
HUST
TRƯỜNG ĐẠI HỌC BÁCH KHOA HÀ NỘI
HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY
ONE LOVE. ONE FUTURE.

1


SOICT
School of Information and Communication Technology
ONE LOVE. ONE FUTURE.

2

TRƯỜNG ĐẠI HỌC
BÁCH KHOA HÀ NỘI
HANOI UNIVERSITY
OF SCIENCE AND TECHNOLOGY

IT3180 – Introduction to Software Engineering

6 – Feasibility Study

ONE LOVE. ONE FUTURE.

3

3

Overview

Lecture 5 introduced several processes:

- Waterfall Model and Modified Waterfall Model
- Iterative Refinement – Prototype Model and its variants
- Spiral Development
- Agile Development

Before applying a process to develop a software system, the project shoud be studied – **Feasibility Study**

4

4

Feasibility Study

A **feasibility study** is a study made before committing to a project

A feasibility study leads to a **decision**:

- Go ahead
- Do not go ahead
- Think again

In introduction projects, the feasibility study often leads to a **budget request**

A feasibility study may be in the form of a proposal

5

5

Feasibility Study - A general step

Feasibility study can be observed in our life

- A housewife inspects the quality of the product she is purchasing from a grocery store ➔ It's actually a material quality feasibility test
- Due to increasing fuel rates and air pollution, young students perform technical, resource and economic feasibility tests in order to launch an electric vehicle

6

6

Why are Feasibility Studies Difficult?

Uncertainty

- **Clients** may be unsure of the scope of the project
- **Benefits** are usually very hard to quantify
- **Approach** is usually unclear or vague ➔ Estimates of resources and timetable are very rough
- **Organization changes** may be needed

Feasibility Studies rely heavily on the judgement of **experienced** people

Mistakes made at the beginning of a project are
the most difficult to correct

Feasibility Study is about Decision Making

The feasibility study makes **recommendations**

- **Client**: Who is this project for?
- **Scope**: What are the boundaries of the project?
- **Benefits**: What are the benefits? Can they be quantified? If the software is a product, what are the forecasts or likely sales?
- **Technical**: Is the project possible? Is there at least one technical way to carry out the project?
- **Resources**: What are the estimates of staff, time, equipment, etc.?
- **Alternatives**: What are the options if the project is not done?

Where are the Risks?

Technical Risks

- There must be an outline plan with a rough timetable and staff allocation
- The plan must have a large margin for **contingencies**

External Risks

- Every system interacts with others. Are the others **committed** to the necessary efforts?
- Where are the external **pressures** and **obstacles**?

Example 1: A case study - Decision made before feasibility study

Outline Description

A governmental agency (X) has to manage huge numbers of documents and other records, wishes to move from a paper based approach to a system that can manage digital documents

Example 1: Problems (1)

Context:

- A team at University B developed a prototype system to demonstrate technology for Agency X
- Funds were approved
- An external feasibility study was commissioned to report on the technical approach to be followed (technical feasibility).

Problems:

- The decision to go ahead was made and the budget was approved **before the feasibility study was begun**
- The feasibility study looked at only the **technical aspects**

Example 1: Problems (2)

Organizational:

- Agency X manager lacked the experience to lead a very large project that will completely change the agency
- No thought was given to the **workflow** and **job changes** that would affect almost every member of staff.

Preparation:

- No preliminary study was made of **volumes** or **kinds** of data; nor of the complex policies for access (e.g., privacy, classified information).

Requirements:

- The requirements were complex and only **partially** understood.
- Major changes were inevitable even after the system went into production with real users.

Example 1: Problems (3)

- A successful implementation needed fundamental changes at the Agency management level
- A phased approach, using iterative refinement over many years, might possibly work

BUT…

- The agency did not want to abandon the project (money needs to be returned to the government)
- The agency adopted a pure waterfall model to initialize the project

This is how disasters are made

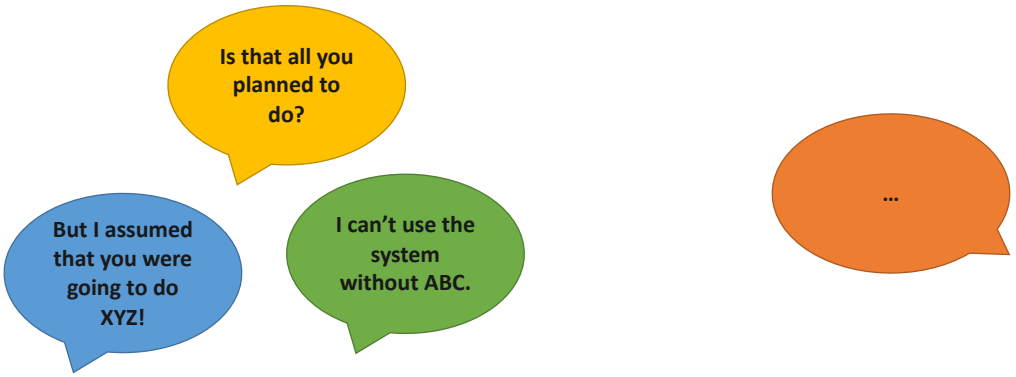
Feasibility Study: Scope

Scope expresses the **boundaries of the system:**

- It will have a **list of included functions**
- It will have a **list of excluded functions**
- It will have a **list of dependencies**
- It will have a **list of current systems to be replaced**

