

## Highlights

- What is a Feasibility Study
- Operational, technical, Social Feasibility
- Preparing for a Feasibility Study

## Inside

- Function of a Feasibility Study
- Steps undertaken
- Concluding a Feasibility Study

## SA LEC 04

*Bolger 'n' Slaters  
Systems  
Analysis Course  
Notes  
Issue 4*

# The Systems Analysis LECTURE

# SA

## The Feasibility Study

*Background about the steps involved in a Systems Project*

### Feasibility study

#### What is a Feasibility Study ?

The purpose of the a Feasibility Study (or preliminary investigation as it alternatively known) is to evaluate project requests. It is NOT a design study, nor does it include the collection of details to completely describe in extreme detail the business system.

Its purpose should be to answer the question 'Should further time and money be spent in studying or developing a new or modified system ?'.

A preliminary investigation involves the collecting of information that permits project initiators to evaluate the merits of the project request and make an informed judgment about the feasibility of the proposed project.

As an Analyst working on the preliminary investigation you should accomplish the following objectives (in short make sure that your preliminary study report has the following headings, and answers as far as possible, the questions listed below): The feasibility study is concerned with three aspects:

- Technical Feasibility,
- Operational Feasibility
- Social feasibility and,
- Economic feasibility.

#### What is meant by Operational Feasibility ?

Proposed projects are beneficial only if they can be turned into information systems that will meet the organisations operating requirements. Simply stated, this test of feasibility asks if the system will work when it is developed and installed. Are there major barriers to implementation ? The following questions will help test the operational feasibility of a project.

- Is there sufficient support for the project from management ?
- Are current business methods acceptable to the users ?
- Have users been involved in the planning and development of the project ?
- Will the proposed system cause harm ?

#### What is meant by Technical Feasibility ?

**Technical feasibility** deals with the question of whether the proposed system will achieve its objectives; in other words, will it work? Advances in technology may mean that a system that was not feasible a couple of years ago is now a possibility. The Technical issues usually raised during the

feasibility stage of the investigation include the following:

- Does the necessary technology exist to do what is suggested ( and can it be acquired ) ?
- Does the proposed equipment have the technical capacity to hold the data required to use the new system ?
- Will the proposed system provide adequate responses to enquiries , regardless of the number or location of users ?
- Can the system be expanded if developed ?
- Are there technical guarantees of accuracy, reliability, ease of access, and data security ?

#### What is meant by Social Feasibility ?

**Social feasibility** is concerned with the effect on employees and customers of the introduction of a new system. Will it result in redundancies, or a need for retraining or relocation of some of the workforce? Will some jobs be 'de-skilled', and will current employees be able to perform effectively any new tasks introduced by the new system? It is essential that user cooperation is secured before changes are introduced. Equally, the effect on customer service has to be considered.

#### What is meant by Financial and Economic Feasibility ?

A system that can be developed technically and that will be used if installed must still be good investment for the organisation. Financial benefits must equal or exceed the costs. The financial and economic questions raised by analysts during the preliminary investigation must allow estimation of the following:

- The cost to conduct a full systems investigation
- The cost of hardware and software for the class of application being considered.
- The benefits in the form of reduced costs or fewer costly errors.
- benefits that are hard to quantify such as improved management information or better customer service
- The cost if the proposed system is not developed
- The development costs if it is

- The running costs

#### Practical Class Activity

Q1: Name some development costs and running costs incurred in switching over to a new computerised system.

#### Preparing for the Feasibility study

We are now going to look at the steps involved with the first phase in the Systems Project.

The first essential step in finding the solution to any problem is to be clear what the problem is and whether you really have got a problem in the first place.

The second essential step is to have some idea about what sort of solutions would be possible, and how much effort each would require. You are then some of the way towards deciding what the best solution would be. These are the essential objectives of the feasibility/planning stage.

Throughout our look at the stages of the system project, we'll be looking both at the processes involved and also at the target documents that come at the end of each process.

In this issue of the notes we will look at the conduct of the processes involved in the feasibility/planning stage, and also at the target document from this stage, The Feasibility Study report.

A feasibility study will consume significant resources. The task is usually given to an experienced systems analyst, who will be provided with TERMS OF REFERENCE from a senior manager.

