ARBA MINCH UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING AND FINANCE

PROJECT ANALYSIS AND EVALUATION (*AcFn 4262*)

Module

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January, 2020

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Preface

Well come to this course dear reader! This module is aimed to help students to understand the basics of project analysis and evaluation. The completion of reading this module expected to help the readers to assist what project is and how a successful project can be identified through its feasibility study and implemented. The module classified in seven chapters that includes; introduction to project, project cycle, project identification, project feasibility study, financial feasibility, economic feasibility and implementation chapters. Therefore, after successfully completing this course students will be able to understand:

- The general introduction project meaning
  - The complete cycle of project implementation
  - How project idea can be generated
- How a viable project can be evaluated
- How project can be successfully implemented

Contents

CHAPTER ONE

OVERVIEW OF PROJECT

Dear reader! What is project? Do you think your degree program of studying Accounting and Finance is a project? Do you think that there is difference between operational work and project activities?

In this course you will learn about what is project in general and its' difference from operational work.

After successful accomplishment of this chapter the student is able to know

What does mean project

What is the difference between project, program and operation Concepts and basis of classifying the project

Features or characteristics of the project

The relationship between plan and project

The role of project manager and what look like project environment

1. Introduction

Projects exist in every sphere of business, markets, and industry. They come in a myriad of types, sizes and complexity – from; small initiatives such as weddings, parties, fundraising to, medium-size initiatives such as advertising campaigns, capital acquisitions, business reengineering, restructuring, information systems; through to, mega-projects such as the Channel Tunnel, NASA space station, hydro-electric dams and military campaigns. Project helps to enhance economic development and widening of series business activities and improve quality of life.

Particularly for developing countries like Ethiopia we need both small and large project for tackling the economic challenges and improve the overall living standards like Ethiopian Great Renaissance Dam and others.

1.1. Definition of Project

"A Project is a temporary endeavor undertaken to create a unique product or service" (PMBOK®Guide, 2000). A project is a series of activities aimed at achieving specified objectives within a defined time period and with a defined budget (EU, 2002). Project is a temporary endeavor involving a connected sequence of activities and a range of resources, which is designed to achieve a specific and unique outcome, which operates within time, scope, cost and quality constraints and which is often used to introduce change. It is very difficult to find a single comprehensive definition of project b/c projects are d/t in terms of their nature and objectives.

According to Gittinger (1982), a project is defined as a complex set of activities where resources are used in expectation of returns and that lead itself to planning, financing, and Implementation as a separate unit. Gittinger explains more as: A project usually has: a specific starting point and a specific ending point, intending to achieve specific objectives. A well-defined sequence of investment and production activities and a specific group of beneficiaries that can be identified, quantified, and valued, either socially or monetarily. Project- is a non-repetitive activity that is goal oriented, that has a particular set of constraints, the output of which is measurable, and that changes something when carried out.

Key concepts

Purpose: the basic reason for the existence of a project to solve a problem, address a need or take the advantage of opportunity.

Temporary: means that a project is something that has a specific start date and a specific end date. Projects are of a transient nature, with a defined beginning and end. The end is reached when the project's objectives have been achieved and effectively handed over to the business.

Sequences of Activities: the works and the steps we perform and the methods and knowledge we use to achieve the project objective.

Unique Outcome: The product or service is different in some distinguishing way from all other products or services within an organization. Projects are a means to respond to those requests that cannot be addressed within the organization's normal operational limits. Identifying and focusing on uniqueness is important to project management. It helps identify new organization risk areas, enabling management to develop and implement timely risk management strategies.

Resources: A project utilizes a variety of resources [human, financial, material, information, etc] to carry out the activities or tasks.

Scope: the extent of the problem or opportunity that the project needs to address.

Organization: is vital to coordinate resources to achieve the project objectives-organizations can be public, private or NGOs.

Time: any project should be time bounded-it has a start and end time

Cost: activities consume human, financial and material resources.

Quality: the project needs to produce quality products to maximize the satisfaction of the users.

Introduce change: A project is often used as an instrument for change - change for the betterment of the society.

Activity 1.1

Project can be define in deferent ways, clearly discuss and give justification what is the reason that different definition will be given for the word project?

What does mean project is temporary endeavor?

1.2. Common Characteristics of Projects

Though project can be defined in various ways and they differ in many respects, the following are common features of projects. These are:

Project involves the investment of scarce resources in expectation of future benefits,

Project is an activity that is capable of being planned, financed and implemented as a unit,

Project has a defined set of objectives and specific start and end dates, Project has geographical or organizational boundaries.

It is an activity around which conceptual boundaries can be ascribed,

A project can be seen as an activity which is likely to have a partially or wholly independent administration.

Activity1.2

Write and discuss at least five common characteristics of project?

Explain that projects are cutting age of development?

How does scope differentiate projects from program?

1.3. Classification of Projects

Projects can be classified based on several criteria, including: ownership, sources of finance, and forces behind the projects.

Based on Ownership:

Private sector- mostly projects undertaken by business enterprise.

Public sector- projects undertaken by national and local government body.

NGO's – development projects are most often undertaken by non-government and not for profit organizations

Based on the Sources of Finances:

Government treasury- projects may be entirely financed by government budget as per its priority. For instance, construction of regional airport.

Government treasury and external sources- most projects are financed by the joint partnership of the government and donor groups. For example, a road project may be financed 50% by government and 50% by foreign donors.

External Sources of Finance- Projects may be financed totally by parties other than the government but established for the wellbeing of the citizens and the ownership may be for the government or the public.

Based on the Forces Behind;

Demand driven/need driven- based on identified unsatisfied demand project can be created or on unsatisfied basic needs like food, water and shelter.

Donor Driven- the force behind the financing organization. Donors will have their own say and influence the types of projects to be established.

Political Driven- Projects may be established in response to some political situation such as for example because of National Elections, projects by religious organizations, etc.

Based on their Nature:

Civil engineering, Construction, petrochemical, mining, quarrying projects- projects far away from the contractors' home office, and involve especial risk as well as problems organizational communication.

Manufacturing projects- conducted in a factory or other home based environment and enable exercising on the spot management.

Research Projects- established for pure research consuming large sum of money and lasting over years resulting in dramatic profitable discovery or proving waste of money.

Management projects- projects that require the employment of an external project manager or managing contractor for issues such as relocating head quarters, developing and introducing a new computer system, preparing for a trade exhibition, producing a feasibility or other study report, restructuri9ng the organization, etc.

Projects can also be differentiated by the following:

Long-term Vs short term projects

Regional, national, international projects

Agricultural Vs industrial projects.

Capital, labor or energy intensive projects.

Activity 1.3

Discuss project classification based on force, time, resource, ownership and source of finance?

1.4. Project Management

Project management can be defined as the set of concepts involved in the realization of goals through efficient, effective, transparent and responsible administration of a given set of activities, with associated accountability for the outcomes in the process, so as to meet basic objectives and enhance the satisfaction of stakeholders. In this process, all stakeholders should be consulted in matters affecting a project to ensure co-ordination in project activities.

Project, Plan and Program

There are some degree of relationships between projects, plans and programs. There are also significant differences. Their hierarchical relationship is given based on the chart (Exhibit 1.1).

Development Goal/Objectives

A development goal or objective is a statement of intension or aspiration of a government to improve living conditions of its people – Vision of the government. For example, growth, equity in income distribution, reduction of unemployment. It is a comprehensive statement which guides development. It determines the environment or framework within which development is expected to take place.

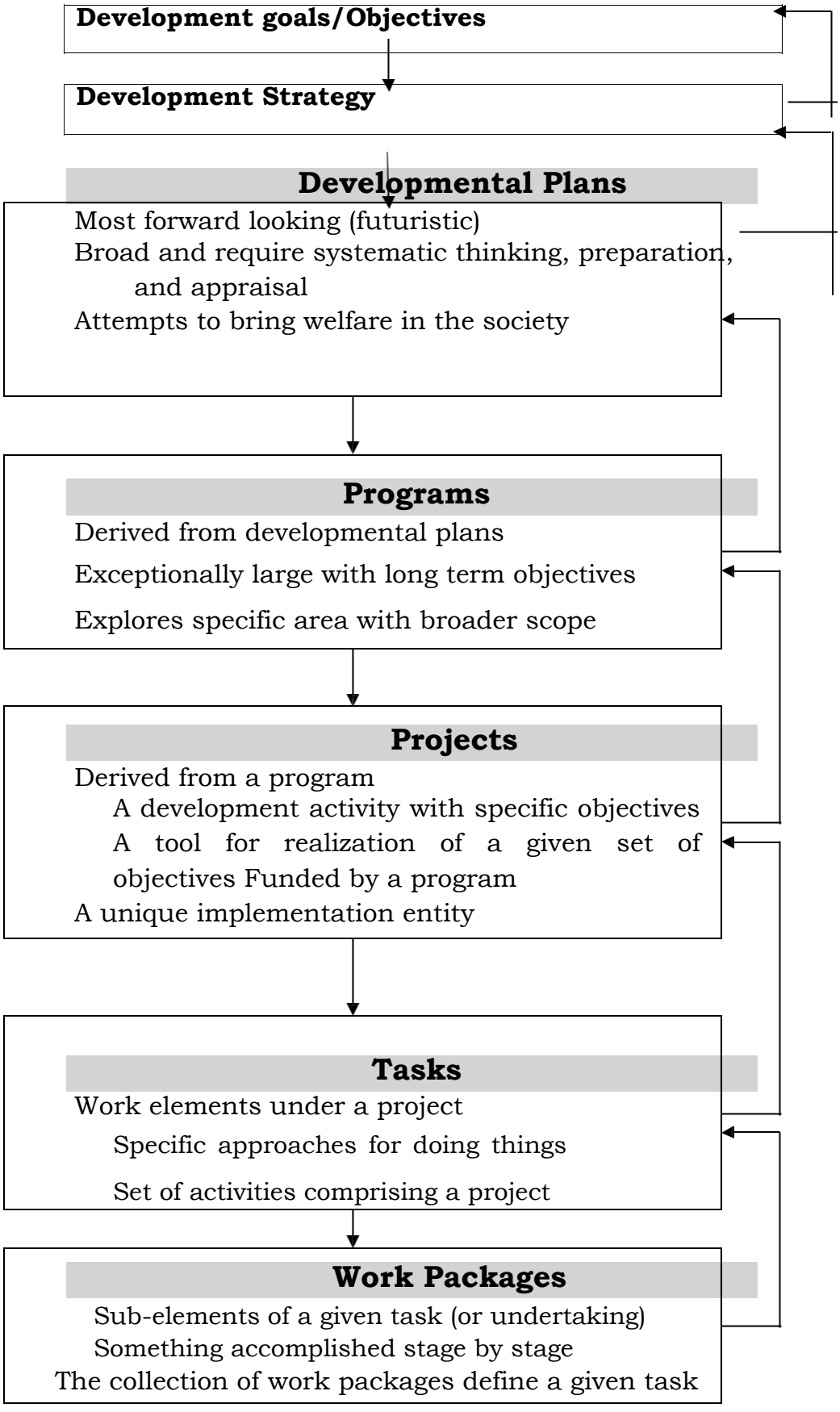

Development goals/Objectives
Development Strategy
Developmental Plans
Most forward looking (futuristic)
Broad and require systematic thinking, preparation, and appraisal
Attempts to bring welfare in the society
Programs
Derived from developmental plans
Exceptionally large with long term objectives
Explores specific area with broader scope
Projects
Derived from a program
A development activity with specific objectives
A tool for realization of a given set of objectives Funded by a program
A unique implementation entity
Tasks
Work elements under a project
Specific approaches for doing things
Set of activities comprising a project
Work Packages
Sub-elements of a given task (or undertaking)
Something accomplished stage by stage
The collection of work packages define a given task

Exhibit 1.1 Hierarchical Relationships

Development Strategy

A strategy is defined in various ways by different authors. But in general it refers to the general methods of achieving specific objectives at national or organizational levels.

It mainly describes the essential resources which will be committed to achieve objectives. It also explains how these resources will be organized. Example, it may ask how to organize the labor force of organization or the object. It can take different forms such as import substitute, export promotion, ADLI, etc.

Development strategy is likely to involve:

Establishment of sector goals- for example, what is the goal of agriculture sector in the next 5 years, 10 years; the industry sector in the coming 10 years.

Defining of the means to achieve the sector goals.

Determining of the feasibility of achieving the stated goals from the political, technical, organizational and resource point of view.

Preliminary assessment of costs and benefits of goals and objectives.

Setting priorities- which sub-sector should be provided more attention in each sector.

Plans and Projects

Planning can be defined as a ***"continuous process that involves decisions or choices about alternative ways of using available resources with the aim of attaining a particular goal or set of goals at some time in the future."***

Planning serves as a tool for enhancing the effectiveness in mobilizing resources and as well enables allocation of resources into priority areas of development.

In this regard, development planning can be regarded as an attempt to raise the rationality of decision- making.

Plans are designed as a means to accomplish development strategies; National Plan should identify priority areas and set a specific objective. The specific

objective can be achieved through various means (fiscal policies and development projects).

As it can be observed from Exhibit 1.2, the essence of development planning is futuristic, i.e., it is most forward looking and involves systematic thought and preparation.

Virtually, every nation, be it developed or developing, should have a systematically elaborated national plan to hasten economic growth and further a range of social objectives.

In this regard, we can explain the relationships between development plans and projects as follows:

Projects provide an important means by which investment and other development expenditures foreseen in plans can be clarified and realized.

Sound development plans require good projects, just as good projects require sound planning.

The two are interdependent.

A sound plan requires a great deal of knowledge about existing and potential projects.

Sound planning rests on the availability of a wide range of information about existing and potential investments and their likely effects on growth and other national objectives.

It is project analysis that provides this information, and the projects selected for implementation become the vehicles for using resources.

Thus, plans require projects. Realistic planning involves knowing the amount that can be spent on development activities each year and the resources that will be required for particular kind of project

Since projects commit scare resources, project selection is meaningful only when it is placed within a broader development

framework.

This framework could be medium or long-term development plans and policy statements issued by the government.

The best economic appraisal of projects cannot be made without referring to such plans and policies.

Effective project preparation and analysis must be set in the framework of a broader development plan.

Projects are part of an overall development strategy and a broader planning process.

Governments must allocate their available financial and administrative resources among many sectors and many competing programs.

Project analysis can help improve this allocation.

Within the broad strategy, planners have to identify potential projects that address the policy of production targets and priorities.

The more elaborated the plans and policies of the governments are, the easier becomes the work of the project planner.

For example, the project planner will have to refer to such plans and policies to see whether the project being considered fits well in the plan and contributes most to the fundamental objectives of the government.

These objectives can include self-sustaining growth, promotion of employment, income distribution, etc.

National plans and elaborated sectoral programs are of great help in identifying development projects.

A realistic plan should be prepared by assessing the development potentials in the various sections of the economy.

It is, therefore, obvious that the successful formulation and implementation of a national development plan

depends on the proper selection of projects and the associated sectoral programs.

Thus, project formulation and evaluation, being a continuous and integrated process, is one of the basic components of economic planning.

In order to ensure realistic planning, an iterative process with a sufficient flow of information, suggestion, and guidance between decision makers at the macro levels are essential.

As projects rightly called the ***"Cutting Edge" of development***, they are powerful means to achieve the development objectives; they are the crucial building blocks of a development structure.

Projects aim mainly at increasing the production of goods and services, which are fundamental components of people's welfare, and the main objective of any development effort is, of course, to advance social well- being.

Projects and Programs

It is necessary to distinguish and/or understand the difference between projects and programs because there is sometimes a tendency to use them interchangeably.

- *A project, in this regard, refers to an investment activity where resources are used to create capital assets that produce benefits over time, having a beginning and an end, and specific objectives pursued;*
- *Whereas a program is an on-going development effort or plan. A program is, therefore, a wider concept than a project.*

A program may include one or several projects at various times whose specific objectives are linked to the achievement of higher level of common objectives.

***For instance**, a health program may include*

A water project as well as construction of a health center;

Both are aimed at improving the health of a given community that previously lacked easy access to these essential facilities.

Projects that are not linked with others to form a program, however, are sometimes referred to as "***Stand-Alone" projects.***

Said differently, a **program** is a definite plan or scheme of any sequence of operations aimed at the attainment of the planned objectives.

This explanation, however, assumes that a program is a plan of activities with general objectives that would be derived from the development plan.

In general, programs and projects have got their own differences and similarities. For purpose of clarity, it is important to outline the major differences and similarities between the two concepts.

In this regard, the following table depicts, comparatively the differences between projects and programs.

Differences

Projects Have:	***Programs Have:***
Specific objectives	General objectives/wide/diverse
Specific projects area (location)	No specific area (location)/diffused
Specific beneficiaries group	No specific beneficiaries group
Clearly determined and allocated funds	No clear and detailed financial resource allocation
Specific lifetime	No specific lifetime

Similarities

Projects and programs have similar characteristics in that both are:

Having objectives;

Requiring financial, human, material, and other inputs (or resources) Generating outputs of value (i.e. goods/services);

Serving as instruments for the execution of development plans and attain national goals.

Activity 1.4

What are different types of project plans in Ethiopia?

What is the effect of plan on project?

How plan achieve project objective?

1.5. Project Environment

All projects are planned and implemented in a social, economic, environmental, political and international context.

Cultural and Social Environment is that how a project affects the people and how they affect the project. This requires understanding of economic, demographic, ethical, ethnic, religious and cultural sensitivity issues.

- ***International and Political Environment*** refers to the knowledge of international, national, regional or local laws and customs, time zone differences, teleconferencing facilities, level of use of technology, national holidays, travel means and logistic requirements.
- ***Physical Environment*** is the knowledge about local ecology and physical geography that could affect the project, or be affected by the project.

1.6. Project Manager

Who is a Project Manager?

A project manager is a professional in the field of project management. They have the responsibility of the planning and execution of any project. A project manager's central duty is to ensure the success of a project by minimizing risk

throughout the lifetime of the project. This is done through a variety of methods, both formal and informal. A project manager usually has to ask penetrating questions, detect unstated assumptions, and resolve interpersonal conflicts, as well as use more systematic management skills.

In whatever field, a successful project manager must be able to envisage the entire project from start to finish and should have the ability to ensure that this vision is realized.

1.7. Project Planning

To be effective, the project planning should be approached systematically. Some activities to be done and questions that need to be asked at planning stage of a project may include the following:

Situational analysis- is identification of the current situations and assessing the factors that leads to current position. This involves answering questions such as:

Where are we now?

How we reached to this point?

Why and how we reached to the current position?

