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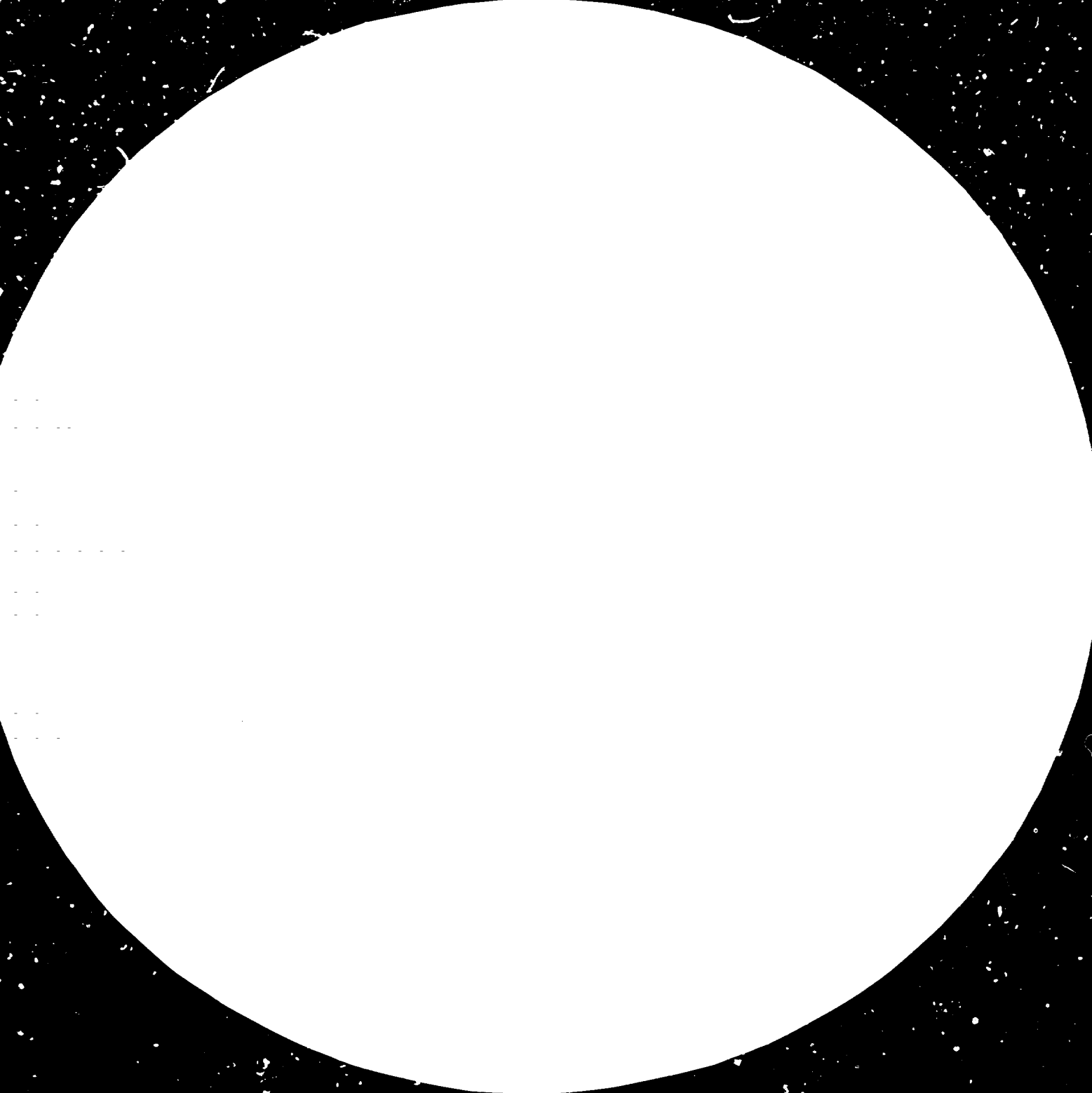
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Resolution Test Chart
Model No. 1017, Model No. 1018, Model No. 1019
Resolution Test Chart
Model No. 1020, Model No. 1021, Model No. 1022
Resolution Test Chart
Model No. 1023, Model No. 1024, Model No. 1025

