The Feasibility Study

- What is a feasibility study?
- What to study and conclude?
- Types of feasibility
  - Technical
  - Economic
  - Schedule
  - Operational
- Quantifying benefits and costs
  - We have covered this already
- Comparing alternatives
Why a feasibility study?

**Objectives:**
- To find out if a civil engineering project can be done:
  - ...is it possible?
  - ...is it justified?
- To suggest possible alternative solutions.
- To provide management with enough information to know:
  - Whether the project can be done
  - Whether the final product will benefit its intended users
  - What the alternatives are (so that a selection can be made at a later phase)
  - Whether there is a preferred alternative

**A management-oriented activity:**
- After a feasibility study, management makes a “go/no-go” decision.
- Need to examine the problem in the context of broader objective/strategy
Content of a feasibility study

- **Things to be studied in the feasibility study:**
  - The present organizational system
    - Stakeholders, users, policies, functions, objectives,...
  - Problems with the present system
    - inconsistencies, inadequacies in functionality, performance,...
  - Goals and other requirements for the new system
    - Which problem(s) need to be solved?
    - What would the stakeholders like to achieve?
  - Constraints
    - including nonfunctional requirements on the system (preliminary pass)
  - Possible alternatives
    - “Sticking with the current system” is always an alternative
    - Different business processes for solving the problems
  - Advantages and disadvantages of the alternatives

- **Things to conclude:**
  - Feasibility of the project
  - The preferred alternative.
Four Types of feasibility

Technical feasibility
- Is the project possible with current technology?
- What technical risk is there?
- Availability of the technology:

Economic feasibility
- Is the project possible, given resource constraints?
- What are the benefits?
- What are the development and operational costs?
- Are the benefits worth the costs?

Schedule feasibility
- Is it possible to build a solution in time to be useful?

Operational feasibility
- If the system is developed, will it be used?
- Human and social issues...
(1) Technical Feasibility

- Is the proposed technology or solution practical?
  - Do we currently possess the necessary technology?
  - Do we possess the necessary technical expertise
    - ...and is the schedule reasonable for this team?
  - Is relevant technology mature enough to be easily applied to our problem?

- What kinds of technology will we need?
  - Some organizations like to use state-of-the-art technology
    - ...but most prefer to use mature and proven technology.
  - A mature technology has a larger customer base for obtaining advice concerning problems and improvements.

- Is the required technology available “in house”?
  - If the technology is available:
    - ...does it have the capacity to handle the solution?
  - If the technology is not available:
    - ...can it be acquired?
(2) Economic Feasibility *(covered earlier!!)*

Can the bottom line be quantified yet?

- Very early in the project...
  - a judgment of whether solving the problem is worthwhile.
- Once specific requirements and solutions have been identified...
  - ...the costs and benefits of each alternative can be calculated

Cost-benefit analysis

- Purpose - answer questions such as:
  - Is the project justified (i.e. will benefits outweigh costs)?
  - What is the minimal cost to attain a certain system?
  - How soon will the benefits accrue?
  - Which alternative offers the best return on investment?

Examples of things to consider:

- Selection among alternative financing arrangements (rent/lease/purchase)

Difficulties

- benefits and costs can both be intangible, hidden and/or hard to estimate
- ranking multi-criteria alternatives
(3) Schedule Feasibility

- How long will it take to get the technical expertise?
  - We may have the technology, but that doesn't mean we have the skills required to properly apply that technology.
    - Whether hiring or training, it will impact the schedule.

- Assess the schedule risk:
  - Given our technical expertise, are the project deadlines reasonable?
  - If there are specific deadlines, are they mandatory or desirable?
    - If the deadlines are not mandatory, the analyst can propose several alternative schedules.

- What are the real constraints on project deadlines?
  - If the project overruns, what are the consequences?
    - Deliver a properly functioning information system two months late...
    - ...or deliver an error-prone, useless information system on time?
  - Missed schedules are bad, but inadequate projects are worse!
(4) Operational Feasibility

- How do end-users/managers/policy-makers feel about... 
  - ...the problem?
  - ...the alternative solutions you are exploring?

- You must evaluate:
  - Not just whether the project *can* work...
  - ...but also whether a system *will* work.

- Any solution might meet with resistance:
  - Does management support the project?
  - How do the end users feel about the project (often open public hearing for large scale civil engineering projects *after* technical feasibility)?
  - Inertia within existing system/ Vested interests?
    - People tend to resist change/other agenda.
    - Can this problem be overcome? If so, how?
Feasibility Study Structure

1. Purpose & scope of the study
   - Objectives (of the study)
   - who commissioned it & who did it,
   - sources of information,
   - process used for the study,
   - how long did it take,…

2. Description of present situation
   - organizational setting, current system(s).
   - Related factors and constraints.

3. Problems and requirements
   - What’s wrong with present situation?
   - What changes are needed?

4. Objectives of the new system.
   - Goals and relationships between them

5. Possible alternatives
   - …including ‘do nothing’.

6. Criteria for comparison
   - definition of the criteria

7. Analysis of alternatives
   - description of each alternative
   - evaluation with respect to criteria
   - cost/benefit analysis and special implications.

8. Recommendations
   - what is recommended and implications
   - what to do next;
     - E.g. an interim & a permanent solution

9. Appendices
   - to include any supporting material.
Comparing Alternatives

- How do we compare alternatives?
  - When there are multiple selection criteria?
  - When none of the alternatives is superior across the board?

- Use a Feasibility Analysis Matrix!
  - The columns correspond to the candidate solutions;
  - The rows correspond to the feasibility criteria;
  - The cells contain the feasibility assessment notes for each candidate;
  - Each row can be assigned a rank or score for each criterion
    - e.g., for operational feasibility, candidates can be ranked 1, 2, 3, etc.
  - A final ranking or score is recorded in the last row.

- Other evaluation criteria to be included in the matrix
  - quality of output
  - cost of maintenance
  - load on system

This section briefly discussed earlier!!