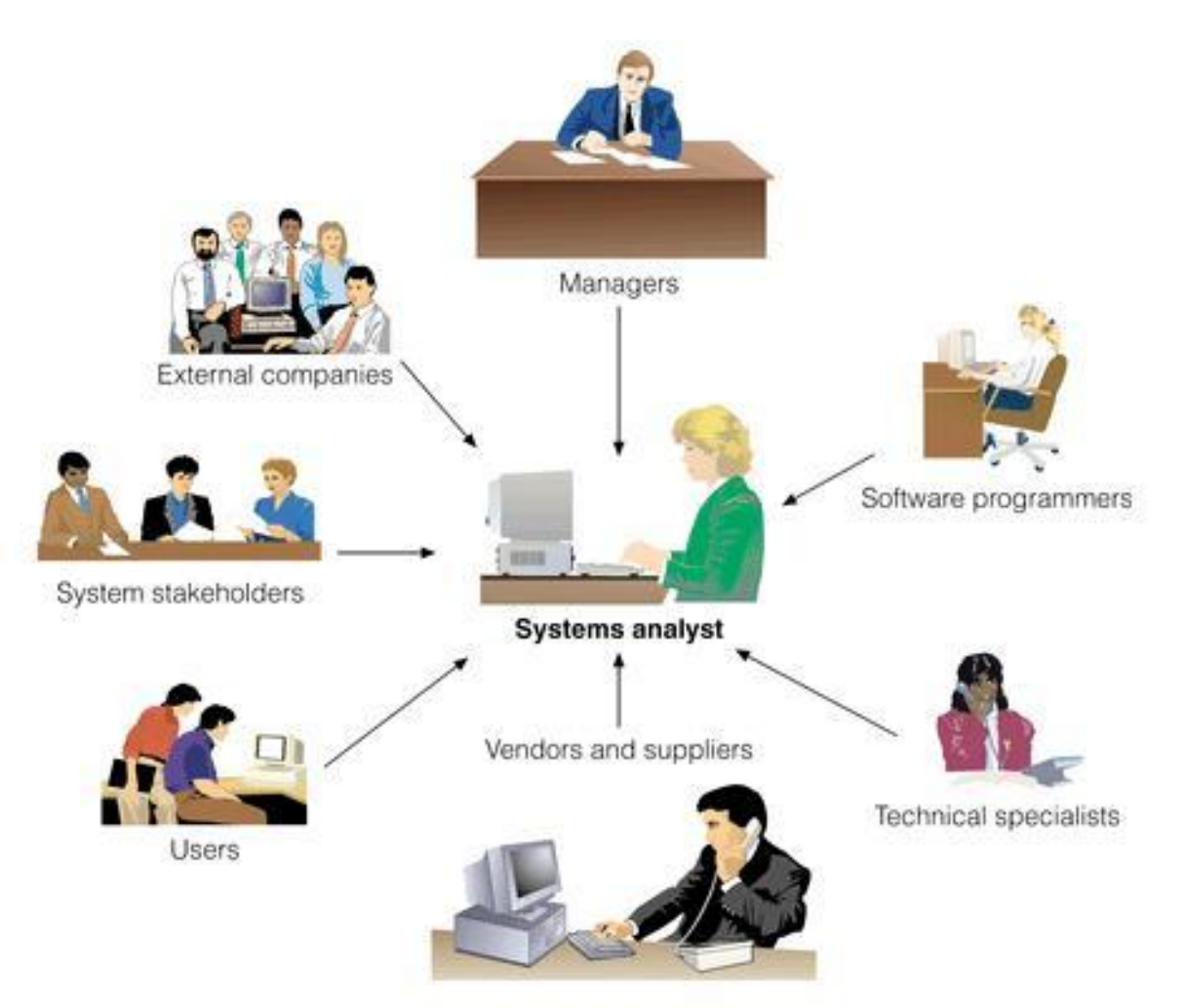
The System Analysts

- Plays key role in Information Systems development projects.
- Assists and guides the project team
- Must understand how to apply technology to solve business problems.
- Serves as change agents who identify the organisational improvements, design systems to implement those changes, and train and motivate others to use the systems.