10160

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GUIDELINES FOR THE PREPARATION OF
INDUSTRIAL FEASIBILITY STUDIES FOR CONSULTING FIRMS *

prepared by the
Feasibility Studies Section
Industrial Operations

5/8/80

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SCOPE OF CONTRACTING SERVICES

The consultant is expected to prepare the pre-feasibility (or feasibility) study in accordance with the UNIDO approach and methodology as embodied in the Manual for the Preparation of Industrial Feasibility Studies. These guidelines were written in order to explain the contents of such a study in more detail. Since UNIDO attempts to standardize its pre-investment work a complete computer programme is currently being developed in line with the Manual for the Preparation of Industrial Feasibility Studies. In order to ensure that the pre-feasibility (or feasibility) study is as comprehensive as possible, the consulting firm is requested to apply the schedules given in the Manual particularly those of Chapter X.

The Report will consist of 10 Chapters in line with Part two of the Manual, each providing in-depth analysis and information in the manner outlined below:

Chapter I

1. Executive Summary

The Executive summary should summarize all conclusions and recommendations covering all critical aspects of the study:

Project background and history (Chapter II)

State:

Name and address of project promoter
Project orientation: market or raw material oriented
Market orientation: domestic or export
Economic and industrial policies supporting the project
Project background

Market and plant capacity (Chapter III)

List annual data on:

Demand
Projected sales
Production programme
Plant capacity

Materials and inputs (Chapter IV)

Describe general availability of:

- Raw materials
- Auxiliary materials
- Factory supplies
- Utilities

List annual supply requirements of material inputs

Location and site (Chapter V)

Describe location and state plant site

Project engineering (Chapter VI)

Describe layout and scope of the project
State technology finally selected
Summarize equipment selected
Describe required civil engineering works

Plant organization and overhead costs (Chapter VII)

Outline the organization

Manpower (Chapter VIII)

State selected type and size of labour force
State selected type and size of staff

Implementation scheduling (Chapter IX)

Duration of plant erection and installation
Duration of production start-up and running-in period

Financial and economic evaluation (Chapter X)

Total investment costs:

List major investment data in local and foreign exchange, as needed,
for:

- Land and site preparation
- + civil engineering works
- + technology and equipment
- + pre-production capital costs
- + working capital
- = total investment costs

Project financing (assumed)

Sources of financing
Impact of cost of financing and debt servicing on project proposals
Public policy and regulations on financing
Financing institutions
Required financial statements
Financial ratios

Total production or manufacturing costs (at feasible normal capacity)

List annual data for

	Factory costs
+	administrative overheads
+	<u>sales and distribution costs</u>
=	operating costs
+	financial costs
+	<u>depreciation</u>
=	total production or manufacturing costs

Financial evaluation

Net present value
Internal rate of return
Pay-back period
Simple rate of return
Break-even analysis
Sensitivity analysis (detailed)

National economic evaluation

Appraise the project proposal from the national economic point of view

C o n c l u s i o n s

Major advantages of project
Major drawbacks of project
Chances of implementing the project

Chapter II

2. Project Background and History

The presentation of this chapter should be done in the following fashion:

P r o j e c t b a c k g r o u n d

Describe the project idea
List the major project parameters that serviced as the guiding

principles during the preparation of the study: product and product mix, plant capacity and location, market or raw material orientation of project, implementation schedule and others

Outline the economic, industrial, financial, social, and other related policies

Show different geographical levels, such as international, regional, national, areal and local

Highlight the economic, sectoral and subsectoral project coverage

Project promoter and/or initiator

Name(s) and address(es)

Financial possibilities

Role within the project

Other relevant information

Project history

Historical development of the project (dates of essential events in project history)

Studies and investigations already performed (title, author, completion date, ordering party)

Conclusions arrived at, and decisions taken, from these former studies and investigations for further use within this study