#### The function of a Feasibility Study

In normal circumstances before being asked to conduct detailed analysis into a system, an analyst will be asked to report on the feasibility of a computer solution. At the centre of this 'justification stage' is the feasibility study. In general terms a feasibility study should:

- Examine the requirements of a business operation.

- Look at the way that those requirements are being met.
- Suggest if there are better or more cost-effective ways of meeting the requirements.

No mention, notice, of problems or computers! However, in practice, a problem is often the reason for carrying out a feasibility study. In general terms, too, installing a computer doesn't have to be the reason for carrying out a feasibility study ( it may be that it is felt that there may be a more effective manual way of carrying out existing manual processes).

So the purpose of carrying out a feasibility study is to gather , analyse and documents and the data needed to make an informed, intelligent decision regarding a systems practicality.

*In a nutshell, a feasibility study is a short assessment of the proposed information system to determine whether the system can effectively meet the specified business requirements of the organisation, and whether there is a justification for developing a replacement system. Both the current and proposed / required system environments are studied (as briefly as is necessary to determine*

*if full Analysis can occur), and is documented only in sufficient detail to enable:*

1. A Problem Definition Statement to be developed and agreed with the project board, and
2. For overview possible replacement computerised Business Information System Options to be identified.

*A feasibility study is recommended as a preliminary to a Full Study Requirements Analysis, Requirements Specification and Logical System Specification) for all projects except those of low risk. The scope of the feasibility study activities will often extend beyond those supported by SSADM techniques and those described in the activity descriptions. The SSADM techniques primarily assist the identification of information system requirements and the assessment of technical feasibility.*

#### Activities needed to support a Feasibility Study

Feasibility Studies are the responsibility of the project board. They need to establish whether or not the organization's resources should be committed to a project, and if so what those resources should be.

#### More about the role of a Feasibility Study

The role of the Feasibility Study is to actually study very briefly, the system under investigation. This needs to happen in order to provide information about the organisation so that it can be established whether or not a new system might be a feasible solution to meet its needs and if so whether a full systems project needs to be carried out.

As you will find with most things to do with Systems Analysis there are no hard and fast rules about the level of study to be undertaken (as usual it varies from project to project) and the level of detail to which it should be carried out should be that which is sufficient to support decision making.

#### Before you start

##### Clarify and understand the project request

- What is being done currently ?
- What is required both now and in future ?
- Why is it required / going to be required ?
- Is there an underlying reason different from the one the requester identifies ?

**Determine the size of the project**

- What are the system boundaries ?
- Which processes lie within the study ?
- Which processes lie outside the study ?

**What is needed in order to start a Feasibility Study ?**

The main participants in the Feasibility Study are the Feasibility Study team, those with project management and analysis skills, user participants and specialist advisers, and anybody else deemed relevant to the success of the study. The major inputs to this stage are:

- a) Management Authorization - This usually includes Agreement to the scope of the investigation and Agreement to the definition of the current problems encountered.
- b) The Project Initiation Document
- c) Reference material relating to the Company - This includes assorted documentation such as Business Objectives, Business Plans, an Information System strategy statement, an Information system strategy planning working paper, Management and technical policies, Organisation charts, Project portfolio)

**What must be achieved during the feasibility study ?**

The objectives of the Feasibility Study module are:

- a) To establish whether a proposed information system can meet the specified business requirements of the organisation.
- b) To establish the business case for the proposed information system, and enable the project board to decide whether to commit resources to a more detailed study.
- c) To determine whether to proceed in a different direction from that envisaged in the information system strategy.

**What should you have on completion of the Feasibility Study Module ?**

The main output products of the Feasibility study module are as follows:

- The Context Diagram
- First draft of the Current Physical Level 1 DFD
- First draft of the Overview Logical Data Structure
- First draft of the Requirements Catalogue containing requirements definitions
- First draft of any Dialogue Design / Identification
- First draft of any Business System Options (i.e. the first draft overview of any proposed replacement systems )
- First draft of any Technical System Options (i.e. the first draft Technical Specifications of the Business System Options drafted )

all these documents will form the initiation documents for the Requirements Analysis and Requirements Specification stages of the project.