The System Analysts

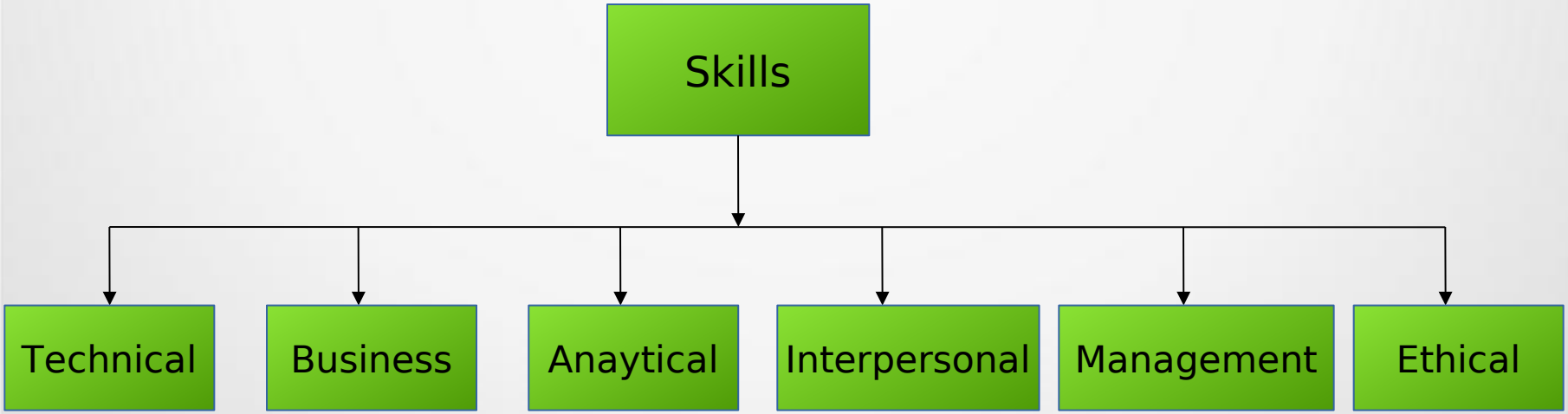
- A systems analyst, also known as business technology analyst.
- An information technology professional who specializes in analyzing, designing and implementing information systems.

The System Analysts



Systems Analyst Skills

- New Information systems introduce change to the organization and its people.
- A successful organizational change effort is one of the most difficult jobs to do.
- These skills can be divided into six categories:



Systems Analyst Skills

Technical – understand technical environment and the new system's technology foundation, and the way in which both can be fit into an integrated technical solution.

Business – understand hw IT can be applied to business situations and to ensure that the IT delivers real business value.

Analytical – understand the problem solving for organisational and project levels and they put their analytical skills to the test regularly.

Systems Analyst Skills

Interpersonal – need to communicate effectively, one-on-one with users and business managers and with programmers.

Management - manage people with whom they work, and they must manage the pressure and risks associated with unclear situations.

Ethical - must be fair, honest and ethical with other project team members, managers, and system users. Maintain confidentiality and trust with all people.

Various Roles of System Analyst

In large organizations, a project team will incorporate several analyst with different roles but in small organization, a single anlayst plays several roles.

- System Analyst
- Business Analyst
- Requirements Analyst
- Infrastructure Analyst
- Change Management Analyst
- Project Manager role

System Analyst Role

- Focuses on the IS issues surrounding the system.
- Develops ideas and suggestions for ways that IT can support and improve business processes helps design new business processes supported by IT.
- Designs the new information system, and ensures that all IS standards are maintained.
- The systems analyst will have significant training and experience in analysis and design and in programming.

Business Analyst Role

- Focuses on the business issues surrounding the system.
- Helps to identify the business value that the system will create, develops ideas for improving the business processes, and helps design new business processes and policies.
- The business analyst will have business training and experience, plus knowledge of analysis and design.