Confusion over scope is a common reason for clients to be dissatisfied with a system

In Reality



Example 2: Confusion over Scope

Context:

- A government organization L required a "repository system" to store and make accessible very large amounts of highly varied material over long periods of time
- An outside organization, C, built a repository system to store and manipulate complex digital material

BUT…

- Nobody built the sub-systems needed to organize, validate, and to load material into the repository.
- L expected the repository system to include these sub-systems. C considered the sub-systems separate from the repository system.

A good feasibility study would have seen this confusion

Benefits of Feasibility Study

Why is this project proposed? Can you quantify the benefits?

Organization benefits

- Create a marketable product
- Improve the efficiency of an organization (e.g., save staff)
- Control a system that is too complex to control manually
- New or improved service (e.g., faster response to customers)
- Safety or security

Professional benefits are not the reason for doing a project

Feasibility Study: Technical

A feasibility study needs to demonstrate that the proposed system is technically feasible. This requires:

- an outline of the requirements
- a possible system design (e.g., database, distributed, etc.)
- possible choices of software to be acquired or developed
- estimates of numbers of users, data, transactions, etc.

These rough numbers are part of the provisional plan that is used to estimate the staffing, timetable, equipment needs, etc.

The technical approach actually followed may be very different.

Feasibility Study: Planning and Resources

The feasibility study must include an outline plan:

- Estimate the staffing and equipment needs, and the preliminary timetable
- Identify major milestones and decision points
- Identify interactions with and dependences on external systems
- Provide a preliminary list of deliverables and delivery dates

Feasibility Study: Alternatives and Risks

A feasibility study should identify risks and alternatives:

Risks

- What can go wrong?
- How will progress be monitored and problems identified (visibility)?
- What are the fall back options?

Alternatives

- Continue with current system, enhance it, or create new one?
- Develop in-house, or contract out? (How will a contract be managed?)
- Phases of delivery and possible points for revising plan

Techniques for Feasibility Studies

The highest priority is to ensure that the client and development team have the same understanding of the goals of the system

Techniques for Feasibility Studies

For the **development team** to understand the goals:

- Interviews with client and the staff of the client's organization
- Review of existing systems (including competitors')

For the **client** to appreciate the proposed system:

- Demonstration of key features or similar systems
- Mock-up of user interfaces
- Walk through typical transactions or interactions

Techniques for Feasibility Studies

Outline budget:

- n people for m months at $x per month
- equipment, buildings, etc.
- contingency (at least 50% is needed)

Phases/milestones:

- specify deliverables and approximate dates
- planned releases

Feasibility Study: Report

A feasibility study should have a written report

It should be a well written, well presented document:

- For a general audience: client, financial management, technical management, etc.
- Short enough that everybody reads it.
- Long enough that no important topics are skipped.
- Details can be included in supporting documents.

A report that is not read and understood is useless

IT31380 Project: Feasibility Report

Specific Requirements for the Feasibility Report:

- Outline plan, showing principal activities and milestones (see the lecture on Project Management)
- Risk analysis. What can go wrong? What is your fall back plan?

IT3180 Project: Challenges

- **Team**: How many hours per week? What skills do people have?
- **Time**: Must be completed by end of semester, including operational system, documentation, presentation
- **Equipment** and **software**: What special needs are there?
- **Client**: Will the client be sufficiently available and able to help?
- **Start-up time**: Creating a team, scheduling meetings, acquiring software, learning new systems, ...
- **Business considerations**: Licenses, trade-secrets, ...
- **Too ambitious**: Nothing to show at the end of the semester...
- **What else**?

Good processes lead to good software

Good processes reduce risks

IT3180 Project: Feasibility Report – Common problems

- The purpose of a feasible study is to establish if a project is **feasible**, at reasonable cost, within the planned period
- The report should conclude with **recommendations** about whether to proceed, but the final decision is made jointly by the client and the development team
- In previous years, many reports have had the following problems:
  - The report is **vague about the scope**. Without a clear definition of scope, it is not clear that the project is feasible
  - The plan does not describe the activities in enough detail to **estimate the effort** convincingly.
  - The projects is **too ambitious**. The report needs to describe how will you monitor the progress and adjust the scope if necessary.

29

6 – Feasibility Study

(end of lecture)

ONE LOVE. ONE FUTURE.

30