**Reporting recommendations to management****Planning for Feasible Projects**

Basically if the cost/benefit analysis suggested that the new or modified system will be feasible, you now need to make plans to continue the next phase. You may for example want to call in outside consultants at this point to carry out the remainder of the project.

You will need to recommend a timetable for planning, developing and implementing the system, or you may suggest that additional time be allowed for more study.

You will need to prepare a 'progress' report detailing the work and recommendations of the study. Based on this report, management decides whether to end the project or to begin the investigative study.

**Handling Unfeasible projects**

Not all projects submitted for evaluation and review are judged acceptable. Requests that fail to pass feasibility tests are not pursued further, unless they are reworked and resubmitted as new proposals.

In practice only part of a project is actually unworkable, and the selection committee may decide to combine the workable part of the project with another feasible proposal.



**Step 1 - Prepare for Preparing for a Feasibility Study**

The first step creates a base on which other steps can build. One aspect of this is to agree a plan for how the stage will be conducted. The other aspect builds on any previous work to outline the current system.

**STEP 1  
Prepare for Feasibility Study****Input(s) Required**

- Project Initiation Document (from project procedures).

**Activities to be performed**

- a) Working from any documents which initiated the study create an outline description of the existing system and record known requirements.
- b) Establish the scope of the Feasibility Study, and agree it with the Project Board
- c) Tune your proposed methods if necessary to meet the needs of the feasibility study and agree with the Project Board.

**Techniques to be used**

- Use data flow modeling
- Logical data modeling
- Requirements definition

**New or Modified Products generated**

- Context Diagram ( to be used in step 2 )
- Current Physical Level-1 DFD ( to be used in step 2 )
- Overview of Logical Data Structure (to be used in step .2)
- Requirements Catalogue (to be used in step 2)
- Agreed study method ( to be forwarded to Project Procedures)

**Step 2 - Defining the Problem**

Step 2 is undertaken in order to understand the major problems and opportunities which a project would need to address. It is not meant to go into great detail about the existing system and its difficulties, or people's hopes for the future.

It is very important for potential users to check the developer's understanding of the present Information System and that the developers understand exactly what the users requirements really are.

This step allows a developer and users to discuss open minded considerations of future information Systems prior to studying the current system in more detail. Though the tasks undertaken during this step are listed chronologically, when undertaken they are more likely to overlap into each other.

The products generated by the activity include descriptions of current and future environments. The step uses and extends the DFM and an LDS. And will extend them with narrative and other charts to provide a richer picture of the situation. Any problem definition produced will be a primarily narrative description of the major (i.e. general and obvious) requirements only.

**STEP 2**  
**Prepare for Feasibility Study**

**Input(s) Required**

- Context Diagram from step 1
- Current Physical Level 1 DFD from step 1
- Overview Logical Data Structure (LDS) from step 1
- Requirements Catalogue from step 1

**Activities to be performed**

- a) Describe an outline of the required system with a Level 1 DFD and a Logical Design specification
- b) Enhance the descriptions of the current system by extending the DFM and LDS, and recording known problems in the Requirements Catalogue
- c) Record potential users of the required system in the User Catalogue
- d) Establish the new requirements of the potential users, possibly by discussing dialogues, and record in the Requirements Catalogue
- e) Consolidate the requirements into a narrative Problem definition Statement
- f) Agree the problem Definition Statement with the project board

**Techniques to be used**

- Use data flow modeling
- Logical data modeling
- Requirements definition
- Dialogue Design

**New or Modified Products generated**

- Outline Current environment Description (to be used in steps 3 and 4)
- Outline Required environment Description (to be used in steps 3 and 4)
- Requirements Catalogue to be used in steps 3 and 4
- User Catalogue to be used in steps 3 and 4
- Problem Definition Statement to be used in step 3 and by project procedures

### Step 3 - Selecting Feasibility Options

The title of this step understates its contents. The work here includes defining feasible options and assisting the Project Board in making a selection and developing plans for any agreed project. In evaluating the options there is a need to evaluate projects on a wide range of criteria, such as

1. The costs of undertaking the project, and the penalties of not doing so.
2. Changes in the work of the business itself and the people who are involved.
3. Risks associated with security , auditing and confidentiality.
4. The viability of the development project itself, in particular is there a clear owner of the project ( with a budget) and a project leader ( with both commitment and ability ) ?