Requirements Analyst Role

- Focuses on eliciting the requirements from the stakeholders associated with the new system.
- Plays most critical role as needs to understand the client requierements.
- The analyst, can understand the business well, are excellent communicators and are highly skilled with requirements acquicition techniques

Infrastrucure Analyst Role

- Focuses on technical issues surrounding the ways the system will interact with the organization's technical infrastructure.
- Ensures that new IS conforms to organizational standards and helps to identify infrastructure changes that will be needed to support the system..
- He has training and experience in
  - Networking
  - Database Administration
  - Hardware and Software products
- An experienced infrastructure anlayst may have the role of software architect.

Change Management Analyst Role

- Focuses on the people and management issues surrounding the system installation.
- Ensures tha adequate documentation and support are avaiablle to users, provides user training on the new system.
- Develops strategies to overcome resistance to change.
- The change management analyst will have the significant training in organizational behavior and expertise in change management.

Project Manager Role

- Ensures that the project is completed on time and within budget and that the system delivers the expected value to the organization.
- A experienced system analyst who has acquired specialized project management knowledge and skills.

System Development Life Cycle (SDLC)

- SDLC is the process of determining how an IS can support business needs, designing the system, building it, and delivering it to users.
- The key person in the SDLC is the systems analyst, who analyzes the business situation, identifies opportunities for improvements, and designs an information system to implement the improvements.
- The primary goal is to create value for the organization, which for most companies means increasing profits.
- It is also called as Software Development Process.

System Development Life Cycle (SDLC)

IDEA

System Development Life Cycle (SDLC)

IDEA

PLANNING

System Development Life Cycle (SDLC)

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PLANNING

ANALYSIS

System Development Life Cycle (SDLC)

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IMPLEMENTATION

System Development Life Cycle (SDLC)

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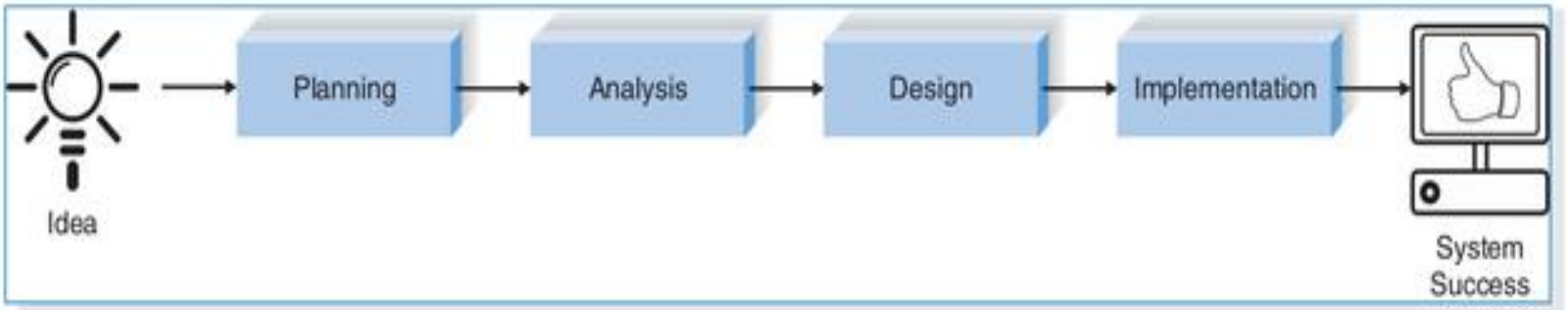
IMPLEMENTATION

SYSTEM SUCCESS

System Development Life Cycle (SDLC)



System Development Life Cycle (SDLC)

- Building an information system using the SDLC follows a similar set of four fundamental phases:
  - Planning
  - Analysis
  - Design
  - Implementation

Each phase is itself composed of a series of steps, which rely on techniques that produce deliverables (specific documents and files that explain various elements of the system).