Feasibility study

Author, title

Ordering party

Cost of preparatory studies and

related investigations (provided that they

form part of the project's pre-production expenses, i.e. that they are to be borne by the project and not by third parties)

Pre-investment studies

Opportunity studies

Pre-feasibility studies

Feasibility study

Partial studies

Experts, consultant and engineering fees

Preparatory investigations, such as:

Land surveys

Quantity surveys (Quantification of building materials)

Quality (laboratory) tests

Other investigations and tests

Others

Chapter III

Market and Plant Capacity

Before the project is formulated, the size and composition of the present effective market demand, by segment, should be determined in order to estimate the possible degree of market penetration by a particular product. Also, the income from sales should be projected taking into account technology, plant capacity, production programme and marketing strategy. The latter has to be set up during the feasibility study giving due consideration to product pricing, promotional measures, distribution systems and costs.

Once the sales projections are available, a detailed production programme should be made showing the various production activities and their timing. The final step at this stage of a feasibility study is to determine the plant capacity taking into account alternative levels of production, investment outlay and sales revenues.

Demand and market study

Data and alternative projection methods

- List and describe data needed for the demand and market study
- List and describe possible alternative methods of data evaluation and determination of present and future demand
- Select a method of data evaluation and state reasons for selection
- Detail the methods of data evaluation and demand determination to be used for the project under consideration.

Determination of demand and market size for products (by-products)

Evaluate data and present final results showing:

- The size and composition of present effective demand (total and by segment)
- The demand projections for the market (total and by segment) for the lifetime of the project
- The estimated market penetration by products

Sales forecast and marketing of products and by-products

Data and alternatives

- Describe data required in addition to the results of the demand and market study
- Describe possible alternative sales and marketing programmes

- Selection of sales programmes and marketing strategy
- State reasons for selection of sales programme

- Detail the sales programme
- Presentation of the programme (descriptively, using tables, graphs and maps as appropriate to show development throughout the life of the project)

State reasons for selecting of marketing strategy

- Detail the marketing strategy
- Presentation of marketing strategy

Product pricing

Promotional efforts during the pre-production and production stages

Organizational set-up of distribution and sales

Commissions or discounts on sales

After-sales facilities and services

Estimate of sales revenues

Estimate annual sales revenues based on the sales programme and the marketing strategy

Estimate of sales and distribution costs

Estimate of sales costs

Estimate of distribution costs

P r o d u c t i o n p r o g r a m m e

Data and alternatives

Describe the data required to set up a production programme

Describe possible alternative production programmes

When preparing the production programme, keep in mind among other things:

- Anticipated sales
- Minimum storage requirements
- Expected wastage
- Parameters of plant capacity
- After-sales requirements
- Reserves due to operational reasons

Selection of production programme

State reasons for selection
Describe in detail the production programme
For each product (and by-product):

Quality specifications
Quantities produced annually
Time schedule of production (start-up,
trial runs, full capacity production)

For emissions such as:

Wastes and effluents (to be treated or not),
dust, fumes, noises etc.
Quality of emissions
Quantities of emissions
Time schedule
Means of treatment

Estimate costs of emissions disposal

Treatment (as far as not covered under equip-
ment and civil works)
Disposal in dumps and/or sewage system
Compensation payments to neighbours for damage
caused by emissions

Plant capacity

Data and alternatives

Describe data for the determination of plant
capacity (feasible normal as opposed to nominal
maximum capacity)
List possible alternatives on plant capacity

Determination of feasible normal plant capacity

Select and describe in detail the feasible
normal plant capacity
State reasons for selection
Describe nominal maximum capacity

The selection of the feasible normal plant
capacity should be based on:

- Parameters of the production
programme
- Parameters of minimum economic
equipment size

Plant capacity should be determined as feasible normal capacity for:

- The entire plant
- The main departments (semi-finished products)

Chapter IV

Materials and Inputs

There is a close relationship between the definition of input requirements and other project formulation stages, such as definition of plant capacity, location and selection of technology and equipment, as these inevitably interact with one another. The main basis for the selection of materials and inputs is the demand analysis and the production programme and plant capacity derived therefrom.