Is this where we want to be?

Setting Objective- This involves answering questions such as **Where should we find ourselves in 5 to 10 years from now?**

Identification of alternatives and strategies- How can we reach to the place that we want to go in the indicated time limit?

Identification of strengths, weakness, opportunities and threats- what might prevent us from getting there and what might help us to get there? (SWOT analysis).

Action plans and implementation- What do we need to do, where do we need to do it, how will we do it and who will do it?

Monitoring and evaluation- What do we need to do to be on course, can we do it, and how do we know when we have arrived?

Budgeting- Involves quantification of the costs involved.

1.8. Why projects are Undertaken?

The principal purposes or goals of undertaking projects depend on the nature of the project:

Development Project (usually undertaken by government or NGOs) – May have the following objectives:

- Projects are very powerful and efficient means to achieve development or growth. They are said to be cutting edge of development.
- They are mechanisms for improving income distribution. For example, implementing a project that enhance the income of the poor people or that benefit the majority poor.
- They are mechanisms to solve immediate problems. For example, implementing a project to solve specific problem in the society such as projects to eradicate malaria such as Anti-Malaria Association, projects to prevent the spreading of HIV/AIDS such as Tesfa Goh Ethiopia, project to eliminate poverty.

Project undertaken by Business Organizations- have a primary objective of maximizing the wealth of current shareholders. Other objectives may include maximization of profit, maximization of earning per share or maximization of return on equity. They will also have indirect objectives of creating employment opportunities, and other social benefits.

Five constraints (parameters) operate on every project:

Scope Cost Quality Time

Resources

These constraints are an interdependent set. Which means Change in one can cause a change in another constraint to restore the equilibrium of the project.

Activity 1.5

1. What type of skill will be needed for managing a huge project?
2. What are the possible challenges while operating the project, discuss each constraints?

1.9. Projects vs. Operational Work

Organizations perform work to achieve a set of objectives. Generally, work can be categorized as either projects or operations, although the two sometimes overlap. They share many of the following characteristics:

Performed by people

Constrained by limited resources

Planned, executed, and controlled.

Projects and operations differ primarily in that operations are ongoing and repetitive, while projects are temporary and unique. The objectives of projects and operations are fundamentally different. The purpose of a project is to attain its objective and then terminate. Conversely, the objective of an ongoing operation is to sustain the business. Projects are different because the project concludes when its specific objectives have been attained, while operations adopt a new set of objectives and the work continues.

Projects are undertaken at all levels of the organization and they can involve a single person or many thousands. Their duration ranges from a few weeks to several years. Projects can involve one or many organizational units, such as joint ventures and partnerships.

The difference and common feature that characterizes both operation works and project works can be summarized as follows by using the figure 1.1 below:

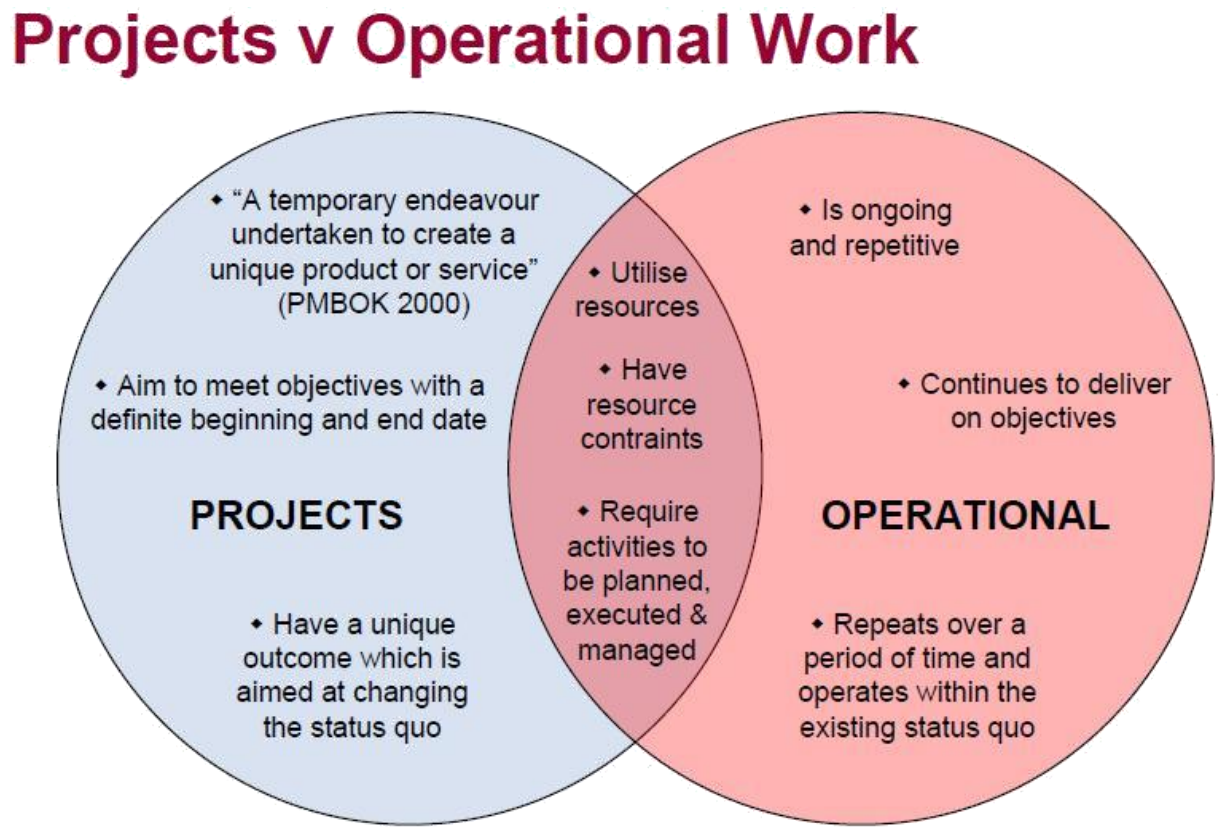
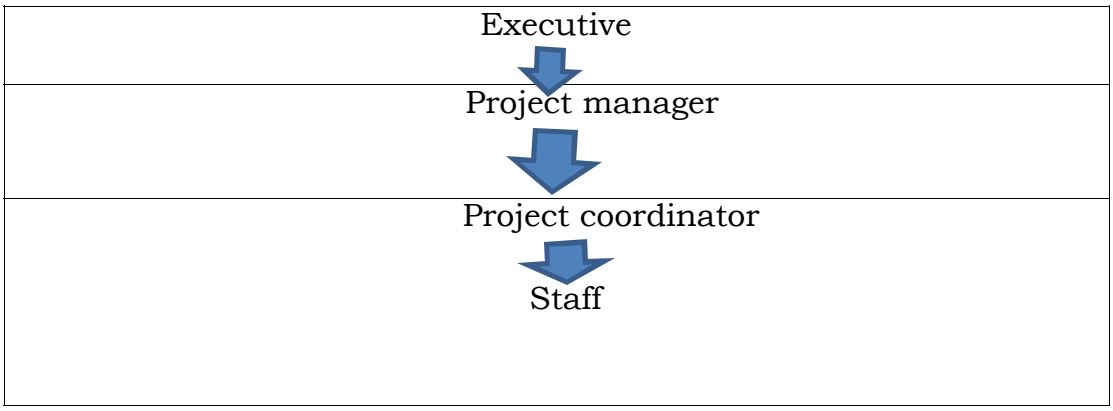


Figure 1.1: Differences and common features of operational and project works

1.10. Project Organization Structure

A project organization structure is a structure that facilitates the coordination and implementation of project activities. Its main reason is to create an environment that fosters instruction among the team members with a minimum amount of disruption, overlaps and conflict. Three basic types of organizational structure, Functional organization structure, Project based organizational structure And Matrix organizational structure.

Generally a very organization must have a well-defined organizational structure in order to work efficiently and achieve its goals with fewer risks and obstacles. In modern market organization must be very competitive, efficient, and dynamic in order to survive and grow.



Advantages of having an effective organizational structure

A project organizational structure is a framework that helps an organization effectively manages its operations and achieves its goal with minimal effort. This structure defines the relationship between the various departments and teams of the organization. Moreover it helps organizations to delegate authority, power, and responsibility.

Project organizational structure how the employee relate their superiors or to the project manager therefore it becomes something strategic for coordination and cooperation with in the group members. The main advantage of having an effective organizational structure is the reduction of fraction and discussion among the employees since the roles, responsibilities and reporting structure are very clear.

1.11. Management-By Project

Management by project is a set of activities including planning, decision making, organization and leadership. Managing people and controlling is used in the intention of achieving the objectives of various projects in an efficient and effective manner.

Activity 1.6

What is the need for developing organization project structure and how to facilitate the project work?

What is the significant/importance/ of organization structure?

How management activity will be controlled by project itself, discuss?

What are the possible characteristics of effective organization structure?

Summary

Projects exist in every sphere of business, markets, and industry.

Project helps to enhance economic development and widening of series business activities and improve quality of life.

Project involves the investment of scarce resources in expectation of future benefits

A project is a complex set of investment activities where resources are used in expectation of returns; and which lends itself to financial planning and implementing as a unit. Moreover, a project as an investment activity passes through a number of capital budgeting processes. The general view for the project development process is mainly to include planning, analysis, selection, financing, implementation, and review components.

A project organization structure is a structure that facilitates the coordination and implementation of project activities.

Five constraints operate on every project are, scope, quality, cost, time and resource.

Projects and operations differ primarily in that operations are ongoing and repetitive, while projects are temporary and unique.

Review Questions

PART I: True or False

WRITE "TRUE" IF THESTATMENT IS CORRECT OR "FLASE" IF THE STATEMENT IS INCORRECT.

The nature of project is non- repetitive.

All individuals can manage large project in different areas.

The works and the steps we perform and the methods and knowledge we use to achieve the project objective is clearly explains scope of project rather than project activities.

A short period project has been limited by time but not large project.

National Plan is long term plan which aims to altimetry reaching on their objective.

PART TWO: CHOOSE THE BEST ANSWER FROM THEIR ALTERNATIVES

Which one is not basis for classifying the project?

Based on Ownership

Based on source of finance

Based on their nature

Based on force behind

None

Which one of the following is true about project except

Project is temporary end over

Project have their on time limit

Project has continuous in nature

All

Of the following is not the characteristics of project.

Project involves the investment of scarce resources in expectation of short term current benefits

Project is an activity that is capable of being planned, financed and implemented as a unit

Project has a defined set of objectives and specific start and end dates

All

Which one of the following is constraints of project except

Cost

Time

Resource

None

Which one of the following is examples of project

Developing a new product or service

Effective a change in structure

Designing a new transportation vehicle

Developing or acquiring a new or modified information system

All

Which one of the following is factors that affect project objective

Politics

Custom and value of the society

Geographical phenomena

All

Which one of the following is true about program

Wide in scope; can comprise many projects as components.

Comprehensive and general

Specific and detail

all except c

Which of the following is not a feature of a project?

Constrained by limited resources

Planned , executed and controlled

Creates unique product or service

May be ongoing and repetitive

Your IT Company is responsible for making software virus programs. You are responsible for managing both individual product releases and co-ordination of multiple released over time. Your role is that of a :

Project Manager

Program Manager

Functional Manager

Operations Manager

You are working as a project manager of a project. Meanwhile you get a new project worth of 2Milon USD. What should be your first step?

Ask management how the new project will affect your project

Ask management how the new project will use resources

Resource level your project

Crash your project

Part II: Short Answer

What is project?

Projects can be classified based on their purpose. Discuss

Explain how projects may be classified and list some examples under each case.

What are the major reasons for undertaking the project?

How do you differentiate programs from projects?

Discuss barfly management by project?

Define the following terms:

Project

Plan

Program

Goal

Strategy

CHAPTER TWO

THE PROJECT CYCLE

Dear reader! In the first chapter you have learnt about the general introduction of project. In this chapter you will **about project cycle, approaches of project cycle such as** After successful ac omplishment of this chapter the student is **Baum model, UNIDO and DEPSA.** able to know

Describe what project life cycle is to mean

Identify stages in a project life cycle according to different models

Compare and contrast different classifications of project life cycle

Describe the relevance of a project life cycle analysis and Project clearance report

Management approach to project cycle

Introduction

This chapter is designed to discuss about the project life cycle. Project cycle is defined differently by different authors. Phases in a project are described in different fashions based on the nature of the project, its scope and authors emphasis. However, the basic issues of pre-investment, investment and operational phases of a project are, in one way or another, not neglected. Hence, these phases are areas of emphasis of the chapter with other concepts still part of the discussion.

2.1. What is a Project Cycle and Why?

The project cycle considers various stages in which each stage not only is grown out of the proceeding ones (i.e. activities in progress) but also leads into the subsequent ones.

Project cycle is a self-renewing cycle in that new projects may grow out of the old ones in a continuous process and self-sustaining cycle of activity. These processes can usefully be considered as ***a comprehensive sequence*** in the sense that for the project that is implemented, each stage naturally follows the proceeding one and leads on to the next.

Actually, the division into stages is *artificial*; but it helps to understand project planning, though a continuous process, has distinct phases and

stages. Therefore, throughout the project cycle, the primary preoccupation of the analyst is to ***consider alternatives***, ***evaluate them,*** and ***to make decisions*** as to which of them should be advanced to the next stage in the planning process.

2.2. Models of Project Cycle

There are different models of project cycle but the following are discussed as an instance

The Baum's Project Cycle

II. The UNIDO Project Cycle **III.**

The DEPSA's Model

The Baum Project Cycle (World Bank Project Cycle)

A project with the characteristics already outlined above typically run through at least several separable stages that can be thought of as constituting a definite sequence, which some writers and institutions have called "**a project cycle**". In this regard, the first basic model was developed by **Warren C. Baum** in 1970, which was adopted by the World Bank as a project cycle model. Initially, this model had recognized only four main stages in the project cycle, namely:

Identification

Preparation

Appraisal and Selection; and

Implementation

Later in 1978, the author has added additional two stages called **"Negotiation" and "Evaluation**". In this version of the Baum model, the issue of negotiation comes when projects pass the appraisal process and become a candidate for realization. It is after appropriate negotiations that projects become implementation entity. Then, projects already implemented will be the concern for evaluation, which usually closes the cycle as evaluation often gives rise to the identification of new projects. This model, therefore, includes six identifiable stages in the project cycle. The World Bank accepted the amendment and adopted the new version since then.

1. Identification

The first stage in the project cycle and in the planning process too, is to search for and identify potentially feasible projects. The sources for identifying such projects may be one or more of the following:

"Resource-based" project ideas that stem from the opportunity to make profitable use of available resources.

Some projects may be ***"market-based"***, the idea of which is arising from an identified demand in home or overseas markets.

Others may be ***"need-based***", where the purpose is to try to make available to all people in an area of minimal amounts of certain basic material requirements and services.

Well-informed ***"technical specialists"*** and "***local leaders"*** are also common sources of project ideas.

Technical specialists could identify areas with technical deficiencies, where they feel that new investments might be profitable; while local leaders may provide some insights regarding existing problems and bottlenecks, where investments need to be carried out for alleviating the same.

Ideas for new projects also come from ***"proposals to extend and/or expand existing programs and projects"*** as well as from ***identifying technological alternatives***. In general, most projects start as an elementary idea. Some simple ideas are elaborated to the extent that eventually the name "project" can formally be given to it.

2. Preparation

Once projects are identified, there begins a new stage that calls for progressively more detailed preparation and analysis of a project's aspects. At this stage, the project is being seriously considered as a definite investment action.

Project preparation, (also called project formulation), involves pre-feasibility and feasibility studies and covers the establishment of commercial, technical, institutional, financial, and socio- economic feasibility.

To this end, decisions have to be made on the scope of the project,

location and site, soil and hydrological requirements, project size (farm or factory size), etc.

Resource base investigations are undertaken and alternative forms of projects are explored.

Complete technical specifications of distinct proposals accompanied by full details of financial and economic costs and benefits are the outcome of the project preparation stage.

The project now exists as a set of *tangible proposals*. Practically, project design and formulation is an area in which local and international consultants are very active, especially for big projects that cover large areas and have big budgets.

3. Appraisal and Selection

After a project has been prepared, it is generally appropriate to make a *critical review* or conduct an independent appraisal.

- This provides an opportunity to re-examine every aspect of the project plan and hence, helps to determine whether the proposal is appropriate, sound, and acceptable or not before large sums are committed.
- Generally, internal government staffs only used, for public projects, for this work and not consultants, and projects, in this regard, are apprised both in the field and at the desk level.
- For private investments too, only internal staffs opt to involve in the appraisal process.
- Appraisals should cover at least seven aspects of a project, each of which must have been given special considerations during the project preparation phase.

The seven aspects, in this regard, are the following:

Technical: here the appraisers concentrate in verifying whether what is proposed will work in the way suggested or not.

Financial: the appraisers try to see if the requirements for money needed by the project have been calculated properly, their sources are all identified, and reasonable plans for their repayment are made where necessary.

Commercial: the way the necessary inputs for the project are conceived to be supplied is examined and the arrangements for the disposal (marketing) of the products are verified.

Incentive: the appraisers see to it whether things are arranged in such a way that all those whose participation is required will find it in their interest to take part in the project, at least to the extent envisaged in the plan.

Economic: the appraisers here try to see whether what is proposed is good from the viewpoint of the national economic development interest, all project effects (positive as well as negative) are taken into account, and check if all are correctly valued. Socio-economic aspect is the other name given to the same.

Managerial: this aspect of the appraisal process examines if the capacity exists for operating the project and see if those responsible ones can operate it satisfactorily. Moreover, it tries to see if the responsible are given sufficient power and scope to do what is required.

Organizational: the appraisers examine the project if it is organized internally and externally into units, contract, policy, institution, etc so as to allow the proposals to be carried out properly and to allow for change as the project develops.

The appraisal process builds on the project plan, but may involve new information if the appraisal team feels that some of the data used at preparation or some assumptions are faulty.

The implications and/or impacts of the project on the society and the environment are also more thoroughly investigated and documented. Similarly, the technical design, financial measures, commercial aspects, incentives, and economic parameters are thoroughly scrutinized. These issues are the subjects of specialized appraisal report. Based on an appraisal report, decisions are made whether to go ahead with the project or not. The appraisal may also change the basic project plan or develop a new plan. To this end, comments often made at the appraisal stage frequently give rise to alterations in the project plan (project proposal).