System Development Life Cycle (SDLC)

- It is important to understand that the SDLC is a process of gradual refinement.
- The deliverables produced in the analysis phase provide a general idea what the new system will do.
- These deliverables are used as input to the design phase, which then refines them to produce a set of deliverables that describes in much more detailed terms exactly how the system should be built.
- These deliverables in turn are used in the implementation phase to guide the creation of the actual system.
- Each phase refines and elaborates on the work done previously.

SDLC - Planning

- Focus:
  - Why build this system?
  - How to structure the project?
- Primary Outputs:
  - System request with feasibility study
  - Project plan
- Fundamental process
  - **WHY** an information system should be built and determining how the project team will go about building it.
- Two Steps in Planning:
  - Project Initiation
  - Project Management

SDLC - Planning

Project initiation:

- Systems‘ business value is identified
- Most ideas for new systems come from outside the IS area in the form of a system request.

System request – presents a brief summary of business need and it explains how a system that supports the need will create business value.

The IS department works together with the person or department generating the request (project sponsor) to conduct a feasibility analysis.

SDLC - Planning

Feasibility analysis – decide whether project should be undertaken. Key aspects are:

- The technical feasibility (Can we build it?)
- The economic feasibility (Will it provide business value?)
- The organizational feasibility (If we build it, will it be used?)

The system request and feasibility study are presented to an **information systems approval committee (steering committee)** which decides whether the project should be undertaken or not.

SDLC - Planning

Once the project is approved, it enters Step 2: **project management.**

- During project management, the project manager creates a work plan, staffs the project, and puts techniques in place to help the project team control and direct the project through the entire SDLC.
- The deliverable for project management is a project plan that describes how the project team will go about developing the system.

SDLC - Analysis

Focus:

- WHO will use the system,
- WHAT the system will do
- WHEN it will be used

- Primary Outputs:
  - System proposal
- Fundamental process
  - Project team investigates current system
  - Identifies improvement opportunities
  - Develops concept of new system.
- Steps in Analysis:
  - Analysis strategy
  - Requirements gathering
  - Proposal plan

SDLC - Analysis

Analysis strategy:

- Is to guide project team efforts
- A study of the current system (called the as-is system) and its problems, and envisioning ways to design a new system (called the to-be system).

Requirements Gathering:

- Analysis of this information with input from the project sponsor and many other peopleleads to the development of a concept for a new system.
- System concept through requirement statements is used to develop a set of business analysis models.
- The set typically includes models that represent the data and processes necessary to support the business process.

SDLC - Analysis

System proposal:

- Analyses, system concepts, requirements and models are combined into a document called system proposal.
- The project sponsor and other decision makers decide whether to move the project further or not.

The system proposal is the initial design for the new system.

SDLC- Design

- Focus:
  - How will this system work?
- Primary Outputs:
  - System specification
- Fundamental process
  - Design physical system
  - Design architecture
  - Design interface
  - Design problems
  - Design database and files
- Steps in Analysis:
  - Design strategy
  - Architecture design
  - Database and file specifications
  - Program design

SDLC- Design

- How the system will operate in terms of the h/w, s/w and n/w infrastructure, the user interface, forms, and reports that will be used; and the specific programs, databases, and files that will be needed.
- The steps in the design phase determine exactly how the system will operate. The design phase has

SDLC- Design

Design strategy:

- This clarifies whether the system will be developed by the company's own programmers or outsourced to another firm or whether the company will buy an existing software package.

Architecture design & Interface design:

- Architecture design for the system that describes the hardware, software, and network infrastructure that will be used.
- Interface design specifies how the users will move through the system.

SDLC- Design

Database and file specifications:

- These define exactly what data will be stored and where they will be stored.

Program Design:

- The analyst team develops the program design, which defines the programs that need to be written and exactly what each program will do.

SDLC- Design

System specification is a collection of deliverables handed to programming team for implementation

At the end of the design phase, the feasibility analysis and project plan are reexamined and revised, and another decision is made by the project sponsor and approval committee about whether to terminate the project or continue.