The following issues relating to material and input requirements should be covered in the feasibility study.

C h a r a c t e r i s t i c s o f m a t e r i a l s a n d i n p u t s

Materials and inputs should be classified into:

- Raw materials (unprocessed and semi-processed)
- Processed industrial materials (intermediates)
- Manufactures (sub-assemblies)
- Auxiliary materials
- Factory supplies
- Utilities

Data and alternative

- Describe data for the selection of materials and inputs
- List all required materials and inputs and show alternatives

Selection and description of materials and inputs

- Select and describe in detail the chosen materials and inputs
- State reasons for selection
- Describe materials and inputs, stating

- Qualitative properties
- Quantities available
- Sources, supplies
- Availability (schedule)
- Unit costs

S u p p l y p r o g r a m m e

Fundamental data and alternatives

Describe fundamental data for the preparation of the supply programme

Prepare supply programme, show alternatives

When setting up the supply programme, consider the:

- Production programme
- Availability of supplies
- Characteristics of supplies
- Technology and equipment
- Losses of raw material inputs due to transport and storage
- Losses of semi-finished and finished products due to processing, distribution and storage
- Replacements due to warranty services
- Local conditions

Selection of the supply programme

Select and describe in detail the optimum supply programme

State reasons for selection

Describe supply programme, stating for each input:

- Quantitative supply programme
- Sources of supply
- Time delivery (schedule)
- Storage measures and capacities (if necessary)

Cost estimate

Estimate annual costs of materials and inputs:

- Raw materials
- Processed industrial materials
- Manufactures
- Auxiliary materials
- Factory supplies
- Utilities

Chapter V

Location and Site

A feasibility study has to define the location and site suitable for the industrial project under consideration. The choice of location should be made from a fairly wide geographical area within which several alternative sites may have to be considered. Once the site has been selected, the impact on the environment of erecting and operating the industrial plant has to be studied.

L o c a t i o n

Data and alternatives

Describe the fundamental data and requirements on the locations for plant operation

List possible locations, describe and show them on maps of appropriate scale

Choice of location

Select and describe in detail the chosen optimum location

State reasons for selection

Describe location, state:

Country
Geographical location
District
Town

For the choice of location, the following aspects, among others, should be taken into consideration:

Public policies
Material versus market orientation
Local conditions: infrastructure and socio-economic environment

S i t e

Data and alternatives

Describe fundamental data and requirements on site for plant erection and operation

List possible site alternatives, describe and show them on maps of appropriate scale

Site selection

Select and describe in detail the chosen optimum site

State reasons for selection

Describe site, state:

Location (town, street, number etc.)
Geographical and geodetical conditions
Use maps of appropriate scale, showing:
Orientation
Boundaries
Neighbours
Contour lines
Roads and other traffic connections
Utility connections, next point of tie-in
Existing obstacles and structures
Underground conditions
Existing rights of way, easements, etc.

For selection of the plant site, the following aspects, among others, should be taken into consideration:

Cost of land
Local conditions: infrastructure and socio-economic environment
Public policies versus private interests
Site preparation and development
Site properties and conditions

Cost estimate

Investment cost, such as:

Land
Taxes
Legal expenses
Payments to neighbours
Rights of way (one time payments)

Production cost, such as annual payments for:

Right of way
Easements
Rents

Local conditions

List and describe local conditions

Climate
Site and terrain
Transport facilities
Water supply
Power supply
Waste disposal
Manpower
Fiscal and legal regulations
Construction, erection and maintenance facilities
Living conditions

Environmental impacts

Describe environmental impacts to be expected because of erection and operation of plant on

Population (increase of employment etc.)
Infrastructure (development of traffic network, public utilities etc.)
Ecology (water, air, soil, plants, animals etc.)
Landscape

Chapter VI

Project Engineering

The scope of the project should not only cover the plant site but all other activities required to supply inputs, deliver outputs and provide ancillary infrastructure investments. This comprehensive approach should help to determine which investments have to be undertaken by the investor or any third party. Functional and physical layouts serve as a basis for defining the scope of the project and the subsequent engineering work.