After appraisal, the viable project proposals are chosen for implementation on the basis of the priorities of the stakeholders and the available resources. For instance, the Treasury, for public projects, may impose a ceiling on the ministries with a big portfolio of investments, calling for prioritization of the core over lower priority projects. In practice, there can be quite sequence of project selection decisions.

If the project involves loan finance, the lender will almost certainly wish to carry out its own appraisal before completing negotiations with the borrower. Following appraisal, some projects may be discarded as well.

4. Negotiation and Financing

Once the project to be implemented is agreed on, for donor funded projects, discussions are held on funding and associated aspects of funding such as

- Conditions for grants,
- Repayment period,
- Interest rates on loans,
- Flow of funds,
- Contributions from stakeholders, and
- Whether there is co-financing or not.

This culminates into an "**Agreement Document**" for the project, which binds all the parties involved during implementation of the project.

5. Implementation

The objective of any effort in the process of project planning and analysis, clearly, is to come up with projects that can be implemented and/or realized to the benefit of the society.

- Thus, implementation is, perhaps, the most important part of the project cycle.
- In this stage, funds are actually disbursed to get the project started and keep running.
- A major priority during this stage is to ensure that the project is carried out in accordance with the basic plan (i.e. within the cost, quality, and time standards).
- Problems frequently occur as the economic and financial environment

during implementation often differ from the expectations at the time of appraisal.

Frequently, original proposals are modified, though usually only with difficulty, because of the need to get agreement between the parties involved.

It is during implementation that many of the real problems of projects are first identified.

Because of this, the **feedback** effects on the discovery and design of new projects as well as the deficiencies in the capabilities of the project actor can be revealed.

To this end, to allow the management to become aware of the difficulties that might arise, **recording, monitoring,** and **progress reporting** should be integral parts of the implementation stage.

Some of the aspects of implementation that are of particular relevance to project planning and analysis, therefore, are the following:

The first is that, the better and more realistic a project plan is, the more likely that the plan can be carried out and the expected benefits realized.

This emphasizes once again the need for careful attention to each of the seven aspects of projects.

The second is that, project implementation must be flexible.

Circumstances will change and, therefore, project managers must be able to respond intelligently to these changes.

The common ones are technical changes (soils, water logging, and nitrogen application); price changes; economic policy and environmental changes; political changes, etc.

Moreover, all these alter the way in which projects should be implemented.

6. Evaluation

The final phase in the project cycle is evaluation. Once a project has been carried out, it is often useful, (though not always done),

To look back what took place in the past,

To compare actual progress with the plans, and

To judge whether the decisions and actions taken were responsible and useful.

The extent to which the objectives of a project are being realized provides the primary criterion for an evaluation. The analyst looks systematically at the elements of success and failure in the project experience to learn how better to plan. Evaluation is not limited only to completed projects.

It is a most important managerial tool in on-going projects as formalized evaluations may take place at several times in the life of a project.

Evaluation may be undertaken when the project is in trouble as the first step in a re-planning effort.

Careful evaluation should precede any effort to plan for new projects and it is also needed to follow-up the progress of projects.

Moreover, a final evaluation should be undertaken when a project is terminated or is well into routine operation.

Different groups or units may do the evaluation of projects. Among others,

- ***Project's management unit*** often continuously evaluates its experience as implementation proceeds.
- ***The sponsoring agency***, perhaps, the operating ministry, the planning agency, or an external assistant agency may undertake evaluation.
- In large and innovative projects, the project's administrative structure may provide a **separate *evaluation unit*** responsible for monitoring the projects' implementation and for bringing problems to the attention of the projects' management.
- Evaluation can help not only in the management of the project after

the initial phase, but also help in the planning of future projects.

- Experience with one project can give rise to new ideas for extension of the project, repetition, need for associating projects "vertically" that supply inputs to or process products from this project, and other ideas that become the seeds to generate new project proposals.

Activity 2.1

What is project cycle?
How do we know whether the project is promising or not
Where project idea comes from?
Do you believe that all ideas are relevant for project, discuss it?
List and discuss the steps of project cycle in Baum approach.

The UNIDO Project Cycle

The UNIDO has established a project cycle comprising the following three distinct phases:

The pre - investment phase

The investment phase, and

The operating phase

Each of these three phases is divided into stages, some of which constitute important consultancy, engineering, and industrial (manufacturing) activities. In this regard, increasing importance should be attached to the pre-investment phase as a central point of attention, because the success or failure of an industrial project ultimately depends on the marketing, technical, financial, and economic findings and their interpretations, especially in the feasibility study.

To reduce wastage of scarce resources, a clear comprehension of the sequence of events is required when developing an investment proposal from the conceptual stage by way of active promotional efforts to the operational stage.

The Pre–Investment Phase

According to the UNIDO, ***Manual for Industrial Feasibility Study***, the pre-investment phase comprises several stages. These are:

Identification of investment opportunities (opportunity studies);

Analysis of project alternatives, preliminary project selection, and project preparation (pre-feasibility and feasibility studies);and

Project appraisal, selection, and investment decision (specialized appraisal reports)

Support or functional studies are also part of the project preparation stage and are usually conducted separately, for later incorporation of the findings in a pre-feasibility study or feasibility study as appropriate. Though it is easier to grasp the scope of an opportunity study, it is not an easy task to differentiate between a pre-feasibility and a feasibility study in view of the frequently inaccurate use of these terms.

The division of Pre-investment phase in to stages avoids the attempt to proceeding directly from project idea generation (identification) to the final feasibility study without examining the project idea systematically or being able to present alternative solutions. This cuts out many feasibility studies that would have little chance of reaching the investment phase.

This also ensures that the subsequent project appraisal task, made by national or international financing institutions, becomes an easier task when based on well-prepared studies. All too often, project appraisal actually amounts to project preparation, given the low quality of the feasibility study undertaken and poorly prepared document submitted.

Opportunity Studies

The identification of investment opportunities is the starting point in a series of investment related activities, when potential investors (private or public) are interested in obtaining information on newly identified viable investment opportunities.

In this regard, the main instrument used to quantify the parameters, information, and data required to develop a project idea into a proposal is the opportunity study, which should analyze:

Natural resources,

The existing agricultural base (it may be the basis for agro-industries),

Future demand for consumer goods,

Imports substitution and export possibilities,

Environmental impacts (mandatory or non-revenue producing projects),

Expansions of existing capacity,

Manufacturing sector (benchmarking from other countries), Diversification

Opportunity studies are rather sketch in nature and rely more on aggregate estimates than on detailed analysis. To this end, opportunity studies could be **general or specific**.

General opportunity studies, (referred to as “sector approach”), could be area studies designed to:

- Identify opportunities on a given area (Administrative province, backward region, etc);
- Industry studies to identify opportunities in delimited industrial branch and
- Resource-based studies to reveal opportunities based on the utilization of natural, agricultural, or industrial resources.

Specific project opportunity studies, (referred to as "enterprise approach"), are seen, for instance, in the form of products with potential for domestic manufacturing. A specific project opportunity study may be defined as *the transformation of a project idea into a broad investment proposition.*

In general, a project opportunity study should not involve any substantial cost, as its intention is primarily to highlight the principal investment aspects of a possible industrial proposition. The purpose of opportunity study is to arrive at a quick and inexpensive determination of salient facts of an investment possibility.

B. Pre-Feasibility Studies

The project idea must be elaborated in more detailed study. However, formulation of a feasibility study that enables a definite decision to be made on the project is a costly and time-consuming task.

Therefore, before assigning larger funds for such a study, prior assessment of the project's idea might be made in a pre-feasibility study. This helps to see if:

All possible project alternatives are examined

The project concept justifies detailed study,

All aspects are critical and need in-depth investigation,

and The project idea is viable and attractive or not.

A pre-feasibility study should be viewed as an intermediate stage between a project opportunity study and a detailed feasibility study, the difference being in the degree of detail of the information obtained and the intensity with which project alternatives are discussed. The *structure* of a pre-feasibility study should be the same as that of a detailed feasibility study, however.

C. Support /Functional/ Studies

Support or functional studies cover aspects of an investment project, and are required as prerequisites for, or in support of, pre-feasibility and feasibility studies, particularly for large-scale investment proposals. This may include:

Market studies of products,

Raw material and factory supply studies,

Laboratory and pilot plant tests,

Location studies,

Environmental impact assessment,

Economies of scale studies, and

Equipment selection studies

The contents of a support study vary, depending on the type and nature of projects. However, as it relates to a vital aspect of the project, the conclusions could be clear enough to give directions to the subsequent stage of project preparation. In most cases, a support study when undertaken either before or together with a feasibility study, form an integral part of the latter and lessen its burden and cost.

D. Feasibility Studies

A feasibility study should provide all data necessary for an investment decision. The commercial, technical, financial, economic, and environment prerequisites for an investment project should, therefore, be defined, refined, and critically examined based on alternative solutions already reviewed in the pre- feasibility study.

The results of these efforts is *then a project whose background conditions and aims have been clearly defined in terms of its control objective and possible marketing strategies, the possible market shares that can be achieved, the corresponding production capacities, the plant location, existing raw materials, appropriate technology and mechanical equipment and, if required, an environmental impact assessment.*

The financial part of the study covers the scope of the investment, including the net working capital, the production and marketing costs, sales revenue, and the return on capital invested. Final estimates on investment and production costs and its subsequent calculations of financial and economic profitability are only meaningful if the scope of the project is defined unequivocally in order not to omit any essential part and its related cost.

There is no uniform approach or pattern to cover all industrial projects of whatever type, size, or category in such studies. The emphasis on the components varies from project to project. For most industrial projects, however, there is a broad format of general application – bearing in mind that the larger the project the more complex will be the information required.

Although feasibility studies are similar in content to pre-feasibility studies, the industrial investment project must be worked out with the greatest accuracy in an iterative optimization process, with feedback and inter- linkages, including the identification of commercial, technical, and entrepreneurial risks.

The sensitive parameters such as the size of the market, the production program, or the mechanical equipment selected should be examined more closely. Moreover, a feasibility study should be carried out only if the necessary financing facilities, as determined by the studies, can be identified with a faire degree of

accuracy.

There would be little sense in a feasibility study without the reliable assurance that, in the event of positive study findings, funds could be made available. For that reason, possible project financing must be considered as early as the feasibility study stage, because financing conditions have direct effects on total costs and, thus, on the financial feasibility of the project.

Activity 2.2

What is the need for project opportunity studies?

How to identify whether the project is viable or not?

What are the major possible points that will remind under project pre-feasibility study?

E. Appraisal Report

When a feasibility study is completed, various parties will carry out their own appraisal of the investment project in accordance with their individual objectives and evaluation of *expected risks, costs, and gains*.

Large investment and development finance institutions have a formalized project appraisal procedure and usually prepare appraisal reports. This is the reason why project appraisal should be considered an independent stage of the pre-investment phase, marked by the final investment and financing decisions taken by the project promoters.

The appraisal report will prove whether the pre-production expenditures spent since the initiation of the project idea were well spent or not. Project appraisal as carried out by financial institutions concentrates on the health of the company to be financed, the returns to be obtained by equity holders, and the protection of its creditors. The techniques applied to appraise projects in line with these criteria center around technical, commercial, market, managerial, organizational, financial, and, possibly, socio-economic aspects.

The Investment/Implementation Phase

The investment or implementation phase of a project provides wide scope for consultancy and engineering work, primarily in the field of project management. The

investment phase can be divided into the following stages:

Establishing the legal, financial, and organizational framework; Tendering, evaluation of bids, and negotiations;

Technology acquisition and transfer;

Detailed engineering design and contract, including tendering, evaluation of bids, and negotiations;

Acquisition of land, construction work, and installation;

Pre-production marketing, including the securing of supplies and suppliers and setting up the administration of the firm;

Recruitment and training of personnel;

and Plant commissioning and start-up

Detailed engineering design comprises preparatory work for site preparation, the final selection of construction planning and time scheduling of factory construction, as well as the preparation of flow charts, scale drawing, and a wide variety of layouts.

During the ***stage of tendering and evaluation of bids***, it is especially important to receive comprehensive tenders for goods and services for the project from a sufficiently large number of national and international suppliers of proven efficiency and with good delivery capacity.

Negotiations and contracting are concerned with the legal obligations arising from the acquisition of technology, the construction of buildings, the purchase and installation of machinery and equipment, and financing. This stage covers the signing of contracts between the investor or entrepreneur, on the one hand, and the financing institutions, consultants, architects, and suppliers of raw materials and required inputs, on the other.

The ***construction stage*** involves site preparation, construction of buildings and other civil works, together with the erection and installation of equipment, in accordance with proper programming and scheduling.

The ***personnel recruitment and training stage***, which should proceed simultaneously with the construction stage, may prove very crucial for the expected growth of productivity and efficiency in plant operations.

Of particular relevance is ***the timely initiation of marketing arrangements*** to prepare the market for the new products (*pre-production marketing*) and secure critical supplies *(supply marketing*).

Plant commissioning and start-up is usually a brief, but technically critical, span in project implementation. It links the proceeding construction phase and the following operational (production) phase.

In general, it is to be noted that in the pre-investment phase, the quality and dependability of the project are more important than the time factor; while in the investment phase, the time factor is more critical in order to keep the project within the forecast made in the feasibility study.

Activity 2.3

□ □ □ □ □ What are the possible stages of project under investment phase?

What does mean appraisal report?

3. The Operating Phase

The problem of the operating phase needs to be considered from both a short- and a long-term view point.

The ***short-term view*** relates to the initial, after commencement of production period, when a number of problems may arise concerning such matters as the applications of production techniques, operation of equipment, or inadequate labor productivity owing to lack of qualified staff and labor. Most of these problems have their origin in the implementation phase and hence, relatively easy to overcome as there is learning over time.

The ***long-term view*** relates to chosen strategies and the associated production and marketing costs as well as sales revenues. These have direct relationships with the projections made at the pre-investment phase. If such strategies and projections prove faulty, any remedial measures will not only be difficult but may prove highly expensive. The given outline of the investment and operating phases of an industrial project is undoubtedly an oversimplification for many projects, and, in fact, certain other aspects maybe revealed that even have greater short- term or long-term impacts.

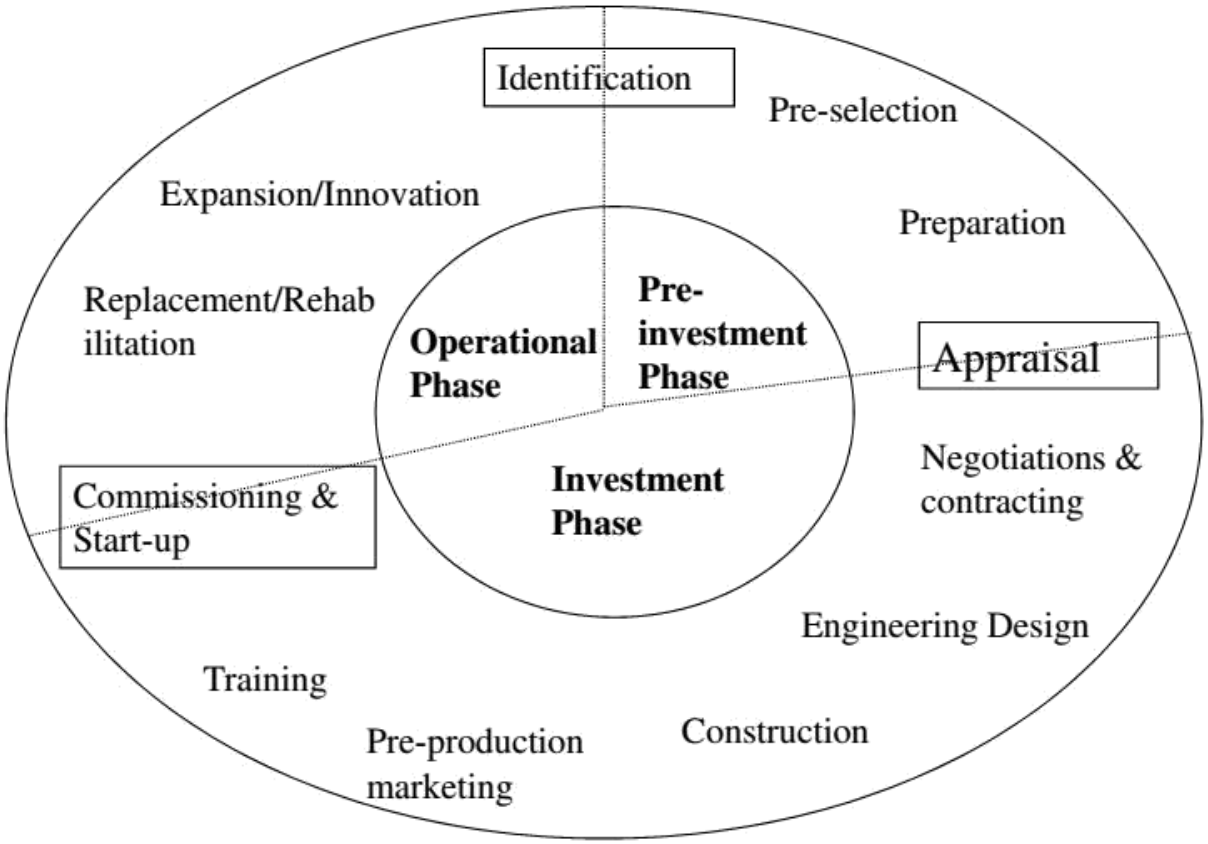


Exhibit 2.1 Summary of UNIDO Project Cycle

The DEPSA's Project Cycle

This model is developed in Ethiopia in 1990 by **Development Projects Studies Authority (called "The DEPSA's Model")**, which is nearly identical with the UNIDO cycle, will be briefly discussed. There are various ways in which the project cycle may be viewed and portrayed depending on the purpose, emphasis, and detail required to illustrate. According to the Guidelines to project planning in Ethiopia (1990) of **Development Project Studies Authority (DEPSA)**, the project cycle comprises three major phases.

Pre - investment phase,

Investment phase, and

Operating phase

Each of these three phases may be divided into stages. The Guideline has divided the above phases into six stages as follows:

Identification,

Preparation,
Appraisal/decision,
Implementation,
Operation, and
Ex-post evaluation

The pre-investment phase consists of the first three stages, while the investment phase includes the fourth stage, and the operation phase covers the last two stages.

A project cycle, in other words, means the various stages of information gathering and decision-making, which take place between a project's inception and completion. In reality, these are somewhat artificial, but do serve to emphasize the need to think of project planning as a process of decision-making taking place over time.