SDLC- Implementation

- Focus:
  - Delivery and support of completed system
- Primary Outputs:
  - Installed system
- Fundamental process
  - Construct system
  - Install system
  - Maintain system
  - Post-implementation
- Steps in Analysis:
  - System construction
  - Installation
  - Support plan

SDLC- Implementation

- Final phase in SDLC
- System is actually built
- Longest and most expensive phase

System construction:

- The system is built and tested to ensure that it performs as designed.
- Since the cost of fixing bugs can be immense, testing is one of the most critical steps in implementation.

System installation –

- Old system is turned off and the new one is turned on.
- Most important aspects of conversion is the training plan.

System Plan:

- The analyst team establishes a support plan for the system.
- This plan usually includes a formal or informal post-implementation review, as well as a systematic way for identifying major and minor changes needed for the system.

FEASIBILITY STUDY

Feasibility analysis

- Once the need for the system and its business requirements have been defined, the approval committee may authorize the systems analyst to prepare a more detailed business case to better understand the proposed information system project.
- Feasibility analysis guides the organization in determining whether to proceed with the project.
- Feasibility analysis also identifies the important risks associated with the project that must be managed if the project is approved.
- As with the system request, each organization has its own process and format for the feasibility analysis.

Feasibility analysis

- Three areas of feasibility analysis
  - Technical feasibility
  - Economic feasibility
  - Organizational feasibility

Result of feasibility study deliverable that is submitted to the approval committee at the end of project initiation.

Technical Feasibility

CAN WE BUILD IT?

- Issues for Technical Feasibility:
  - Familarity with application
  - Familarity with technology
  - Project Size
  - Compatibility

Technical Feasibility

- The extent to which the system can be successfully designed, developed, and installed by the IT group.
- Technical feasibility analysis is, in essence, a technical risk analysis that strives to answer the question:

"Can we build it?"

- Many risks can endanger the successful completion of the project.

Familiarity with the application

- When analysts are unfamiliar with the business application area, they have a greater chance of misunderstanding the users or missing opportunities for improvement.

- The risks increase dramatically when the users themselves are less familiar with an application.

Technical Feasibility

Familiarity with the technology

- Risk increases dramatically when the technology itself is new.
- When the technology is not new but the organization has lack of experience then expertise is available from outside vendors.

Project size

- Whether measured as the number of people on the development team, the length of time it will take to complete the project, or the number of distinct features in the system.
- Larger projects present more risk, because they are more complicated to manage.

Technical Feasibility

Compatibility:

- Project teams need to consider the compatibility of the new system with the technology that already exists in the organization.
- New technology and applications need to be able to integrate with the existing environment for many reasons.
- They may rely on data from existing systems, they may produce data that feed other applications, and they may have to use the company's existing communications infrastructure.

Economic Feasibility

- Also called a cost–benefit analysis.

"Should we build the system?"

- Economic feasibility is determined by identifying costs and benefits associated with the system, assigning values to them, calculating future cash flows, and measuring the financial worthiness of the project.
- As a result of this analysis, the financial opportunities and risks of the project can be understood.
- OSrganizations have limited capital resources and multiple projects will be competing for funding.

Economic Feasibility

- The more expensive the project, the more rigorous and detailed the analysis should be.
- The costs and benefits can be broken down into four categories:
  - Development costs
  - Operational costs
  - Tangible benefits
  - Intangible benefits

Economic Feasibility

Development Costs

- Development costs are those tangible expenses that are incurred during the creation of the system, such as salaries for the project team, hardware and software expenses, consultant fees, training, and office space and equipment.
- Development costs are usually thought of as one-time costs.

Operational Costs

- Operational costs are those tangible costs that are required to operate the system, such as the salaries for operations staff, software licensing fees, equipment upgrades, and communications charges.
- Operational costs are usually thought of as ongoing costs.