Once the entire extension of the project is understood, the appropriate technological processes to be employed, the type and extent of machinery and equipment required, and the cost of technology and equipment involved should be determined on the basis of the identified plant capacity.

Next, the various structures and civil works, such as factory buildings, auxiliary structures and plant infrastructure facilities, have to be defined and the relevant cost estimates be prepared.

Project layouts

Data and alternatives

State the data required for the preparation of project layouts, such as:

Production programme
Supply programme
Technology
Equipment
Civil works
Local conditions

Prepare and describe alternative project layouts if deemed necessary

Selection of layouts

Select and describe in detail optimum layouts, state the reasons for

the selection, show the selected layouts by appropriate drawings

Scope of project

Data and alternatives

State the data required to define the scope of the project
Prepare and describe alternatives

Selection of the scope of the project

Select and describe in detail the optimum scope of the project
State reasons for the selection
Use physical layout drawings to show the scope of the project
and project components
Number and list the project components required to serve as
bases for further engineering and cost estimates

Technology (ies)

Data and alternatives

State the data required for the technologies to be used
Describe alternative technologies

Selection of technology

Select and describe in detail the optimum technologies
When selecting the technologies the following aspects
should be considered:

The nature of the technologies required (e.g. labour
versus capital intensity, non-obsolescence)
Sources
Means of acquisition: licensing; purchase, joint venture
Cost

State the reasons for the selection
Describe the selected technology, stating the type, source, specification

Cost estimate

Investment costs
Lump sum payments

Production cost

Royalties
Fixed annual payments

E q u i p m e n t

Equipment should be classified into production, auxiliary, service equipment, spare parts and tools.

Data and alternatives

State the data for equipment engineering
List the necessary equipment and alternative

Selection of equipment

Select and describe in detail optimum equipment
State reasons for the selection
Describe selected equipment, stating number, type, specification, capacity, source

Cost estimate

Estimate the cost of equipment
Investment
Production
Auxiliary
Service
Primary stock of spare parts, wear and tear parts and tools.

C i v i l e n g i n e e r i n g w o r k s

Civil engineering works should be classified into site preparation, and development, buildings and special civil works, and outdoor works (auxiliary and service facilities).

Data and alternatives

Describe data for civil engineering
List civil engineering works and possible alternatives
Physical plant layout
Availability and quality of construction material, plant and manpower
Technical requirements of plant operation
Local conditions
Cost

Selection of civil engineering works

Select and describe in detail optimum civil works
State reasons for selection
Describe selected civil works, stating number, type, specification (if applicable)

Cost estimate

Estimate the cost of civil engineering works:

Investment costs
Site preparation and development
Buildings and special civil works
Outdoor works

Chapter VII

Plant Organization and Overhead Costs

Project engineering and organizational planning are closely related and should therefore be undertaken jointly in a series of feedback operations. Organizational planning will enable the calculation of overhead costs which in some projects can be decisive to their profitability. A feasible division of the plant into components (production, service and administrative cost centres) is imperative for a realistic assessment of overhead costs.

C o s t c e n t r e s

Data and alternatives

State data to set up cost centres, such as

Engineering layouts
Production programme and capacity
Types of cost centres (production, services,
administrative)

Prepare alternatives

Selection of cost centres

Select and describe in detail the composition of cost centres
State reasons for selection
Show selected cost centres

O v e r h e a d c o s t s

Data and alternatives

State data: list of cost items and differentiation between
factory and administrative overheads, depreciation and
financial costs
List alternative arrangements

Selection of cost items and their grouping as overheads

Select and describe in detail composition of overhead cost items
State reasons for selection

Chapter VIII

Manpower

Personnel required for the project under consideration at various

levels of management; production and other related activities should be assessed together with the requirements of training at various levels and during different stages of the project.