Broadly speaking, what is important about this process is that it should begin with the identification of a number of alternatives, suing (obtaining) existing information, and gathering new data in such a way as to limit alternatives under consideration to those few, which are most promising. Throughout the project cycle, the primary preoccupation of the analyst is to consider alternatives, evaluate them, and to make decisions as to which of them should be advanced to the next stage.

In short, the project planning process is essentially a task of eliminating less viable ideas and alternatives; and in the continuum, the planner naturally hopes that the best alternative will emerge. In this process:

The results and/or outputs of a given stage serve as the input or part of the input of the next stage, if it is decided to proceed to the next stage;

The output or part of the output of one stage may be used as new input (feedback) to reconsider or revise, where necessary, the results of proceeding stages; and

Most importantly, the results of the implementation, operation, and ex-post evaluation stages of a project constitute valuable experience for the preparation of

subsequent projects, provided these inputs are systematically documented and analyzed.

Summary

Project cycle refers to the various stages through which a project passes from inception up to implementation and realization of its objectives**.** The Baum"s traditional project cycle model emphasis on identification, preparation, appraisal, and implementation which later has included an evaluation stage.

UNIDO classified the project cycle into three major phases: pre-investment phase, investment phase and operational phase. Under the pre-investment phase are project identification, project preparation, and project appraisal. The investment phase has implementation; tendering, negotiation and contracting; detailed engineering design; constructing, and erecting and commissioning components. During the operational phase operation of the project and ex-post evaluation are conducted.

The details of what occurs during each phases of project cycle differ between institutions, reflecting differences in procedures. However, within all institutions the cycle shares three common themes: the cycle defines the key decisions, information requirements and responsibilities at each phase.; the phases in the cycle are progressive – each phase needs to be completed for the next to be tackled with success; the cycle draws on evaluation to build experience from existing projects into the design of future programs and projects. Distinctions among these phases are often unclear in practice and their relative importance varies greatly, depending on the character, scale and history of the project.

Review Questions

Part I: True or False

WRITE "TRUE" IF THESTATMENT IS CORRECT OR "FLASE" IF THE STATEMENT IS INCORRECT

Project life cycle is the stages through which the project passes from inception to its completion.

The first stage in the project cycle and in the planning process too, is to search for and identify potentially feasible projects.

Technical specialists could not identify areas with technical deficiencies of project

After a project has been prepared, it is generally appropriate to make a critical review or conduct an independent appraisal.

After well project is planned implementation of project will be conducted but it may not be effective as a result of planned project

UNIDO classified the project cycle into three major phases: pre-investment phase, investment phase and operational phase.

PART II: CHOOSE THE BEST ANSWER FROM THEIR ALTERNATIVES

Which one of the following is forth stages of project life cycle

Identification

Implementation

Preparation &Appraisal

Project planning

Which Project cycle phase is created outlining the activities, tasks, dependencies & timeframes.

Identification

Preparation &Appraisal

Project planning

Implementation

Comparing and contrasting actual result with proposed one is

Preparation &Appraisal

Evaluation

Implementation

None

Which one of the following is odd from phases of project cycle except

pre - investment phase

Investment phase, and

operating phase

All

Which one of the following is the importance of Prior assessment of the project's idea might be made in a pre-feasibility study.

All possible project alternatives are examined

The project concept justifies detailed study

All aspects are critical and need in-depth investigation

The project idea is viable and attractive or not

All

Which one of the following is support and functional studies except

Market studies of products

Raw material and factory supply studies

Laboratory and pilot plant tests

None

Which point that we undertake while appraisal and selection of project

Technical

Financial

Incentive

Commercial

all

Part III: Based on what you learnt in this chapter answer the following questions:

What is project cycle?

List the three project cycle approaches.

Discuss project cycles of Baum Model

What are the steps of project cycle in UNIDO approach?

Compare and contrast the UNIDO and DEPSA Model.

CHAPTER THREE

PROJECT IDENTIFICATION (PRE-FEASIBILTY STUDIES)

Dear reader! In the previous chapter you have learnt about the general introduction of project cycle. In this chapter you will learn about project identification. Before reading the proceeding parts of this chapter answer the following questions to your-self:

How project idea may come in to your mind?

Do you think every idea that comes in to your mind can be feasible to implement? If 'No' how can you identify best After succprojectssfulidea?ccomplishment of this chapter the student is able to know:

Identify promising project.

Source of project idea

Project concept and ranking of

project Who identifies the project

3.1. Introduction

Project identification is the process of searching for and subsequently finding potential projects that might be realized to generate benefits in excess of costs that accrue to the society and contribute towards the attainment of development objectives. The generation of promising investment (and/or project) ideas is among the major stages in the project cycle. It is the first stage in the project planning process.

Project identification is made in rather general terms with broader scope at the first glance and then, the idea will be progressively developed. According to the UNIDO model, opportunity studies and/or assessments of existing investment opportunities are considered very essential and hence, should precede the task of identification. Opportunity studies generally provide useful insights about possible/potential areas of investments. Generally speaking, a range of alternative project ideas needs to be considered, and even alternative versions of the same project may be conceived.

3.2. Who Identifies Projects?

There are quite large number of institutions and/or groups that often identify investment opportunities (or generate project ideas) in the society. These entities may be private firms, public enterprises, government units, local or international development agencies, financial institutions, as well as profit seeking or not-for- profit organizations. Listed below are the major groups that are involved, by and large, in the identification of projects in the society:

Small producers organizations/producers' unions; Large scale individual private sector producers; Product marketing organizations;
Private sector companies (local/multinational);
State owned enterprises & organizations;
Government ministries, authorities, agencies, and commissions Development banks (local as well as foreign);
International development agencies, aid agencies, and self-aid associations;
Local governments and state, regional, and sub-regional authorities;
Local political & pressure groups such as opposition parties;
Local and/or international NGOs;
Credit institutions (such as credit unions, savings and loan associations, saving banks, commercial banks) and cooperatives; and so on.

Activity 3.1

How promising project idea will be identified?
Discuss the means of providing project information from NGO?
Who participate in project identification?

3.3. How Project Ideas Come About?

The idea of a project may come to our mind basically from observing existing opportunities and problems in a given context. Such ideas generally emanate from one or a combination of the following:

Polices review & opportunity studies made by central government ministries;
Sectorial strategies & sub-sectorial programs of technical ministries such as ministries for health, agriculture, tourism, education, etc;
Surveys conducted by local governments and regional organizations
Review of past projects;

Private sector, cooperatives, and state enterprise plans;
Investment identification missions by development banks and other donors; Brainstorming (bright ideas) through unsystematic discussions;
Observation of constraints, problems, and limiting factors/bottlenecks;
Need analysis (existence of unsatisfied demand); and
Need to tackle unexpected or undesirable events such as drought, earthquake, flood, natural catastrophes, and other similar hazards.

4. Pre-Identification and Identification of Projects

3.4.1. Pre-Identification

"Pre-Identification" is an important prerequisite to the identification of promising investment projects. The pre-identification stage involves surveying, reviewing, inventorying, and analysis of strategies and policies, data about natural resources, and socio-economic variables. This stage is a synonym to opportunity study under the UNIDO cycle, which is a very important phase in project planning. Unfortunately, this aspect of planning is either totally ignored or for which inadequate resources are provided in most developing countries. There are a number of reasons for disregarding this aspect in project planning:

- First and, perhaps, most important of all is the sheer ignorance: to learn its importance and to identify ways of carrying out surveys; inventorying of resources; collection, organization, and integrating data; and analyzing the information cost-effectively and generating useful information.
- Secondly, such work tends to be regarded as an extensive task resulting in excessive overhead costs. Moreover, funds for such activities often are expended in tight schedules during end of budget period.

- Thirdly, much of the work has tended to be time consuming and, thus, people lack the initiatives to start it as well as unable to foresee & measure its benefits. They often do not have the patience to wait for results.

Nowadays, modern technology is revolutionizing the survey methods and the means for carrying out synthesis and analysis, speeding up some processes, reducing the costs of surveys, and providing new ways of looking at things. Identifying existing gaps, generating useful information, accomplishing analysis of data, and throwing up ideas for possible projects is a pre-requisite to sound project formulation.

In order to come up with sound and/or useful project ideas, we need to carryout project identifications within national, regional, and sectorial development framework and existing policies including pricing, taxation, and subsidy. Otherwise, much time and effort might be wasted in the process of identifying and preparing projects that might be inconsistent with existing policies, strategies, and priorities, which might turn out to be not viable by the end of the day. Thus, those who are responsible for identifying projects need to be aware of accepted strategies and policies as well as be in a position to feedback information to those who are responsible for formulating policies.

3.4.2 Project Identification

The search for promising project ideas is the first step towards establishing a successful venture. The key to success lays in getting into the right business at the right time. The objective is to identify investment opportunities, which are prima facie feasible and promising and merit further examination and appraisal.

Project identification is the process of finding projects that could contribute towards achieving specified development objectives. In principle, project identification should be an integral part of the macro-planning exercise, with sectorial information and strategies being the main sources of project ideas.

In practice, projects often are not derived from national and/or sectorial plans, however. Instead, projects may originate from several sources. Irrespective of

their origin, project ideas generally should aim at overcoming constraints on the national development efforts (be it material, human, or institutional constraint) or at meeting unsatisfied needs/ demand for goods and services. The prevailing constraints, needs, and demands should be interpreted broadly to include, for instance, foreign exchange constraints that might indicate the need to undertake projects for export promotion or import substitution.

The variety of projects makes it impossible to prepare an exhaustive list of sources from where project ideas emanate; but much depending on the experience and imagination of those entrusted with the task of initiating development project. In general, one can distinguish two levels where project ideas are born: macro-level and the micro-level.

Macro – Versus Micro – Sources of Project Ideas

Macro Sources of Project Ideas

Among the various institutions and sources, the following macro sources are considered the major ones in order to generate project ideas, especially in developing countries:

Federal/Central or Regional Governments;

Bilateral and Multilateral Agreement; and

International Development Agencies.

In general, in developing countries, the government remains to be the major source of project ideas. The following are presumed to be the major reasons for governments to be important sources of project ideas in developing and/or underdeveloped nations:

- They often have the necessary resources for undertaking opportunity studies;
- They do also have unlimited access to data & information;
- They do have the required facilities to conduct survey, studies, and reviews;

Moreover, such governments are fully familiar with the development objectives, priorities, and strategies. In this regard, the development goals, priorities, and strategies often are not clearly communicated groups (individuals and/or institutions) at micro-level. The development goals in such contexts also seem to be ambiguous to groups at the micro-level and/or may not be consistent with the interests of local groups.

Specifically, project ideas often emanate from the following macro sources:

National policies, strategies, and priorities as may be enunciated (or articulated) by government from time to time.

National, sectoral, sub-sectoral, or regional plans and strategies supplemented by special studies, called opportunity studies, conducted with the explicit aim of translating national, sectoral, sub-sectoral, and regional programs into specific projects.

General surveys, resource potential surveys, regional studies, master plan and statistical publications, which indicate directly or indirectly investment opportunities.

Constraints on the development process due to shortage of essential infrastructure facilities, problems in the balance of payments, etc.

Government decisions to correct social and regional inequalities or to satisfy basic needs of the people through development projects.

A possible external threat that necessitates projects aiming at achieving, for example, self-sufficiency in basic material, energy, transportation, etc.

Unusual events such as droughts, floods, earthquake, hostilities, etc.

Government decisions to create project-implementing capacity in such areas as construction, etc.

Project ideas can also originate from multilateral or bilateral agreements, development agencies, and as a result of regional or international agreements in which the nation participate. These are considered macro sources of project ideas. In addition, inspirations of individuals and institutions on workshops and development experiences of other nations may point to some interesting project ideas in the local context.

Micro Sources of Project Ideas

Apart from the macro sources for generating project ideas, there are diverse kinds of institutions and/or economic entities that are considered micro sources of project ideas. The following are among the major micro sources of investment (or project ideas):

Private and Public Enterprises;

Local Groups or Organizations;

Consumer Groups and Associations;

Financial Institutions/Credit Associations;

Cooperatives, Farmers' Unions, etc

New Technology Suppliers and so on.

In general, project ideas that emanate from the micro-sources are obtained (and/or generated) based on one or many of the following conditions:

The identification of unsatisfied demand or needs;

The existence of unused or underutilized natural or human resources and the perception of opportunities for their efficient use;

The need to remove shortages in essential materials, services, or facilities that constrain development efforts;

The initiative of private or public enterprises in response to incentives provided by the government;

The necessity to complement or expand investments previously undertaken;

The desire of local groups or organizations to enhance their economic status and improve their welfare;

Moreover, the following techniques and/or procedures can be adopted in order to generate project ideas from micro sources:

Analyze the performance of existing industries;

Examine the inputs and outputs of various industries; Review imports and exports;

Look at the suggestions of financial institutions and development agencies; Investigate local materials and resources;

Analyze economic and social trends;

Study new technological developments;

Draw clues from consumptions abroad;

Explore the possibility of reviving sick units;

Attend trade-fairs (trade promotions/bazaars); and so on.

Project proposals may also come from multinational firms, in response to government investment incentives or else when such firms consider production within the country is a better way to secure a substantial share of the domestic market for their products.

Activity 3.2

Which is best for viable project source of information

Dear student; please specify (political information, demographic, technology, micro, macro argue which one is best?

3.4.2.1 Project Identification Studies and Process of Idea Generation

Identification Studies

When we are more concerned about project identification, the formal task of conducting identification studies, (opportunity studies), is one of the best available option to project planners, which is critically important to generate and/or come up with useful information.

Objective of Identification Studies:

The major objective of identification studies is to collect sufficient data and/or generate beneficial information concerning the background, technical, economic, social, and environmental aspect of a potential project.

In general, there are four approaches for conducting project identification studies. These are:

Area studies,

Industrial studies,

Resource-based studies, and

Sectorial studies.

In this regard, each of the approaches focuses on relatively unique aspects and pay attention to some important variables (or considerations). One may follow any one of these approaches depending on the appropriateness for the type of project being pursued and the significance it has to the concerned. Exhibit 3.1 depicts the main approaches for project identification studies together with the relevant aspects to be assessed and the major considerations there in.

Exhibit 3.1: Project Identification Studies

Approaches	Aspects	Considerations
Area studies	Identification of opportunities in given area such as localities, regions, states, etc. The objective is to bring balanced development among areas.	Backward areas (less developed and/or marginalized areas).
Industry Studies	Identification of opportunities in the industrial sector. Specific marketable product: Diversification opportunities; Import substitution and export possibilities; etc.	Development plans & programs; investment policies; economic policies; and industrial policies.
Resource Based Studies	Opportunities in exploiting natural resources: Natural resource analysis; Import substitution; Export possibilities; etc.	Resource allocation & utilization policies; industrial policies; and other polices & priorities.
Sectoral Analysis/ Studies	Satisfaction of social needs/removing sectoral problems: Agriculture sector, Manufacturing sector, Health sector, Education sector, Service sector, etc.	Sectoral strategies; sectoral priorities; existing unsatisfied needs; sectoral development level; etc.

3.4.2.2 Project Idea Generation Process

The aspects indicated in 1 through 7 below more or less explain the process of generating project ideas.

1. **Survey & Review of Endowments and Facilities (Infrastructures):**

Surveying, reviewing, and analyzing existing policies, resource endowments, and socio-economic variables.

Natural Resources: review of the natural resource endowments of the country.

Human Resource: review of educational standards and facilities.

Socio-Economic Variables: review of various socio-economic factors. This, among others, includes:

Housing facilities &
standards Utilities services;
Health and nutrition services;
and Income distribution

Field Survey and Interview:

This includes asking people regarding what goods or services they want, which helps to identify if any unsatisfied need exists. It also involves:

Obtaining information about their existing problems may be through directly asking them (i.e. people about what their problems are).

Asking the public unit closest to the people at the grass-root level about their problems and/or needs (asking him/her what the community needs/what the people need).

Observing and Analyzing Prevailing Situation:

Observation and analysis of the prevailing situation is also an important means in order for generating project ideas. This includes:

Observation & examination of current demand & supply situation for goods/services;
Examination of past & future consumption/production trends for goods and services;
Observing possibilities for improvement of goods and services (both in terms of quality & quantity);
Observing opportunities & threats in the invention & introduction of new technologies, etc.

Participating in Deliberations, Discussions, and Trainings:

Participating in various discussion forums and deliberations made in seminars, workshops, and conferences (both local and international) are believed to be important for generating useful investment ideas.

Meeting at different levels within the organization;
Educational & training programs; and the like.

Brainstorming:

Brainstorming is also an important means for generating project ideas. In brainstorming sessions, a group of people suggests different ideas regarding future

activities very quickly before analyzing and/or considering the source of the idea more carefully. Brainstorming is essential before detailed analysis of an idea of a project as well as before detailed planning.

6. Exposures to Publications & Media:

Reading various publications (scientific or otherwise) and exposures to different communication media is essential for generating project ideas. This may include:

Print media such as journals, books, magazines, newsletter, news papers, etc; Audio-visual media (discussions and reports on radio, TV, etc); and

Visual media (cinema, video, etc).

Informal Discussions and Meetings:

In addition to the above aspects, it is also useful to take note of ideas thrown in informal (or non-formal) discussions and meetings. This also includes exchange of ideas in friendship/fraternal gatherings and get-togethers.

In a nut shell, all the above aspects and/or procedures might eventually lead to the generation of project ideas about which we develop feeling of feasibility. The individual(s) or entities generating the idea(s) develop a kind of feeling that the identified project(s) might be feasible candidate(s) for further and more detailed analysis, appraisal, and implementation.

Therefore, the feeling of feasibility is a good basis for identification of potentially promising projects that worth considering. Eventually, the project idea generated becomes an eligible candidate for further study and preparation. Such ideas need be thoroughly analyzed and assessed based on tangible facts and data.

3.4.2.3 Approaches to Project Idea Generation

Broadly speaking, project ideas are said to be generated through one of the following two approaches:

Top – Down (Macro) Approach and

Bottom – Up (Micro) Approach.