Not all these tasks need to be undertaken by the feasibility team, who should call upon appropriate expertise as necessary. They do give an indication of what a daunting exercise a thorough feasibility study can be.

#### STEP 3 Select Feasibility Options

##### Input(s) Required

- Outline Current environment Description
- Outline Required environment Description
- Requirements Catalogue
- User Catalogue
- Problem Definition Statement

##### Activities to be performed

- a) Establish which requirements must be met by any proposal
- b) Describe a range of outline BSO's, (up to six)
- c) Describe a range of outline TSO's, (up to six)
- d) Describe a range of composite BSO's and TSO's, for discussion with users and shortlist to leave about three options
- e) Describe the short listed options further, highlighting the differences amongst them, and undertaking initial investment appraisal and impact analysis
- f) Produce project plans for each option, and decide which project(s) are preferred
- g) Assist the Project Board in selecting an option by undertaking presentations and follow-up sessions as necessary, possibly including the definition of a hybrid option
- h) Develop action plans for the selected project(s) so that plans can be made for their undertaking

##### Techniques to be used

- Use data flow modeling
- Logical data modeling
- Business System Options
- Technical System Options

##### New or Modified Products generated

- Action Plan (to be used in step 4)
- Feasibility Options (to be used in step 4)

### Step 4 - Assemble the Feasibility Study Report

Each of the modules within SSADM ends with an 'assembly step'. The purpose is to check that the module has achieved a satisfactory conclusion, and to publish the results. where modules are undertaken by different study teams these steps have even greater significance.

The work on this step is primarily quality assurance, and as such is defined by the organisations quality management practices. The step offers a chance to collect together all the products of the module and check them against each other, sorting out any difficulties. The resolution of these difficulties is often highly illuminating

**STEP 4**  
**Assemble the Feasibility Study Report**

**Input(s) Required**

- Outline Current environment Description
- Outline Required environment Description
- Requirements Catalogue
- User Catalogue
- Problem Definition Statement
- Action Plan
- Feasibility Options

**Activities to be performed**

- a) Check everything is present and acceptable
- b) 'Publish the Feasibility Study Report'

**Techniques to be used**

- As with other 'assembly steps' there are no particular SSADM techniques specified (However later notes for a guide to what really should be included)

**New or Modified Products generated**

- Feasibility Study Report (to go to the project board)

## The Feasibility Study Report

The feasibility study report fully documents the work done during the first two phases of the feasibility study ( Preliminary study and Investigative Study ), showing all expected costs, benefits, and outcomes. The report summarizes the results of the planning effort and should give you recommendations telling how and when the new system should be implemented.

The whole point of producing this report is so that management can study and use the recommendations as the basis for decisions regarding the new system. There is no one set format for a feasibility study report. Basically, the standard laid down for this report requires the following sections -

- A discussion of the present system ( if one exists ! )
- A statement of the problems
- Discussion of communications needed
- Recommended solutions (i.e. a description of the proposed system(s))
- Cost/Benefit Analysis
- Outline of schedule of work and resources required

Most of the above information would be acquired by talking to the people involved in the current system, along with people indirectly involved say from other departments who provide input to the system, or require output from it. We can now look in more detail at exactly what needs to go into each of these sections.

### Section 1 - A discussion of the present system

In this section of the report, an analyst will need to describe the current operation of the existing system. The main input to this report will come from the findings in step 2 of the full investigative study, where you would have carried out a more thorough analysis of the existing situation.

### Section 2 - A statement of the problems

The second section of the feasibility report, a STATEMENT OF PROBLEMS , grows naturally

from the first part. Having analysed the existing system, the priority in this section of the feasibility study report is PROBLEM DEFINITION.

The main input to this report will come from the findings in step 3 of the full investigative study, where you would have prepared a more detailed statement of the problems with the existing system.

### Section 3 - A discussion of the communications needed

This section may not be applicable, but if the system is part of a network, (say spread over more than one site), then there needs to be a discussion of how the network is to be implemented along with a breakdown of the protocols and equipment to be employed and the costs involved in using them.