Labour

Data and alternatives

Describe data required for the determination of labour inputs
Prepare alternative manning table, considering the:

- Organizational layout
- Strategies and objectives of management for operating the factory
- Skill requirements and level of training of labour
- Availability of labour, local/foreign

Selection of labour

Select and describe in detail the manning table for labour
State reasons for selection
Describe in detail the selected alternative

- Show the structure (organization)
- Prepare detailed manning table considering the subdivision into production labour and non-production labour (e.g. administration)

Cost estimate

Estimate annual labour cost at nominal feasible capacity, subdivided into

- Cost of production labour (variable)
- Cost of non-production labour (fixed)

Staff

Data and alternatives

Describe data required for the determination of staff inputs
Prepare alternative manning table, considering:

- Organizational layout
- Strategies and objectives of management for administering and operating the factory, marketing the products etc.
- Skill requirements and level of training of staff
- Availability of staff, local/foreign

Selection of staff

Select and describe in detail the manning table for staff
State reasons for selection
Describe in detail the selected alternative

Show structure (organization)
Prepare detailed manning table

Cost estimate

Estimate annual cost of local and foreign staff

Chapter IX

Implementation Scheduling (Capital expenditure planning for financing)

The project implementation phase embraces the period from the decision to invest to the start of commercial production. It includes a number of stages, including negotiation and contracting, project design, construction and start-up. If not planned properly, this phase may extend over enough time to endanger the potential profitability of the project. The primary objective of implementation planning is therefore to determine the financial implications of the implementation phase with a view to securing sufficient finance to float the project until and beyond the start of production. The choice of financing (equity or loan), as well as the financial implications of investment delays should receive particular attention.

During the implementation phase a series of simultaneous and interacting investment activities take place with different financial implications. To measure them, an optimum implementation programme and time schedule should be prepared and shown in the feasibility study.

Data and activities

State fundamental data for project implementation
Elaborate implementation programme and time schedule and show alternatives, considering:

Establishment of project implementation management
Arrangements for technology supply
Detailed engineering of equipment, tendering, evaluation of bids, awards of contracts
Detailed planning of civil works, tendering, evaluation of bids, awards of contracts
Arrangements for financing

Construction period:

Purchase of land
Supervision, co-ordination, testing and take over
of equipment and civil works

Build-up of administration, recruitment and training of staff and
labour

Arrangements for supplies

Arrangements for marketing

Establishment of contacts with public authorities for timely
approval of licences, contracts etc.

Preliminary and capital issue expenses

Selection of project implementation
programme and time schedule

Select and describe in detail the optimum implementation programme and
time schedule, list activities and show their sequence in bar diagrams
and/or networks

State reasons for selection

Cost estimate of project implementation

Investment (land, technology, civil works, plant and equipment) and pro-
duction costs (material and labour inputs and overhead costs) are explained
and estimated in the preceding chapters. All cost components are collected
in the following chapter with the objective of determining their timing;
this will be based on the implementation schedule decided upon in the present
chapter. For activities that occur during the investment phase up to the
moment when the project becomes operational, cost estimates have to be made
for the activities mentioned under "Data and activities" above.

Chapter X

Financial Evaluation

Preparation of feasibility study should be geared towards the requirements
of financial and economic evaluation. Once all the elements of a feasibility
study are prepared in accordance with the approach outlined in the previous
chapters the next step is to compute the total investment costs and annual
production costs. Taking the above mentioned into consideration, this chapter
should be prepared in the following manner:

Total investment costs

Calculate the total investment costs by summarizing all investment components as described in chapters II, III, IV, V, VI and IX.

Project financing

Describe and justify assumed or actual sources of finance
Prepare cash-flow table for financial planning
Estimate annual financial costs

Total production costs

Calculate total production costs by summarizing all cost items as described in chapters III - IX. Use data from chapter VII to collect all overhead costs and incorporate them into separate schedule to summarize total production costs. Estimate the production costs on an annual basis in accordance with the assumed capacity utilization during the initial years of operations.
Estimate unit costs.

Financial evaluation

Compute commercial profitability criteria

Pay-back period
Simple rate of return
Net present value
Internal rate of return
Break-even analysis (expressed in terms of sales revenues, physical units produced and capacity utilization)
Sensitivity analysis (impact of changes in the unit sales price, variable and fixed production costs on the break-even point)