Top – Down Approach

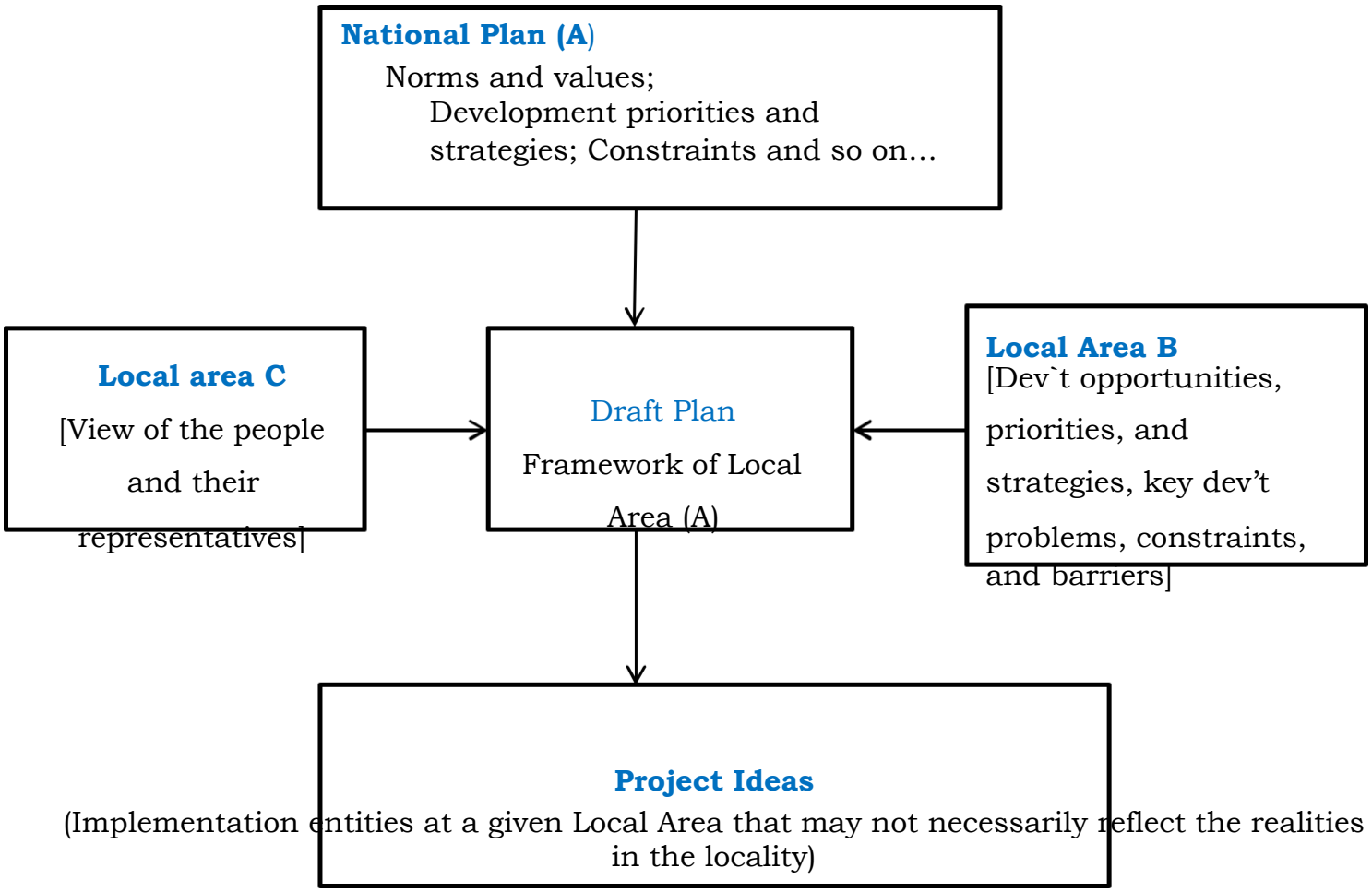
It is an approach whereby individuals at the micro level, or grass root level, are not involved in the process of project idea generation. Projects are identified at higher planning (or macro) level and implemented at the decision of officials at the top. It is

based on the national plan and strategies.

The Government need not go down because the problem might be understandable. However, such projects may not relate to the existing reality in particular vicinity and hence, might encounter resistance and/or implementation constraints, as the people in the context might lack interest to cooperate with. Exhibit 3.2 depicts the general framework of the top – down approach for project idea generation.

In general, the top-down approach for project idea generation helps to identify implementation entities at given local area that may or may not be consistent with the needs in the context. In other words, such projects have long-term orientations that, perhaps, need not necessarily be compatible with the existing reality in the locality.

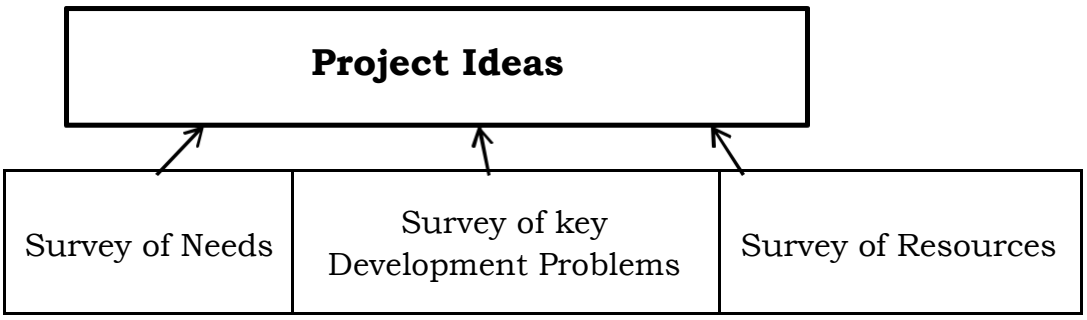
Exhibit 3.2 Top-Down Approach



Bottom – Up Approach

A bottom – up idea generation process requires base line surveys, which is based on the realities existing in different localities. Such projects might be easy to implement (or realize) due to their fitness to the realities in a given context. May get community support, successfully implemented, and the potential benefits might easily be visualized (seen) by the society. This may help to create good will and positive images towards the institution. Exhibit 3.3 depicts the bottom – up approach for generating project ideas.

Exhibit 3.3 Bottom –Up Approach



Activity 3.3

Does the project belong to a sector where the country needs additional investment? Rise points and discuss?

Do you think can project meet the urgent needs of the sector? Rise points and discuss and give examples?

Is project represents the least-cost alternative? Rise points and discuss?

What are the approaches of project idea generation?

3.4.3. Screening Potentially Promising Ideas

In this regard, once a list of project ideas has been put forward, the first step is to select one or more of them as potentially promising. This calls for a quick preliminary screening by experienced professionals who could also modify some of the proposals. At this stage, the screening criteria are vague and rough, that become specific and refined as project planning advances.

During the preliminary screening, to eliminate ideas that prima facie are not promising, it is required to look into aspects pertaining to the following:

Compatibility with the promoter,
Consistency with government
priorities, Availability of inputs,
Adequacy of market,
Reasonableness of costs, and
Acceptability of risk level

During preliminary selection, the analyst should eliminate project proposals that:

Are technically unsound and risky;
Have no market for the output;
Have inadequate supply of inputs;
Are very costly in relation to benefits; and
Assume an overambitious sales and profitability target.

Obviously, since the criteria tend to be somewhat nebulous (vague, imprecise, and ill defined), much depends on the experiences and sense of objectivity of the professionals applying them. It is, however, necessary to conduct this screening, even with indistinct criteria, in order to reduce the number of project alternatives to a manageable level to which more work and time will be devoted.

Indeed, project planning can be viewed as a process of elimination, i.e. elimination of inferior alternatives. As a result of the preliminary screening exercise, a project profile, an opportunity study report, or an identification study report, as appropriate, is prepared showing which project alternatives should be rejected and which ones may be advanced to the next stage.

3.5. Project Rating Index

The steps involved in determining the project rating index are as follows:

Identify factors relevant for project rating
Assign weights to these factors (the weights are supposed to reflect their relative importance)
Rate the project proposal on various factors, **using a suitable rating scale**

(Typically a 5-point scale or a 7-point scale is used for this purpose.)

For each factor, **multiply the factor rating with the factor weight to get the factor score**

Add all the factor scores to get the overall project rating index

Construction of a Rating Index

Factor	**Factor Weight**	**Rating**					**Factor Score**
		VG 5	**G 4**	**A 3**	**P 2**	**VP 1**	
Input availability	0.25			√			0.75
Technical know-how	0.10		√				0.40
Reasonableness of cost	0.05		√				0.20
Adequacy of market	0.15	√					0.75
Complementary r/p with other products	0.05		√				0.20
Stability	0.10		√				0.40
Dependence on firm's strength	0.20	√					1.0
Consistency with governmental priorities	0.10			√			0.30
	Rating Index						**4.0**

3.6. Problems in Project Identification

Ambiguity regarding the Development Goals (Objectives) of the nation:

People may not clearly identify the national development goals.

The development goals may not be well communicated, may not be in the best interests of some groups, or may not get full-hearted acceptance from the public.

Priority Issues in the Existing Development Goals (Objectives):

Conflict of views regarding the development priorities and goals set (that might entail lack of interest & commitment).

Differences in views regarding critical aspects of national priority. Differences in prioritizing sectorial goals & objectives.

Limited Data and Obstacles in Information Flow and Accessibility:

- Problems in data and information flow;

- Constraint (bottlenecks) for accessing data;
- Limited availability of data & information;
- Data may not be dependable (reliable) for use; and so on.

Conflict of Interest between Local Beneficiary Groups [as some group(s) might bear the cost while benefits accruing to others].

What are the costs & benefits of identified projects?

Who bears the costs & benefits in the society?

Is benefits accruing to other groups while the cost paid by a given local group (unit)?

Find mechanisms to compensate those bearing the costs.

Unless compensated otherwise, the consequences might be unfavorable, severe, and costly as well.

Summary

Project identification is the process of searching for and subsequently finding potential projects that might be realized to generate benefits in excess of costs that accrue to the society and contribute towards the attainment of development objectives. The idea of a project may come to our mind basically from observing existing opportunities and problems in a given context. Such ideas generally emanate from one or a combination of the following: Polices review & opportunity studies made by central government ministries; Sectorial strategies & sub-sectorial programs of technical ministries such as ministries for health, agriculture, tourism, education, review of past projects; Private sector, cooperatives, and state enterprise plans etc.

Review Questions

PART I: True or False

WRITE "TRUE" IF THESTATMENT IS CORRECT OR "FLASE" IF THE STATEMENT IS INCORRECT

1. Identifying the promising project is ultimate aims of project manager.

The objectives of project identification are able to identify possible projects which support that strategy.

There is a risk of development specialists being biased by their own specialist knowledge in seeking solutions to project problems and objectives

The process of seeking alternative solutions should ideally be carried out by a multidisciplinary team

SWOT analysis can only be used to assess internal factors that affect a project

PART II: CHOOSE THE BEST ANSWER FROM THEIR ALTERNATIVES

To crash a project schedule you should:

- Increase the time allowed on those tasks that have float.
- Try to increase expenditures of time only those tasks that are behind schedule.
- Replace those worker that are not performing up to par with the busy.
- Increase work efforts on those tasks that are on the critical path.

The successful project managers spend most of their time:

- Planning with their personnel
- Planning with the top management
- Communication with the project team
- Studying project results.

Which one of the following is participants in project identification except

- Small producers
- Large scale individual private sector producers
- Product marketing organizations
- Private sector companies
- State owned enterprises
- None

From where project idea will generate

- Observation
- Need analysis
- Brainstorming
- All

Of the following is operational objective of project organization except

Cost reduction

Productivity improvement

decrease in capacity utilization

Improvement in contribution margin

Which one of the following is not importance of reviewing import and export duties

To improves the balance of payments situation

To provides a market for the supporting industries

To reduce examination of export statistics

To know the possibility of various export products

Part III: Based on what you learnt in this chapter answer the following questions

1. What is project identification?

How can project idea come to our mind?

What are the sources of project idea?

Explain the approaches of project idea generation.

Discuss project idea generation process.

What is the significance of project rating index? discuss

What are the problems in idea generation?

CHAPTER FOUR

PROJECT FEASIBILITY ANALYSIS

Dear reader! In the previous chapters you have seen about the general introduction of project, project cycle and how to identify project idea. In the subsequent part of this module you will read about the detail analysis about the project feasibility. Have you ever heard/seen that some promising projects failed to be implemented? Why do you think it failed? Do you think the idea is not worth to implement or failure to analyze the feasibility of the project? Well! You could find answer for such questions in the next chapters of this module.

After successfully completion of this chapter you will be able:

- to understand the importance of project feasibility analysis.
- to understand the elements of project feasibility study.
- to know the techniques of market and demand analysis.
- to understand what is the production program and plant capacity analysis
- to realize how the analysis of projects environmental impact assessment, technical, and organizational analysis is important for projects.

Introduction

Project feasibility analysis means the detail study of projects viability for its successful implementation. Generating an attractive project idea by itself is not a success unless it implemented successfully. A promising project may be failed due to failure of effective cost estimation, technical problem, and financial shortage or might be due to less market demand of the product. Therefore, project feasibility study focuses on the detail analysis of the following elements:

Market and Demand Analysis
Production Program and Plant Capacity
Raw Material and Supply Studies
Location, Site and Environmental Impact Assessment

Technology and Engineering Study

Organizational Study

Financial Analysis

Economic Analysis

In this chapter we will focus on the first six dimensions and the remaining two i.e. financial and economic analyses will be discussed in the coming two chapters respectively.

4.1. Market and Demand Analysis

Introduction

Dear reader! Assume that you have identified a promising project of introducing new product in the market; do you think you need to asses market demand? What will be happen if you fail to assess the market demand for your product?

Market analysis is a process of assessing the level of demand for product or service to be produced from the project. This means determining the marketability of the product or service of the project under consideration. Market analysis is a critical stage in the feasibility study of projects intended especially for wealth maximization purposes. Different techniques of demand forecasting and analysis are used in analyzing the availability of markets for the products and assessing the level of demand.

4.1.1. Role of Market and Demand Analysis

Market and demand analysis is a key process in determining the feasibility of a project. The basic idea of any project is to benefit either from utilization of available resources or from satisfaction of existing or potential demand for output of a project. Once the present effective demand for the project's output, the characteristics of the corresponding markets and possible market concepts have been determined, the desired production program including the required material

inputs, technology and human resources as well as suitable locations can be defined.

The demand or market analysis must be carefully structured and planned in order to obtain required information within the time and cost limits and to determine the possible marketing and production strategies required to reach the basic or corporate objectives.

Market analysis is discussed based on the following pattern:

Concept of marketing

Marketing research

Outline of project strategy and steps in demand projection.

Marketing

The term marketing can be explained as a ***market orientation*** of management with regard to business decisions. Market orientation of investment and finance decisions would therefore, imply the feasibility studies need to incorporate the design of marketing concept, which should be based on proper marketing research. Marketing can be characterized by the following four key elements. These are:

Business philosophy

Marketing research

Marketing instruments and

Marketing plan and budget.

Business Philosophy- Marketing is above all business philosophy that doesn't focus on products or production (unlike the past periods), but puts the problems, needs and desires of existing or potential consumer groups at the center of the business activities of the firm. This requires that decision makers at all levels and in all functional areas of the enterprise will have to orient their thinking towards the market.

Marketing Research- well planned and systematic market and market related research is a precondition for market oriented decision making. On the basis of information obtained about the potential market as well as the human,

production and financial resources available for the project, marketing strategies are to be developed to ensure the achievement of the project objectives.

It is important to note that the market orientation of project preparation is not limited to sales markets of the enterprise. It is also necessary to analyze the supply markets and design a concept for securing the required project inputs.

Marketing Instruments- The successful implementation of marketing strategies shaping and influencing the market in a well-planned manner, using the necessary combination or mix of marketing instruments.

Marketing plan and Budget- To achieve the marketing objectives, it is necessary to determine the required measures or means and to prepare a plan of action on the basis of findings of marketing research and using the marketing tools available. A project shall be based on well-defined marketing concept in order to achieve the desired objectives.

Marketing Concept

The marketing concept comprises the marketing strategy and operative measures required to implement the project strategy and reach the project objectives. A Project strategy is a set of objectives and principles defined for a project with a view to determining the allocation of resources over a period of time representing the planning horizon chosen for the project. It is a central for both the preparation and evaluation of the project and the design of a proper marketing concept.

The principal question to be addressed by a strategic dimension of a marketing concept is as to which marketing strategy is suitable to achieve the marketing targets within the conditions defined by the project strategy.

The marketing strategy to be considered involves the following dimensions:

Identification of target groups and products likely to win their favor.

Determination of competition policies (whether a low price strategy or differentiation strategy) to defeat competitors.

When we come to the operative dimensions of a marketing concept, a distinction is made between the four marketing tools, the combination known as the marketing mix. These four components are:

Product

Price

Promotion

and Place

Marketing Research

Marketing research is a concise and systematic assessment of information on the market and market environment. It is the task of marketing research to obtain, analyze and interpret this information and to provide the basis for other basic decisions. For the development of the project strategy and the marketing concept, careful marketing research is essential.

The scope of marketing research required for a feasibility study is determined by the need to select and justify a project strategy and the development of the corresponding marketing concept. Any errors made in this research phase would result in wrong marketing concepts and may place the whole project in jeopardy. Hence, it shall be done so carefully and critically.

In general, systems approach to marketing facilities the understanding of interdependencies between market participants and their activities. The elements of this system are enterprises and organizations as well as single persons playing a specific role in the market exchange process.

The following will be some of the steps involved in the process:

Assessment of the target market structure.

Customer analysis and market segmentation

Analysis of channels of distribution

Analysis of competitors

Analysis of socio-economic

environment Life cycle of a subsector

Projecting marketing data

Project Strategy and Projecting Demand

In most cases, the first step in project analysis is to estimate the potential size of the market for product proposed to be manufactured (or the service planned to be offered) and get an idea about the market share that is likely to be captured. Put differently, market and demand analysis is concerned with two broad issues:

What is the likely aggregate demand for the output? and

What share of the market will the proposed project enjoy?

For all investment projects, market analysis is the key activity for determining the scope of an investment, the possible production programs, the technology required and often also the choice of location. Two important implications of market study are:

Influence accept or reject decision- if the demand of the project output is very low, the project may not be accepted. Error in the assessment of market may lead to accepting of the project that should be rejected or rejecting the project that should be accepted. Or if it is wrongly projected, it may lead to wrong investment decision.

Influence the determination of plant capacity. It may lead to wrong choice of capacity-either excess or small capacity.

- Excess capacity – overinvestment, idle capacity
- Cost of small capacity- loss of opportunities, los of the advantage of economy of scale.

4.1.2. Contents of Demand Analysis

Two types of market information can be distinguished, namely general market data and specific data for a particular market segment (consumer group, product or product group).

Most marketing studies include data on the following:

General Economic Indicators- These are factors that are related to socioeconomic factors such as product demand, population level and growth rate, per capita income and consumption, gross domestic product per capita and annual growth rate, and income distribution.