### Section 4 - recommended Solutions

In this section of the feasibility report , RECOMMENDED SOLUTIONS , the analyst will recommend a description of the proposed system, i.e. exactly how to, where to and why to if applicable, develop a data processing system to either support or replace an existing system problem.

In this part of the report the analyst will also incorporate in their recommendation of provision to be able to cope with future demand and growth of the system.

### Section 5 - Cost / Benefit Analysis

The main input to this report will come from the updated and reviewed findings of the work carried out in step 3 of the preliminary study where you carried out cost/benefit analysis.

In this section of the report, the analyst needs to give updated (if appropriate) estimated costs and a proposed schedule for the system development project.

Here costs would be listed under two sub-headings

- **The cost of setting up the system**
- **The cost of Operating the system**

The analyst would do this in some detail. estimating for setting up the system.

- **What systems analyst and programmer resources would be required along with their proposed cost.**
- **How much time on the computer would be needed for development and the cost thereof.**
- **What ( and how much ) additional equipment would be needed and the cost of it.**
- **What ( and how much ) additional software would be needed and the cost of it.**

For operating the system, the analyst would need to look into the following cost areas

- **The cost of actual computer time**
- **The costs of staff time for handling the system**

**Further Background - Cost / benefit Analysis**

Basically your role here is to estimate costs for developing and operating the system compared to the expected direct and indirect benefits. The results of this cost/benefit analysis determine whether or not the next phase (the investigative study) should be performed.

In order to assess accurately the costs and benefits of a system, you should document information about the structure of

- The present existing system
- The proposed projected existing system
- The organisation itself

You need to study the existing system and :

- Calculate the exact time elements involved in performing various actions
- Describe the output in quantitative terms such as minutes, hours , pounds , numbers of replaced parts, and so forth.
- Gather cost data for operating the existing system, defining its strengths and weaknesses in quantitative terms.

The improvements expected from a new system should also be stated in quantitative terms, once again

- Calculate the exact time elements involved in performing various actions in the improved system
- Describe the output in quantitative terms such as minutes, hours , pounds , numbers of replaced parts, and so forth in the improved system
- Gather cost data for operating the improved system defining its strengths and weaknesses in quantitative terms
- You will need to evaluate the costs and benefits that will result from the development of the new system. This would include the costs incurred in planning , developing, and implementing the system, for example. Remember that computers once implemented do not exist for free. They use electricity, they need servicing, they need repairing, usually by engineers/technicians who need to be paid. There needs to be a budget for the long term maintenance. This cost needs to be approximated in an attempt to determine if the long term costs of the system will be outweighed by the losses of not having the system ?

- Salaries of people involved in system development
- preparation of computer programs
- materials
- commissions to outside consultants or experts purchase, lease, and installation of new equipment
- training of personnel to operate new equipment.
- Conversion costs involved in changing over from the old system to the new system.

You will need to evaluate the costs and benefits that will result from the operation of the new system. This would include the costs incurred in operating the new or modified system, including, for example:

- salaries of people involved in operating the system
- forms and other consumables
- equipment maintenance and replacement
- updating employee skills

As an example to guide you, I have produced a preliminary cost assessment of a new system showing monthly & annual cost savings

	RATE	time/quant	Amount needed
<b>Labour costs</b>			
Systems programmer	17.40	12 hrs	208.80
Communications engineer	19.70	31 hrs	610.70
Systems Analyst	23.50	6.5 hrs	152.75
<b>Installation Costs</b>			
Install two circuits		260.00	2
520.00			
<b>Facilities alterations</b>			
			2200.00
<b>Material and supplies</b>			
(per month)	73.50	12 mnths	882.00
<b>Overhead and operating costs</b>			
12 mnths	4680.00	(per month)	390.00
<b>First Year Costs</b>			
			9254.25
<b>Second Year Costs</b>			
			5562.00

After you have carried out this investigation and quantified your answers, you should be able to draw up a Cost/Benefit Analysis ( an example of which is shown below).

<b>COSTS</b>	<b>BENEFITS</b>
* Temporary disruption of operations	* Lower operating costs
* New Forms	* Lower capital investment
* Supplies	* Lower maintenance costs
* New equipment	* Reduced salaries
* Employee training	* Less physical space needed
* Facilities alterations	* Fewer operators required
* Development time	* Faster turn-round time
* Preparation of computer programs	* Greater accuracy
* Consultant fees	* More comprehensive reports
* Conversion costs	* Improved morale

Other Points to note are that there are two kinds of benefit, Direct and Indirect.