Economic Feasibility

Tangible benefits:

- Tangible benefits include revenue that the system enables the organization to collect, such as increased sales.
- In addition, the system may enable the organization to avoid certain costs, leading to another type of tangible benefit: cost savings.
- For example, if the system produces a reduction in needed staff, lower salary costs result.
- Similarly, a reduction in required inventory levels due to the new system produces lower inventory costs. In these examples, the reduction in costs is a tangible benefit of the new system.

Economic Feasibility

Intangible benefits:

- Intangible costs and benefits are more difficult to incorporate into the economic feasibility analysis because they are based on intuition and belief rather than on “hard numbers.”
- For example, increased market share of an organization.

Economic Feasibility

Development Costs	Operational Costs
Development team salaries	Software upgrades
Consultant fees	Software licensing fees
Development training	Hardware repairs
Hardware and software	Hardware upgrades
Vendor installation	Operational team salaries
Office space and equipment	Communications charges
Data conversion costs	User training

Tangible Benefits	Intangible Benefits
Increased sales	Increased market share
Reductions in staff	Increased brand recognition
Reductions in inventory	Higher quality products
Reductions in IT costs	Improved customer service
Better supplier prices	Better supplier relations

Organizational Feasibility

"How well the system ultimately will be accepted by its users and incorporated into the ongoing operations of the organization?"

"If we build it, will they come?"

- The most difficult feasibility dimension to assess.
- How well the goals of the project align with business objectives.

Organizational Feasibility

Two important issues for Organizational feasibility:

- Strategic alignment – How well does the project match up with the business strategy?
- Stakeholder analysis

Strategic Alignments

- The fit between the project and business strategy—the greater the alignment, the less risky the project will be, from an organizational feasibility perspective.
- Many projects fail if the IT department alone initiates them and there is little or no alignment with businessunit or organizational strategies.

Organizational Feasibility

Stakeholder analysis

- A stakeholder is a person, group, or organization that can affect a new system.
- The most important stakeholders in the introduction of a new system are
  - The project champion
    - High level non IS executive
    - Shepherds projects to completion
    - Its good to have more then one.
  - System users
    - In the loop so end system meets needs.
  - Organizational management
    - Need this support to sell system to organization.

Organizational Feasibility

The Project Champion

- The champion is a high-level executive and is usually, but not always, the project sponsor who created the system request.
- The champion supports the project by providing time and resources (e.g., money) and by giving political support within the organization by communicating the importance of the system to otherorganizational decision makers.
- More than one champion is preferable because if the champion leaves the organization, the support could leave as well.
- Champions provide day-to-day support for the system

Organizational Feasibility

Organizational Management

- Organizational management needs to support the project.
- Gives belief that the system will make a valuable contribution and that necessary resources will be made available.
- Ideally, management should encourage people in the organization to use the system and to accept the many changes that the system will likely create.

Organizational Feasibility

System Users

- System users who ultimately will use the system once it has been installed in the organization.
- User participation should be promoted throughout the development process to make sure that the final system will be accepted and used, by getting users actively involved in the development of the system

Organizational Feasibility

	Role	To Enhance Organizational Feasibility
Champion	A champion: • Initiates the project • Promotes the project • Allocates his or her time to the project • Provides resources	• Make a presentation about the objectives of the project and the proposed benefits to those executives who will benefit directly from the system. • Create a prototype of the system to demonstrate its potential value.
Organizational Management	Organizational managers: • Know about the project • Budget enough money for the project • Encourage users to accept and use the system	• Make a presentation to management about the objectives of the project and the proposed benefits. • Market the benefits of the system, using memos and organizational newsletters. • Encourage the champion to talk about the project with his or her peers.
System Users	Users: • Make decisions that influence the project • Perform hands-on activities for the project • Ultimately determine whether the project is successful by using or not using the system	• Assign users official roles on the project team. • Assign users specific tasks to perform, with clear deadlines. • Ask for feedback from users regularly (e.g., at weekly meetings).

Organizational Feasibility

- The final feasibility study helps organizations make wiser and important investements regarding IS.
- Forces project teams to consider technical, economical and organizational factors.
- Feasibility study may be revised throughout the project depending upon the requirements.