Government Policies- demand for goods and services may be influenced by government practices and legislation, at least to the extent they are directly related to consumption, production, imports and exports of the product in question; standards, restrictions, duties, taxes, as well as

subsidies or incentives, credit control and foreign exchange regulations, etc

Present Level of Domestic production- present domestic production by volume and value, including production intended for internal consumption and not placed on the market is relevant in determining the demand gap that exists and assessing the feasibility of the project because the demand gap is one basic source of project idea.

Present Level of Imports- Some gap may be filled by imports. Current level of imports by volume and value (cost, insurance, fright and local costs) will help design import substitute projects.

Production and Imports of Substitutes and near-substitutes- This will influence the demand for the product in question. For example, the demand for a bakery project may be influenced by existing Pasta factory or imports of Pasta from abroad.

Critical Inputs and Complementary Products- These are issues that constrain the feasibility of a project from demand point of view. For example, a project for automobile assembly will be influenced directly by the existence of a project for tyres or the raw materials for the automobile assembly.

Production targets Determined in National Economic Plans- Sometimes government policies may directly influence the production of products in question, substitutes and complementary products. For example, a project on electronic production and distribution is not allowed in Ethiopian context. But it is allowed to the extent of dam preparation and power production (except distribution).

Present Level of Exports- Another important factor in demand analysis is the volume and value of exports about the product or service. This is to incorporate the issue of exporting the goods or services in the feasibility study.

Behavioral patterns- demand for goods and services is significantly influenced by consumer behaviors such as consumer habits and responses (individual and collective) as well as trade practices in a given environment. For example, a Pasta project around the countryside will not be feasible. A project producing space consuming cars, electronics and other similar products will not feasible in urban areas for space consumption is critical issue in urban areas, etc.

The specific demand and market data for a particular market segment should be identified and its availability for the feasibility study ascertained. The range of data, however, depends on the nature of the product and the type and the degree of market research that it may involve. It is not practicable to make any classification or prescribe any guidelines in this regard. In one case, past production figures may be decisive; in another, they may be misleading.

The demand analysis section of the feasibility study should aim at providing basic information such as:

Size and composition of present effective demand in market with clearly defined geographical limits. It shall try to estimate by apparent current consumption-amount of consumption of current time. It is a good starting point to analyze demand but it must be used with due care. It is computed as follows:

Estimated Current effective demand	= Import during the year + Production during the year + Stock at the beginning - Stock at the end Export during the year

Major market segment identification by:

End user types (direct consumer, industrial users, etc)

Consumer groups (income groups, age groups, etc)

Geographical divisions (regional, national, export)

Demand production for the market (for the overall market and the market segment over the coming 10-15 years). In some kind of production, estimation even for a short period is very difficult because of changes in the demand of the product. For example, a projection of demand for electronics goods is very difficult because the useful life of such goods is getting shorter every time.

Expected market penetration ratio of the project over its life, it may not be possible for new projects to satisfy the whole demand. Market share may be built up gradually or it may get a high penetration ratio at the beginning. There may be some constraints- investment constraints to produce at high rate at the beginning for instance.

Pricing structure on the basis of which projections are made for market growth and penetration.

Activity 4.1

What are the elements of project feasibility study?

Why market and demand analysis is important in project analysis?

What are the contents of market demand analysis?

4.1.3. Basic steps in the Projection of Demand

Define, assemble and analyze available data related to past consumption and rates of change over time.

Classify such historical consumption data by market segment. This will help to see how each market segment's consumption has changed over time. For example, a certain region's consumption in the past may be determined.

Determine the principal determinants of past demand and their influence on it.

Factors for the change in consumption such as size of population, extent of extension services, income.

Factors which have an influence on demand.

4. Forecast the future demand through extrapolation of the determinants (using appropriate forecasting techniques).

Methods of Demand Forecasting (in Brief)

After gathering information about various aspects of market and demand from primary and secondary sources, an attempt may be made to estimate future demand. A wide range of forecasting methods are available to market analysis ranging from the simplest to the most complex methods. These methods can in general be placed in two groups.

Qualitative Methods- this method rely essentially on the judgment of experts to translate qualitative information in too quantitative estimates. Examples in these groups are:

Expert opinion/Jury Executive Method- this method calls for the pooling of views of group of experts on expected future sales and combining them in to a sales estimate. The major advantage of this method is the pooling of expertise knowledge in the forecasting process. However, the accuracy of the forecast will depends on the care and experience of the people providing the inputs.

Delphi Method- this method involves converting the views of a group of experts, who do not interact face-to-face, in to a forecast through an iterative process. It is used for eliciting the opinions of a group of experts with the help of mail survey. The process may include the following steps:

A group of experts is sent a questionnaire by mail and asked to express their view.

The response received from the experts are summarized without disclosing the identity of the experts, and sent back to the experts, along with a questionnaire meant to probe further the reasons for extreme views expressed in the first round.

The process may be continued for one or more rounds till a reasonable agreement emerges in the view of the experts.

Quantitative Methods- uses a formal mathematical method to fit cost functions to past data observations. Examples include Time series analysis, Regression (correlation) analysis, Moving average, Exponential smoothing, etc.

Trend Projection Method (Time series Analysis)- Time series analysis forecast based on an analysis of how variables of interest have moved historically over the past periods. It doesn't make a real attempt to analysis why the variables has changed as they did in the past. The change is only related to time. It helps to forecast about the future based on what has happened in the past. It is more reliable when changes have a certain pattern and the same pattern is expected in the future too.

Time series analysis is becoming a very simple task with advanced o computer spreadsheet technologies. When the trend projection is used, the most commonly employed relationship is the linear relationship.

$$Y = a + bx$$

Where: **Y** = demand for the year (dependent variable)

X = time variable (Independent variable)

a = intercept of the relationship

b = slope of the relationship

$$b = \frac{xy - n\,xy}{-\,nx}$$

$$a = y - b(x)$$

For example consider the following sales data about sales of a certain product in the past 12 years. Mathematical computations are used to determine **a** and **b** based on a given set of data.

Required: Forecast sales for the next 5 years and state the sales forecast equations.

The analysis can be made in a tabular manner computing figures for the items included in the formulas above. The final equation is as stated below next to the table.

Year (X)	Sales (Y) (Historical data)	XY	
1	2,109	2,109	1
2	2,530	5,060	4
3	2,287	6,861	9
4	3,194	12,776	16
5	3,785	18,925	25
6	3,372	20,232	36
7	3,698	25,886	49
8	3,908	31,264	64
9	3,725	33,525	81
10	4,129	41,290	100
11	4,532	49,852	121
12	4,487	53,844	144
x=78	y= 41,756	xy = 301,624	= 650

Y= 211.26x + 2106.5

High- low method- it uses only the highest and lowest observation values of the dependent variable. The demand function is estimated by using these two points to calculate the slope coefficient and the constant or intercept.

Slope coefficient (b) - is the difference between the highest demand and lowest demand in the past divided by the difference between the highest and the lowest of the independent variable.

Example: Consider the following observations extracted from 10 years data.

Observation	X	Y
Highest observation	96	1456
Lowest observation	46	710

Based on the above data, slope of the equation can be determined as:

$$\frac{1,456 - 710}{96 - 46} = 14.92/x$$

To compute the constant, we can use either the highest or the lowest observation of the data. Both calculations yield the same answer because the solution

technique solves two linear equations with two unknowns, the slope coefficient and the constant because:

$$Y = a + bx$$
$$A = y - bx$$

Therefore, at the highest observation of x,

The constant = 1,456 – (14.92 x96) =

23.68 y= 23.68 + 14.92x

Regression analysis- is a very popular demand forecasting tool in practice. It involves extrapolating the past trend of demand with identified factor affecting the demand such as income to the project the future consumption. It measures the average amount of change in the dependent variable associated with a unit change in one or more independent variables. There are two types of regression analysis. These are:

Simple regression (using one independent variable) and

Multiple regression analysis (that uses several independent variables).

In general, regression analysis involves:

Determining the trend of consumption by analyzing the past consumption statistics and

Projecting future consumption by extrapolating the trend.

Simple Regression Analysis: For example, in the above case if the assumption is changed as demand is a function of number of households in each year (one independent variable i.e. house hold). The equation to forecast demand called the regression equation and the forecast results will be as shown below:

Note: The formula to compute **a** and **b** in the equation are the same except that the independent variable in this case is not time but number of households.

Year	No. of households (X)	Sales (Historical data) (Y)	XY	2
1	815	2,109	1,718,835	664,225
2	927	2,530	2,345,310	859,329
3	1,020	2,287	2,332,740	1,040,000
4	987	3,194		
5	1,213	3,785		
6	1,149	3,372		
7	1,027	3,698		
8	1,324	3,908		
9	1,400	3,725		
10	1,295	4,129		
11	1,348	4,532		
12	1,422	4,487		
	x= 13,927	**y= 41,756**	**xy=50,038,739**	**= 16,613,611**

Y= 3.5041x – 587.11

Multiple regression analysis- this is a regression analysis that used if demand is affected by more than one variable such as number of households and time. The number of households must be forecasted first in another forecasting.

Year	No. of households	Sales (Historical data)
1	815	2,109
2	927	2,530
3	1020	2,287
4	987	3,194
5	1213	3,785
6	1149	3,372
7	1027	3,698
8	1324	3,908
9	1400	3,725
10	1295	4,129
11	1348	4,532
12	1422	4,487

Intercept = 1792.08354

Year = 191.76807(X1)

Households = 0.38005946(X2)

Y= 1792.08 + 191.77X1 + 0.38X2

Note: These assumptions are made using various tables and formulas that shall be covered in other courses such as operation research in detail and in the same manner as the case of Simple regression analysis.

The regression line minimizes the sum of the squared vertical differences from the data points to the regression line. Goodness of fit test indicates the strength of the relationship between the variables. When the regression (co-relation) trend projection method is used, the most commonly employed relationship is the linear relationship (one independent variable).

Y= a +bx

y = demand for the year (dependent variable)

x = Independent variable

a = intercept of the relationship

b= slope of the relationship

The results should be interpreted with diligence:

Explanatory variable must make sense- there should be plausible relationship between the dependent and independent variables.

The right model must be selected.

Results should be interpreted with due care.

Outliers, observation that is very far from the majority observation, may be disregarded in order to avoid their effect on the regression results.

Exponential Smoothing Method- in exponential smoothing forecast results are modified in the light of observed errors.

If forecast value for year t (Ft) is less than the actual value for year t (St), the forecast for the year t+1, is higher than Ft. i.e. (If Ft <St, Ft+1 >Ft)

If Ft>St, Ft+1< Ft.

Et= error in forecast for year t = St-Ft

= Smoothing parameter (which lies b/n 0 and 1)

How should the first forecast (F1) and the smoothing parameter ( ) be chosen?

A simple and reasonable factory rule of thumb is to choose F1 as the mean of the warm up sample. (The warm-up sample consists of several observations preceding the period for which the forecasting exercise is began).

For choosing , consider several values in the range of 0 to 1 and choose the value that minimizes the MSE (Mean Square error) in the warm-up period.

$$MSE = \frac{(Si - Fi)2}{N}$$

Where: Si = the actual sales in the period i

Fi = the forecast in the period i

N = number of periods in the warm up sample.

Example: Assume that the actual sale of a given product in period 1 is 28,000 units while the forecast sale is 29,000 units for the initial period. Assume further that the actual sales value for the next ten periods is the following:

Period	1	2	3	4	5	6	7	8	9	10	11
Sales ('000units)	28	29	28.5	31	34.2	32.7	33.5	31.8	31.9	34.3	35.2

Given = 0.2, derive the forecast of sales for the next ten periods.

T	Data (St)	Forecast (Ft)	Error (et=St-Ft)	Forecast for t+1 (Ft+1= Ft + x et)
1	28		-1	F2= 29+0.2(-1) = 28.8
2	29		0.2	F3= 28.8 + 0.2(0.2)= 28.84
3	28.5	28.8	-0.3	F4= 28.8 =+ 0.2(0.2) = 28.7
4	31	28.7	2.3	F5 = 28.7 + 0.2(2.3) = 29.2
5	34.2	29.2	5.0	F6= 29.2 + 0.2(5.0) = 30.2
6	32.7	30.2	2.5	
7	33.5	30.7	2.8	
8	31.8	31.3	0.5	
9	31.9	31.4	0.5	
10	34.3	31.5	2.8	
11	35.2	32.1	3.1	F12 = 32.1+ 0.2(3.1) 32.7

e) Moving Average Method

As per the moving average method of sales forecasting, the forecast for the next period is equal to the average of the sale for several preceding periods.

$$F_{t+1} = \frac{S_t + S_{t-1} + S_{t-2} + \ldots\ldots + S_{t-n+1}}{N}$$

Where: F_{t+1} = Forecast for the next period

S_t= Sales for the current period

N= Period over which averaging is done

Example: Consider the following time series (figure in '000 of units):

Year	Sales (St)
1	28.0
2	29.0
3	28.5
4	31.0
5	34.2
6	32.7
7	33.5
8	31.8
9	31.9
10	34.3
11	35.2
12	36.0

Assuming the forecaster has set "**N"** to be equal to **4**, make a forecast of sales for the periods 5 through 12.

Solution:

$$F5 = \frac{28+29+28.5+31}{4} = 29.1$$

$$F6 = \frac{29+28.5+31+34.2}{4} = 30.7$$

$$F7 = \frac{28.5 + 31+34.2+32.7}{4} = 31.6$$

.

.

.

$$F12 = \frac{31.8+31.9+34.3+35.2}{4} = 33.3$$

Other traditional forecasting techniques such as the naïve method may also be used. A naïve method assumes constant amount of demand from period to period though it may not be appropriate method of forecasting.

3) Causal Method for Demand Forecasting

It has several methods of forecasting. These are:

Consumption level method

Income elasticity of demand

Price elasticity of demand

End use method (also called Consumption Coefficient

Method) Leading Indicator method

Chain Ratio method

It is a causal method to forecast sales. Under this approach, the potential sales of a product may be estimated by applying a series of factors that are likely affecting the demand for the product and hence, used to measure the level of aggregate demand.

Example: General Foods of US estimates the potential sales for a new product, a freeze-Fried instant Coffee (Maxim), in the following manner:

- Total amount of coffee sales---------- 174.5 million units
- Proportion of coffee used at home ---------- 0.835
- Coffee used at home---------- 145.7 million units
- Proportion of non-decaffeinated coffee used at home ------- 0.937
- Non-decaffeinated coffee used at home ---------- 136.5 million units
- Proportion of instant coffee ---------- 0.400
- Instant non-decaffeinated coffee used at home-------- 54.6 million units
- Estimated long-run market share for maxim ---------- 0.08
- Potential sales of Maxim ---------- ***4.37 million units***

==========

Problems in demand Forecasting

Data may not be available (few observations)

Available data may not be structured; and may not be suitable for analysis and investigation (lack of standardization).

Influence of abnormal factors (war, natural disaster). Data needed may be classified one for use.

Uncertainty- the forecasting period is full of uncertainties. Environmental change:

- Technological changes
- Shift in government policy
- Developments in the international scene
- Discovery of new sources of raw materials

Model constraint

- Difficult to identify a suitable model
- Inability to handle unquantifiable factors
- Unrealistic assumptions
- Excessive data requirement

Activity 4.2

What are the basic steps in forecasting demand?

Discuss the qualitative methods of market demand analysis.

Explain the quantitative methods of demand forecasting.

4.2. PRODUCTION PROGRAM AND PLANT CAPACITY

Production program is one of an important dimension that based on the market demand analysis. The feasibility report of market demand analysis is base for scheduling the production program to utilize the plant capacity. Therefore, before analyzing the production program we will see the sales program, which is based up on the demand analysis in the previous section.

4.2.1. Production Program: Basis and Aspects

4.2.1.1. Sales Program as a Basis

Sales program shows the **level** of **sales forecast to be realized** during the **specified life** of the envisaged plant in terms of local sales, export sales, total revenues over the project life, etc.

Sales program is projected under market analysis

Market requirements and market structure identified

Marketing strategies will be defined & the implications, broadly, in terms of:

Product pricing,

Production program,

Promotional efforts,

Sales & distribution mechanisms, etc

Marketing mix - combination of the controllable marketing variables

Demand forecasting

Provides inputs for financial analysis

After projecting sales for different stages of production, a feasibility study should define and come up with the detailed *production program*. A production program defines the level of output to be produced during specified period and, from this viewpoint, we can say that it should be directly related to the specific sales forecasts.

4.2.2. Aspects of Production Program

The demand and market analysis specify *the sales program*, which should be transformed into the *plant production program,* taking into account losses of production within the production plant, in storage, transportation, and by warranty service. ***It indicates the level of output and the timing for production.***

Objectives:

To determine the type and range of products to be produced over the life of the envisaged plant.

To show the level of capacity utilization expected and the quantity of production.

Considerations:

Determining **capacity utilization**: The production program should indicate the quantity of outputs to be produced each time in the planning horizon and hence, the associated level of capacity utilization in terms of initial production period, intermediate production period, and full production stages.

Determining the **type of products** or **range of product**s produced over the life of the envisaged plant in terms of:

main product,

by-products and reworks, and

associated wasted units & scraps

It is related to the sales program (sales forecast)

The determinants of a production program during the initial production years vary considerably from project to project**.** Thus, different approaches would be adapted for different industries**.** *Below are examples of manufacturing firms that produce a single product and multiple products:*

Single Product Manufacturers Vs Multiple Product Manufacturers

Cement factory	Electronics factory
Coal factory	Machine tools
Tea factory	Leather products factory
Sugar factory	Food complex factory
Garment Factory	Oil Refinery

Accordingly, the production process also varies among such manufacturing firms. Consider the following four cases as an illustration:

Case 1: Single-product-continuous process manufacturing as in cement production;
Case 2: Multiple- products-continuous process production as in an oil refinery;
Case 3: Batch/job orders production such as in an engineering workshop; and
Case 4: Assembly/mass manufacturing as for the production of motor cars

In the ***first case***, the growth of sales may not be a great problem unless production capacity is in excess of local demand.

However, production problems may be more critical.

In ***the second case***, both production and sales problems may arise.

In the ***third case***, though production aspects may present difficulties, obtaining satisfactory orders would be critical.

In **the *fourth case***, the sales aspects in relation to price would

be dominant. Exhibit 7.1 summarizes this.