Direct benefits include savings in costs and expenses (such as salaries, physical space, equipment, equipment operation, personnel training), improved output and service ( reduction in errors, faster turn-round time ), the ability to produce more comprehensive reports with more detailed interpretations more frequently.

Don't overlook also Indirect benefits which include increased morale, or a greater understanding of the organisational structure of a firm or system. Also a system successfully designed to solve a particular problem, may well be transportable with little or no modification to so solve similar problems in other departments.

To summarise - in preparing cost/benefit analysis you will be concerned with questions such as these:

- 1.) What will be the difference in cost and profit between the old and new systems ? Is a new system justified on the basis of cost alone ?
- 2.) Will a new system increase the firms output capability ?
- 3.) Will the cost of maintaining the new system be less than the old ? What will be the true savings in maintenance costs in both the long and short run ?
- 4.) What indirect benefits will result from the new system ? Will changing the elements of one system improve the operation of another system ?
- 5.) Will the new system be more reliable and dependable ? Are there reasonable expectations of less down time and fewer periods of inactivity from equipment breakdowns ? How can these changes be quantified ?
- 6.) What improvements in personnel attitudes will result ? Will the new system produce greater motivation, resulting in less absenteeism and greater productivity ?

**Section 6 - An Outline of Work & Resources Required**

The main input to this report will come from the findings in step 1 of the full investigative study, where you would have drawn up a schedule for installing the system

Here the analyst would need to propose a system project schedule. Naturally they will have consulted with the project board/steering committee and any management before drawing

up the schedule so that the availability of staff and other resources can be taken into account.

### Concluding the Feasibility Study

The four steps that follow which constitute this module describe the nature of the jobs which need to be undertaken in order to determine how a problem situation should be tackled. They do not give any indication of the amount of work involved as this is likely to vary considerably according to the scope of the project being considered as well as the extent of any preliminary studies.

This module is geared up to supporting the decision making in situations where Information System Development (ISD) is likely to prove beneficial. However the SSADM work is only one part of a full assessment being considered by the Project Board (sometimes incidentally known as a Computer Steering Group or Committee).

The Possibility of taking no action is likely to be an option, particularly as during the early stages not enough organisational support may have been generated to sponsor an IS project. Some people may simply not see sufficient need for a project; as the saying goes 'if it ain't broke don't fix it'. Alternatively there may be other non-IS options under consideration, such as structural change or personnel transfers.

### A Summary - The Feasibility Study

A feasibility study is a short assessment of the proposed information system to determine whether the system can effectively meet the specified business requirements of the organisation, and whether a business case exists for developing such a system. A feasibility study is recommended as a preliminary to a Full Study (Requirements Analysis, Requirements Specification and Logical System Specification) for all projects except those of low risk.

The current and required system environments are studied and documented only in sufficient detail to enable a Problem Definition Statement to be developed and agreed with the project board, and for Business System Options and Technical to be identified. The major inputs to a Feasibility Study are

- a) Management Authorization
- b) The Project Initiation Document
- c) Reference material relating to the Company

The major output products of the Feasibility Study Module are:

- a) The context diagram
- b) First draft of the Current Physical Level 1 DFD
- c) First draft of the Overview Logical Data Structure
- d) First draft of the Requirements Catalogue containing requirements definitions
- e) First draft of Dialogue Design
- f) First draft of any Business System Options
- g) First draft of any Technical System Options

The scope of the feasibility study activities will often extend beyond those supported by SSADM techniques and described in the activity descriptions. The SSADM techniques primarily assist the identification of information system requirements and the assessment of technical feasibility. The current and required system environments are studied and documented only in sufficient detail to enable a Problem Definition Statement to be developed and agreed with the project board, and for Business System Options and Technical System Options to be identified.

### Practical Class Activity

1.) There are three basic approaches to implementing your own system,

1. Build a system of your own
2. Buy an off the shelf package
3. Buy an off the shelf package and tailor it

Suggest as many advantages and disadvantages of each of these approaches as you can think of based on your experiences to date.