Exhibit 3.2.1: Determinants of Production Program

Cases	Production Process	Remark(Determinants of production
Single product case	Continuous production (Ex. Cement)	**Sales may not** be a problem, unless **Local Supply > Demand**
Multiple Products case	Continuous production (Ex.Oil refinery)	**Production** and **sales** problems may arise
Order-based Production	Batch job orders Production (Ex. Engineering work shops)	Obtaining satisfactory order will be critical Production difficulties may also exist. [Ability to reduce the production cycle time and set up time is important]
Assembly & Mass production	Assembly Line and Mass Production process (Ex. Motor cars)	Sales would be critical

Furthermore, an important aspect that needs to be considered in developing production program is capacity utilization. In this regard, the production program changes over time during the project's life with respect to **capacity utilization**.

In general, the initial level of production may not be higher than 40 to 50% of the overall design capacity, for instance, for the first one or two years of operation. This is because market may not be ready to acquire large amount of new product or technological difficulties may obstruct the full-capacity operation of the equipment.

Apparently, full production capacity is being reached usually towards the third or fourth year and stabilizes for about 10 to 15 years.

In this regard, the growth of the demand and continuous improvement in technology usually encourages modernization of a project by updating the production equipment, which helps to stabilize production and enables the firm compete for additional years in the market.

After certain period (probably 30 or more years), however, the project necessarily terminates production due to the low market competitiveness, de-capitalization of the equipment, and/or, sometimes, due to environmental reasons, as old plants often result more environmental pollutions as compared to new ones.

Therefore, while planning a production program, the various production stages should be considered in detail, both in terms of production activities and timing. Within the overall plant capacity, there can be various levels of production activities during different stages that are determined by various factors in different projects as discussed earlier. It would be prudent to recognize the fact that full production may not be practicable for most projects during the initial production operations.

In general:

Even if full production were to be achieved in the first year, *marketing and sales* might prove a bottleneck.

At the initial years, production may be programmed at well below the full capacity in order to adjust *a gradual growth of demand* for a particular product.

Growth of skills in operations can also be a limiting factor in a number of industries and hence, production has to be tailored to the development of such skills and productivity. **Extraction rates and operating ratios** should be effectively determined and adequately planned.

Once a production program defines the levels of outputs in terms of end product, and possibly of intermediate products, and the operating ratio

between various production lines and processes, **the specific requirements of materials and labor should be qualified for each stage.**

The *specific quantities needed* for each stage of the production program and costs that these entail should be determined.

The input requirements and costs have to be assessed in terms of:

Basic materials such as raw materials, semi-processed items, bought-out items, etc

Auxiliary materials and factory supplies,

Major utilities, and

Direct labor requirements.

Detailed estimates, in this regard, should be prepared for the stages of *initial production* and *full production*. The next section summarizes the above considerations (or factors) in setting production program.

4.2.3 Factors Considered in setting the Production Program

Production Level (Capacity Utilization

Production may not be at full capacity during the initial period due to: Production and technological difficulties

New technology,

Design of the production process, Flow of operation, etc

Skill and productivity to be learned

Lack of marketing experience (commercial difficulties)

Market forecast needs testing – to see the actual demand for the product

Plant is new for competition - more time needed to cope up with the competitive environment

A level of 40 – 50% of overall capacity utilization in the first year may not be too low.

In later years, capacity utilization might increase due to learning and/or effects of experience/improvements in skill.

Production Problems:

Machine breakdowns and problems of line balancing in operations; raw material shortages or materials may not be up to the standard; utilities shortage, etc.

Wide range of production problems shall be anticipated while setting the production program

Contingency plan should be worked out to use alternative options or facilities

Wastage and Spoilage:

Try to avoid abnormal spoilages & wastages, and only anticipate normal ones. Note that abnormal spoilages and wastages can be eliminated through efficiency in operations and, thus, are controllable/avoidable. However, normal spoilages and wastages are not controllable or unavoidable.

Anticipate/Allow for → Normal wastage
Normal spoilage

Price Vs Quantity Sales:

Sales might be affected by the price established. That is, the impact of higher prices may be reflected in terms of lower sales volume/quantity. Lower sales volume, in turn, affects the production program. The price charged for goods/services, therefore, affects the production program and hence, should be taken in to account.

4.2.4 Determination of Plant Capacity

The term **"plant capacity**" can generally be defined as the volume or number of units that can be produced during a given period. This definition implies the output expectations from a production plant. The same definition holds for service capacities too.

Objectives:

To identify factors affecting capacity decisions

To examine alternative capacity levels in view of sales, profitability, technology, and so on

To determine the feasible normal level of plant capacity

To provide a basis for determining capacity costs (investment costs in capacity)

4.2.4.1. Factors Affecting Capacity Decisions

Technological Requirements:

It is a minimum economic size determined by the technological factor. For many industrial projects, there is certain minimum economic size determined by the technological factor. For example, a cement plant should have a capacity of at least 300 tons per day in order to use the rotary kilos method, or else it has to employ the vertical shaft method, which is suitable for lower capacity plants.

2. Input Constraints:

In developing countries, there often are constraints on the availability of certain inputs. The following are, among others, mentionable:

Power supply may be limited

Basic raw materials may be scarce

Foreign exchange available for imports may be inadequate

These constraints should be borne in mind while choosing the plant capacity

3. Investment Cost:

In general, investment cost per unit of capacity decreases as the plant capacity increases (i.e. capacity cost increases at a decreasing rate). That is, some capacity costs remain the same regardless of the size of the plant [for instance, installation costs, technicians charges, etc]; and the rest often increase still at a lesser proportion. In other words, as capacity increases, the investment cost per unit of capacity decreases.

The capacity-cost relationship could be defined by the following equation:

$$C_2 = C_1 X \left\{ \frac{Q_2}{Q_1} \right\}^{\alpha}$$

Where:

C1 = Known cost for Q1 units of capacity

C2-= Derived cost for Q2 units of capacity

= (Alpha), which is a factor reflecting capacity-cost relationship Alpha is usually set in between 0.2 and 0.9.

If **α** = 0, it means that there is no relationship between capacity and cost; and

If **α** = 1, it means that capacity cost increases in the same proportion with the increase in the level of capacity.

Therefore, the specified range implies the fact that capacity costs increase at a decreasing rate.

For example, assume that:

C1 = Birr 1,000,000 that represents the investment cost in capacity level Q1,

Q1 = 5,000 units per annum at the normal capacity level, and

= 0.6, reflecting the capacity-cost relationship.

Required: How much will be the investment cost in new capacity (C2) for a level of production (Q2) equal to 10,000 units per annum?

Solution:

$$C_2 = C_1 X \left\{\frac{Q_2}{Q_1}\right\}^{\alpha}$$

Where C2= Derived cost for Q2 units of capacity

C1= Known cost for Q1 units of capacity

α = Capacity- cost relationship

$$C2 = \text{Birr } 1000{,}000 \text{ x } \left\{\frac{10{,}000}{5000}\right\}^{0.6}$$

= **Birr <u>1,515,716.57</u>**

The implication here is that, although capacity level has doubled, the investment cost in capacity has increased to a level that is less than the double cost of the earlier one.

Market Conditions:

The anticipated market for the product has an important bearing on plant capacity.

If the market for the product is likely to be very strong, a plant of higher capacity is preferable.

If the market is likely to be uncertain, it might be advantageous to start with a small capacity.

If the market starting from a small base, but is expected to grow rapidly, the initial capacity may be set to be higher than the initial level of demand.

Further addition to capacity may be effected with the growth of market.

Resources of the Firm:

The following resources define a limit on a firm's capacity decision:

Managerial infrastructure,

Finance, and

Availability of skilled employees to a firm

Government Policy:

Minimum Economic Capacity Policy in several industries

Economic use of raw materials and other scarce resources such as land, capital, etc

Economies of scale and subsequent low prices to consumers

Optimum investment in imported machinery & equipment (to save foreign exchange)

To minimize fragmented (small-scale) investments and encourage long-term investments in large capacity plants

Government policies and regulations with regard to working hours, pollution, etc

4.2.5 Feasible Normal Capacity (FNC)

Once the marketing concept and the corresponding sales volume are defined, other components have to be assessed to determine the feasible normal plant capacity. This capacity should, in fact, represent the optimum level of production as may be determined by the *relative interactions of various components of the feasibility study such as technology, availability of resources, investment and production costs, raw materials and supplies (auxiliary & utilities), human resources, etc.*

The FNC is achievable under normal working conditions taking into account the following conditions:

Installed equipment:

Level of sophistication (technical)

Standard of operation (Rate of operation) Specific characteristics

Technical plant conditions:

Down time (a period where by the plant is not in operation or not running due to technical requirements)

Maintenance requirement Tool checks

Organizational and management aspects:

Normal working hours

Holidays

Normal labor strikes

Ability to manage and coordinate diverse interactions Availability of inputs

Skill of employees (i.e. employee skill should fit to the technological requirement)

The feasible normal capacity is the number of units produced during a given period under the above conditions and that should correspond to the sales projections in the market and demand analysis. Therefore, *both Human Factor and System Engineering define Feasible Normal Capacity (FNC), which is "Plant plus Human".*

4.2.6 Nominal Maximum Capacity (NMC)

This is the technically feasible capacity and frequently corresponds to the installed capacity as guaranteed by the supplier of the plant.

Nominal maximum capacity is defined by system engineering, that is, the equipment installed capacity, which includes reserve and stand-by capacity.

To reach the maximum output figures, overtime work may be needed as well as it might result in excessive consumption of factory supplies, utilities, spare parts, and wear & tear parts.

This results in a disproportionate production cost increase, which is called diseconomies of scale.

In general, the FNC is less than the NMC under normal condition.

4.2.7 Determination of Feasible Normal Capacity (FNC)

In feasibility study, the determination of the appropriate plant capacity is critical. Forecasts of demand and market penetration strategies for a particular product are the staring points. The limited availability of basic materials and inputs or resources may be constraints for certain projects, requiring evaluation of various alternative possibilities of plant sizes and capacity. These alternatives have to be related to various levels of production and different

levels of sales and profitability.

In short, the steps involved are the following:

Identify alternative possibilities of plant size & capacity

Determine various levels of production capacity utilization

Examine the different level of sales & profitability expected

Plant Size	**Capacity Utilization**		**Level of sales and Profit**
Small scale		Initial	_____
Medium size	**Vis-à-vis**	Intermediate	_____
Large size		Full scale	_____

Once the overall constraints on demand and market forecasts are defined, other components of the study have to be assessed to determine the feasible normal plant capacity. This capacity represents **the optimum level of production.**
One of the aspects (components) can be critical for determining the feasible normal plant capacity of a project, but the implications of all the above aspects should be taken into account**.**

Finally, prior to capacity determination, the ***minimum economic size,*** **availability of production technologies, and equipment related to various production levels** should be determined. Production capacities have tended to increase rapidly in a number of sectors in industrialized countries to take greater advantage of economies of scales. Increased capacities give increased output resulting in lower unit production costs. Another important factor is that the available process technology and equipment are often standardized at specific capacities in different production sectors.

Activity 4.2

What is the importance of production program analysis?

How sales can be used as a base for production program analysis?

How the production program can influence the plant capacity?

What are the factor you recommend to be considered while production program and capacity decision?

4.3. RAW MATERIALS AND SUPPLIES STUDY

4.3.1. Introduction

An important aspect of technical analysis is concerned with defining the materials and supplies required, specifying their properties in some detail, and setting up their supply program. There is a close relationship between the study of raw materials and supplies required and other project formulation stages, such as definition of plant capacity, location, and selection of technology and equipment, as these inevitably interact with each other. The main basis for the selection of materials and inputs is, however, the *demand analysis,* the *production program, and finally the plant capacity*. Therefore, we need to examine and/or assess issues pertaining to material and input requirements of a particular project in the feasibility study.

Objectives of Input Study

To determine the:

Types of raw materials and supplies required

Availability of basic raw material suppliers

Quantity of raw materials needed for the plant

Quality of raw materials and supplies available and needed

To estimate the cost of raw materials and supplies needed

To develop supply programs and devise supply marketing schemes

4.3.2. UNIDO Approach in the Study

The approach followed by UNIDO in the study ***of raw materials and supplies*** is as follows:

Step 1: **Classification of Raw Materials:**

Raw materials (unprocessed and semi-processed)

Agricultural products,

Livestock and forest products,

Marine products, and

Mineral products

Processed Industrial Materials and Components

Factory Supplies: *Auxiliary materials, utilities, and spare parts*

Step 2: Specification of Requirements:

Product characteristics and material inputs

Requirements of raw materials and factory supplies

Step 3: Check Availability and Supply of Inputs

Step 4: Supply Marketing and Supply Program:

Supply Marketing , with the objective of:

Cost minimization

Risk minimization (reliable supply sources)

Cultivating relations with the suppliers

Supply program

Step 5: Estimate Costs of Raw Materials and Supplies

Unit costs, annual costs, and overhead costs**.** In this text, therefore, the approach followed by the UNIDO is adopted and each of the aspects indicated in the above five steps is explained next.

4.3.3. Classification of Raw Materials and Supplies

Raw Materials (Unprocessed and Semi–processed)

a. Agricultural Products

If the basic material is an agricultural product, first the quality of the product must be identified. Assessment of the *quantities currently and potentially available* may be a cardinal and/or fundamental feature in pre-investment studies involving the use of agricultural products. In food-processing industries, only the *marketable surpluses* of agricultural produce should be viewed as raw materials, which are the residue remaining after the quantities required for *consumption and sowing* by producers been subtracted from the total crop production. In case of *commercial crops*, the marketing surplus is the total production minus sowing (seeds) requirements.

If the project involves large quantities, the production of agricultural input may have to be increased. This may require the extension of the area under cultivation. For instance, for a Sugar Factory, we need to increase within the same region for plantation of sugar cane because it cannot be transported over long distance without **high costs, loss** of content, or both. In order to estimate the supply and availability of agricultural products, therefore, it may be

necessary to collect data on past crop production pattern, productivity, and their distribution by market segment. In the mean time, storage and transport costs should be assessed.

b. Livestock and Forest Products

In most cases of livestock produce and forest resources, **specific surveys are called for** to establish the viability of an industrial project. However, general data from official sources and local authorities that is only sufficient for opportunity studies is required.

c. Marine Products

The major problem in marine-based raw materials is to assess the *potential of availability, the yields, and cost of collection.* Availability of marine products may not only depend on ecological factors, but also on national polices and bilateral or multilateral agreements, for instance, ***fishing quotas.***

d. Mineral Products

For mineral products, detailed information on the proposed exploitable deposits is essential and proven reserves are needed. The availability of **opencast** or **underground mining**; the location, size, depth, and quality of deposits; and the impurities and the need for beneficiation should be qualified. A detailed analysis of physical, chemical, and other properties of the minerals is required

Processed Industrial Materials and Components

Processed industrial materials and components constitute an expanding category of basic inputs for various industries in developing countries. Such inputs can generally be classified under:

Base metals,

Semi-processed materials, and

Manufactured parts: components for assembly type and engineering goods industry

It is necessary to define *requirements, availability, and costs*. The substitutability and prices of these materials depend, sometimes, on unstable international markets. The substitutability of such metals should be examined, (e.g. replacement of copper by aluminum in the case of electrical power lines). For chemicals and petrochemical industries, careful analysis is necessary with

regard to their availability from external sources, the costs, and the implications of domestic manufacture of such inputs.

Factory Supplies

a. Auxiliary Materials:

All manufacturing projects require various auxiliary materials and utilities summed to be factory supplies. It is not always easy to distinguish between

Auxiliary Materials, such as Chemicals, Additives, Packaging Materials, Paints, and Varnishes and

Factory Supplies such as Maintenance Materials, Oils, Greases, and Cleaning Materials, since these terms are used interchangeably.

Packaging Materials, Containers, and Crates:

All types of containers and packaging materials serve, in principle, two purposes.

These are for **physically holding** as well as **protecting a product** (semi-product or finished) stored by the producer, distributor, or consumer.

The cost of the materials may be considerable in relation to the production costs of the product sold.

Utilities:

A detailed assessment of the *utilities required* (electricity, water, steam, compressed air, fuel, and their efficient disposals) could only be made after analysis and selection of location, technology, and plant capacity. However, the general assessment of these is a necessary part of the input study. An estimate of *utilities consumption* is essential for identifying the existing sources of supply, any bottlenecks, and shortages that exist or are likely to develop. This, in turn, helps to respond properly and take measures in advance, for instance, to provide for either internal or external addition of supplies in good time.

The assessment of utilities includes, inter alia, the following:

Electricity:

An analysis of the energy situation must specify the requirement, sources, availability, and costs of supply of electric power.

The maximum power demand, the connected load, peak-load, and possible stand-by requirement as well as the daily and annual

consumption, both by shift and in total, must, therefore, be estimated in a feasibility study.

Fuel:

When using large quantities of solid and liquid combustion materials, all the relevant environment protection technologies will have to be integrated in the planning and analysis of a project. Consequently, the price of energy inputs will have to be increased by the costs of disposal measures (filters, desulphurization, etc).

Water:

A general estimate should be made of water requirements for the production process, auxiliary purpose, and general purpose so that these can be considered in location decisions at which stage the cost can be specifically defined.

c. Spare Parts:

All machinery and equipment will finally break down after a certain lifetime. Various spare parts will be required to keep a plant in operation. The importance of correctly *identifying essential spare parts, the quantities required, and available suppliers* cannot be overemphasized. Usually, the initial investment includes spare parts for the first one or two years of plant operations under the heading of the initial net working capital requirement (current assets). The consumption of spare parts during plant operation is a part of the annual production costs, which is a manufacturing overhead cost.

4.3.4. Determination/Specification of Requirements

In order to estimate the materials and supplies to be used during the future operation of the plant, the requirement should be identified, analyzed, and specified in feasibility study, both quantitatively and qualitatively. In this regard, a number of factors such as socio-economic, financial, and technical should be considered in specifying the requirement.

The specification of *raw materials and factory supplies*, as required for the envisaged production technologies, is the basis for the assessment and analysis of *the availability of the project inputs*. Therefore, the determination of raw material inputs and factory supplies can be carried out in later stages

only, as they depend on the type of production technology to be used.

Project Characteristics and Material Inputs

In a given industry, the envisaged plant can be capital or labor intensive, computerized or mechanized, complex or simple, and so on. The nominal and feasible plant capacity will have to be defined on the basis of varying supply conditions. Any significant dependencies of the production mix and production target on raw materials and factory supplies should be identified in view of market potential, expected sales, transport facilities, and production capacity. Moreover, the feasible capacity and projected production level will depend not only on engineering factors, but also on the number of shifts and products, the number and skills of the labor force, marketing strategies, managerial infrastructure, and availability of external infrastructures. In general, the characteristics of the project, therefore, have an important bearing on the determination of the material inputs to be used.

Requirements of Raw Materials and Factory Supplies

The determination of requirements of raw materials and factory supplies forms the *basis for the supply program and the subsequent cost estimates*. In this regard, the specifications of requirements should be made in view of (or include) the following:

a. **User Demand:**

Users of the finished goods (or outputs of the project) have their own expectations and/or demands that will have implications over not only on the choice of technology, machinery, and equipment, but also on the type and quality of materials and inputs used.

b. Quantity Required:

The quantities required can be expressed in terms of units produced (i.e. items, tones, cubic meters); section of the production process (for auxiliary materials, utilities, spare parts); machine or labor hours (for factory supplies, spare parts); and number of employees (for medicine, social costs, etc).

c. Qualitative Properties:

These include

Physical properties (size, dimension, form, state, etc.);

Mechanical properties (formability, elasticity, fatigue, and hardness);
Chemical properties (form, composition policy, oxidizing, etc); and
Electrical and Magnetic properties (for instance, magnetization resistance).

4.3.5. Availability and Supply

A number of projects are conceived either to *exploit available raw materials* or to *utilize basic materials that become available* from other production process.

A feasibility study should, therefore, show how the materials and inputs required will be *provided.*

General availability and data about materials, potential users, and supply sources & supply programs are aspects that should be analyzed and described.

At the initial stage of the study, the quantity of basic material inputs that may be required should be assessed principally for determining *availability, sources, and long-term needs.*

Final input requirement will be determined only after the *plant capacity*, *technology, and equipment* to be used are defined.

If a basic input is available within country, its location and the area of supplies should be determined. The issue of *transportability and transport costs* should be analyzed. The distance covered for transporting basic material inputs and the available & potential means of transport should be defined together with possible bottlenecks.

When the basic material is imported, as a whole or in part,

The implications of such imports, the sources, and the alternatives should be fully assessed as well as determined.

Along with this, the uncertainty that may relate to imported inputs should be stated as well as the possibilities and *implications of domestic production* of a basic material that is being imported should be analyzed.

Input alternatives should be identified, as different varieties of raw materials can be used for the production of the same output. In other

words, assessment of opportunities for substitutions (or substitutability analysis) should be made.

4.3.6. Supply Marketing and Supply Program

An enterprise acts as a buyer on supply markets when purchasing required raw materials and factory supplies and as a seller in the markets for finished goods/services. Supplying marketing, therefore, is defined as the acts of an institution in the supply market in order to acquire basic inputs through backward integration with suppliers.

4.3.6.1. Objectives of Supply Marketing

The basic objectives of supply marketing are cost minimization, risk minimization (by identifying reliable suppliers), and creating better relationships with suppliers.

Cost Minimization:

Input costs can be reduced by selecting appropriate suppliers and by choosing a proper volume and frequency of orders.

Economic Order Quantity/Size

Risk Minimization and Reliability of Suppliers:

Reliability with regard to quantity, quality, deadlines (schedule), and prices is significant for the entire manufacturing process.

Late deliveries, lack of quality, or poor maintenance services negatively influence the projects activities.

3. Cultivating Relations with Suppliers:

Purchases should focus not only on acceptable prices, but also on establishing smooth, productive, and long- term relations with the suppliers.

Purchasing prices and conditions largely depend on the bargaining power of the project and its management.

Building up maximum bargaining power is needed.

It is essential to identify possible *supply alternatives (and/or* suppliers) and the *quantities* to be purchased from each should be determined in the study.

4.3.6.2. Supply Program

A supply program is an outline that shows how supplies of materials and inputs will be secured, along with evidence presented to justify the assumptions and suggestions. The subsequent cost estimates, in this regard, should be based on the supply program presented. A *supply program* should deal with:

Identification of supplying sources and suppliers,
Agreement and regulations,
Quantities and qualities,
Consignments,
Means of transport,
Storage, and
Risk assessment

While identifying suppliers, considerations should be made with regard to

- Geographic location,
- Ownership,
- Main activities,
- Financial strength and profitability,
- Production capacity, and
- Business experience with the product.

The types of agreement, such as long-term contracts and license agreements, should be presented. *Letters of intent* regarding supply contract & obligation and agreements such as period of validity, payment terms, currency conditions, and guarantees should be outlined.

4.3.7. Cost of Raw Materials and Supplies

a. Unit Costs:

Not only the availability but also the unit costs of basic materials and factory supplies have to be analyzed in detail, as this is a critical factor for determining project economies. In the case of domestic materials, current prices have to be viewed in the context of past trends and future projection of the elasticity of supply.

The costs of alternative means of transport should be considered as well. For

imported material inputs, the following costs should be considered

C.I.F prices (i.e. the sum of costs, insurances, and freight charges) should invariably be adopted

Clearing charges including loading & unloading charges and port charges, Tariffs and local insurance, and

Cost of internal transport to the plant.

The prices of imported inputs generally fluctuate and depend on international market situations.

b. Annual Costs:

Estimates of annual costs for materials and supplies are to be made. The price basis for the estimates, (price level, quotations from suppliers, world market prices, comparisons with similar inputs in other projects, etc.), should be stated in order to enable the reader to check their reliability. The price mechanism should be explored. In this regard, some prices may be fixed or may be related to an international index for a certain period. Others, however, may be subject to a predetermined rate of escalation or renegotiated every year.

The feasibility study should also

- Determine key factors affecting prices,
- State whether a monopolistic or oligopolistic market situation exist,
- Identify possibilities for obtaining preferential prices, and
- Specify government or other administrative price controls, if they exist.
- Cost estimates are to be divided into foreign and local currency components as per the UNIDO procedures.

The currencies most likely to be used and the exchange rates applied for the cost estimates should be identified, as this will help in making sensitivity analysis. It must be made clear, in this regard, that whether the cost estimates refer to

A hypothetical level of production at full capacity utilization during the operating phase or

The first year (or some other year) of operation according to the time schedule for project implementation.

In the latter case, possible price escalation should be considered and related to a

realistic judgment of feasible capacity utilization.

Note that total fixed costs remain the same but unit fixed costs vary with changes in the level of production. Some costs vary with the production level of the plant in question, while others are more or less fixed. For example, the normal tariff for electricity is divided into an annual fixed fee and a consumption fee per kilowatt/ hour.

Costs should be divided into variable and fixed costs due to variations in the level of production. In this regard, costs should be related to certain production level and, thus, cost estimates for materials and inputs can be expressed either as the cost per unit produced or in terms of a certain production level – (full capacity utilization). At whatever level, it is possible to carry out sensitivity analysis for different levels of production and capacity utilization at the stage of financial appraisal.

In estimating costs, the following information should be presented:

Type of material and input,
Unit of measurement (barrels, cubic meters, etc),
Number of input units consumed (used) per unit of output produced, Estimated cost per input unit,
Estimated cost per unit of output produced,
Estimated cost per unit produced divided into direct, (which are mostly variable costs), and indirect, (predominately fixed and comprised of overheads), cost components.
Direct cost per unit of output produced should be divided into foreign and local currency components (expressed in one currency), often in local currency. Indirect costs per unit of output produced divided into foreign and local currency components.

In order to arrive at the total operating cost by product as well as the total costs per year, the total number of units to be produced should be multiplied by the estimated cost per unit. Costs are projected over the production period.

c. Overhead Costs of Supplies:

When estimating material and input requirements by project components, the project planner has to plan not only at the level of production cost centers,

but also at the level of service, administration and finance, and sales cost centers. Thus, estimation of supplies and their costs should be made.

Activity 4.3

Why raw material analysis is important for a project?

What are the types of raw materials and supplies in project?

What are the costs of raw material?

4.4. Location, Site Selection and Environmental Impact Assessment

Introduction

The main issues of the feasibility study being addressed in this chapter are determination of the specific location and site suitable for the project. Location and site are often used interchangeably but must be distinguished. Ideally, a project can be located in lots of potential locations and specific sites. But a project shall be put at a project location taking in to account various factors such as proximity to inputs or to markets and others.

In addition, the specific site of a project shall be properly studied and selected in a chosen location as there may be various sites for a project in a certain area of location. It is obvious that the location and site of the project not only affect the profitability of the project but also influences the long-run goodwill of the company. Hence, they shall be selected considering various relevant factors. Project location and site selection also affects the lives of the residents in positive as well as in negative ways. A proper environmental impact assessment is essential before locating a project somewhere.

Basic issues concerning Location and Site

The choice of location and site follows an assessment of demand size, and input requirements. It is part of the technical analysis of the feasibility study. As has been indicated above, though often used interchangeably, the terms location and site should be distinguished.

Location refers to a fairly broad, general geographical area, such as city or sub-city, an industrial zone, or a coastal area. But site refers to a specific piece of land where the project would be set up. It may refer to the specific kebele or village for instance in erecting a project.

4.4.1. Location Analysis

Location analysis has to identify locations suitable for the industrial project under consideration. A project can potentially located in a number of alternative regions and it is made from a wide geographical area within which several alternative sites may have to be considered. The choice of location is not always based on systematic step by step analysis and assessment of a gradually reduced number of possible locations ending with the optimum solution. A location may sometimes be suggested at an early stage by the project promoter. However, the methodology of analyzing such a suggestion is the same and the location in question will still have to fulfill the key requirements identified as an essential or critical for a feasible and viable implementation, and operation of the project. The impacts and requirements to be identified may be classified as follows:

- Natural environment, geographical conditions and protection requirements.
  Ecological impact of the project, environmental impact assessment.
- Socioeconomic policies, incentives and restrictions, and government plans and policies
  Infrastructural services, condition and requirements, such
  as: the existing industrial infrastructure,
  the economic and social infrastructure,
  the industrial framework,
  urbanization
  and literacy

The identification of key requirements helps to reduce the number of potential locations and sites at an early stage. An analysis of key aspects is basically made in qualitative terms and does not enter in to any financial calculations.
The primary task at this stage is rather to sort out unrealistic and less attractive alternatives through preliminary analysis than to make the correct rating.

The Natural Environment

In selecting a location for a project, two issues related to the natural environment shall be critically observed:

Climatic conditions and
Ecological requirements

Climate is one of the important factors in the choice of locations.

On one hand, there is a direct impact on the project costs of such factors as dehumidification, air conditioning, refrigeration, or special drainage.

On the other hand, the environmental effects of the project may be significant. Hence, information shall be gathered on temperature rainfall, flooding, dust, fumes, and other factors for different locations.

Climatic conditions can also determine the success of a project in an indirect way the construction, the operation and management of the plant may be less efficient or more expensive if an adequately skilled labor force is reluctant to work in areas with extreme climatic conditions. Thus, climatic conditions shall be specified in terms of:

- air temperature
- humidity
- sunshine hours
- winds
- precipitation
- hurricane risk, etc

Each of these can be specified in great deal such as maximum, minimum, and average temperatures on an average day in particular months or over a period of ten years.

Environmental Impact Assessment (EIA)

Environmental impact assessment (EIA) is an assessment which aims at ensuring that development projects are environmentally sounded (friendly). Environmental impact assessment is designed top develop an understanding of the environmental consequences of a newly planned or existing project and of any project- related activities. This is another critical factor for the selection of location for a project. This issue is becoming very sensitive these days, especially, when project feasibility is developed for applying for international funding. So the feasibility study should include a thorough and realistic analysis of the environmental impact of industrial investment projects.

Environmental impact assessment is part of the project planning process. Environmental benefits or costs of a project are usually externalists or side effects that affect the society in a whole or in part. Actual economic actors take

decisions in the pursuit of their maximum benefit. When the identification, measurement and valuation of externalities are not translated in to prices via tax and subsidy arrangements, these actors, while acknowledging the presence of externalities, will take decisions without taking them in to account.

Some examples of tax and subsidy treatment of externalities will help understanding the case:

The manufacturer of the paper pulp demand large quantities of water. In the process, such water washes away chemical products thus becoming polluted. If the firm throws away the polluted water as it come out of the process, over ground and/or underground rivers become polluted too. As a consequence:

Drinking water will become dangerous for humans and cattle.

Fishes will become contaminated too and thus useless as food.

Water may become unsuitable for irrigation.

Water may become unsuitable for further use in other industrial process.

Tourism and nautical and fishing activities may suffer.

The paper pulp firm will not continue these damages as part of its costs unless a tax is imposed on the disposal of polluted water.

The building of dam for irrigation and electricity results in large artificial lakes that make for the possibility of :

Tourism and water sports

Increase in rainfalls.

The firm that manages the irrigation and electricity project will not compute these benefits in its balance sheet unless a subsidy is paid.

A further example is a family that repairs and paints the front of its house, planting a garden as well. All neighbors will benefit but none will pay.

In order to make prices reflect these externalities, in example one a tax may be imposed, calculated per cubic meter of polluted water. Such tax, by increasing t5he price of polluted water disposal, would be giving the right signal to the

decentralized decision making units, ion this case the paper pulp manufacturing firm. The tax would internalize in the polluting unit the cost born by other decentralized units as a result of that pollution. As a consequence, the polluters will face an option between:

Building a system to purify out-flowing water or

Paying taxes that will be used either to purify the water, or to compensate those damaged by the polluted water.

In example two the government may either:

Grant the rights to exploit tourism and water sports to the irrigation and electricity company if this is institutionally unfeasible,

Sell those rights to another company and pay the proceedings to the irrigation and Electricity Company.

In example three, the state may:

Grant prizes to the nicest houses in the neighborhood, levying a tax on real estate to finance them, and

Legislate on the maintenance of pavements and house fronts.

None of these taxes and subsidy is a simple transfer of funds. Tax and subsidy arrangements are meant to internalize externalities, charging (taxing) decentralized units (firms and families) for the damages and paying them for the benefits (subsidies, prizes). These instruments have role that was simply non-existent in the past.

Environmental impact assessment is required by a law in some countries and could be critical if international financing is sought for the project. It is also a requirement to include an EIA in a project feasibility study top get permit

The general objective of EIA being ensuring that development projects are environmentally sound, to arrive at appropriate decisions, public participation from the earliest stage throughout the development project cycle is essential. Environmental impact assessment as a result will have the following specific objective:

Promoting a comprehensive, interdisciplinary investigation of the environmental consequences of the project and its alternatives. Interdisciplinary persons are required because the environmental impact may have various forms.

Developing an understanding of the scope and magnitude of environmental impacts of the project under alternative designs.

Different design may have different impact and costs.

Incorporating any existing regulatory requirements in the project design, standards, environmental audit, …

Identifying measures for reducing adverse environmental impacts and enhancing beneficial impacts.

Identifying critical environmental problems which require further investigation.

To assess environmental impacts qualitatively and quantitatively, as a required, for the purpose of determining the overall environmental merit of each alternative.

The environmental impacts of each phase of the project development cycle will usually differ. During the planning phase for instance, the environmental effects will be strictly social and economic. New political and social alignments may arise among proponents and opponents.

The impacts of the construction phase are one time effects, while that of those of the operational phase are recurring. In addition, all the environmental impacts of a project may not be known immediately. Some of the impacts may be known after a longer period of time.

Socio-Economic Policies

The other factor influencing choice of location is socioeconomic policies. Socioeconomic policies encompass two basic factors:

Public policies- government regulations and restrictions about public policies may be critical for the location of a project. In public policies such as identification of industry zones, incentives to encourage investment projects, etc are important location factors. For example, some area may be prioritized for a certain project and/ or tax holiday may be given for projects in a certain area. Hence, investors will consider such advantages in selecting location.

The impact of public policies has increased considerably in recent years and the extent to which such policies are applicable to a particular investment proposal should be clearly defined.

Apart from the element of persuasion, public policies ay directly determine industrial locations when there is a substantial involvement of public or institutional finance. Hence, the location of some public financed projects may be decided by the government regardless of economic, market, and inputs consideration. This is because the project may be targeted to balance resource distribution among the society through locating projects in a backward regions or it may be based on a wider policy for regional dispersion of industries.

The Fiscal and legal regulations and procedures- applicable for alternative locations should be defined. The various national and local authorities to be contacted in respect of power and water supplies, building regulations, fiscal aspects, security needs, etc should be listed.

The corporate and individual income taxes, excise taxes, and other national or local taxes should be ascertained for different locations together with the incentives and concessions available for new industries. This should differ considerably for different areas and may be significant location determinants in some case. It would also be useful to list any building and other standards and regulations to which the project need to conform.

Infrastructural Conditions

Relevance of Infrastructure- The availability of a developed and diversified economic and social infrastructure is often of key importance for a project. The Feasibility study should identify such key infrastructural requirements because they are vital to the operation of any project. Quantitative and qualitative requirements for energy, utilities, labor, land, etc during construction and operation might be met only in a few locations if the project is relatively big size. Technical infrastructure and transport and communication will be seen here.

Transport and Communication- Transport facilities such as by water, rail, air, or road may be available for the inflow of various inputs and for the marketing products. As a result, a project that is judged as critically dependent on access to certain means of transport may have limited number of possible locations. The availability of good communication facilities including telex and telephone should also be ascertained for alternative locations. The same reasoning is usually

applicable for projects based on a biog consumption of power, water, factory supplies, human resources and waste disposal mechanisms.

Availability and cost shall be detailed for the total volume of inputs in to the proposed plant and the total out puts leaving the plant with comparisons for various alternative locations. This can be viewed as trade-off between proximity to suppliers/ inputs and proximity to markets for products.

Final Choice of location

The location requirements and conditions that are significant for the selection of both location and site should be judged against the defined corporate strategies and the financial and economic impact the final choice will have on the project. In a feasibility study, a good starting point for the final selection of a suitable location is:

The location of raw materials and factory supplies if the raw materials are bulky.

The location of the principal consumption centers in relation to the plant, in case project is market oriented i.e. if the products are perishable or more bulky than the raw materials.

If inputs are obtained from different sources, mathematical models may be used to optimize costs. And an intermediate location that may serve all purposes may also be selected. The simplest locational model is to calculate the transport production and distribution costs at alternative locations determined by the availability of raw materials and principal markets. However, as many industrial projects are affected by several factors, projects may be located at sources of resources, outlets of products or at intermediate levels without affecting project economies.

Choice of site

Once the location or alternative locations are decided up on, a specific project site or alternative sites should be defined in the feasibility study. This will require an evaluation of the characteristics of each site.

The feasibility study should analyze and assess alternative sites on the basis of key aspects and site specific requirements. Qualitative as well as quantitative considerations are to be taken in to account like that of location selection. Differences in existing social infrastructure facilities are sometimes as important as transport costs for material inputs and product distribution. The analysis

should result in a selection of a specific site and conclusions regarding the feasibility and viability.

The structure of site analysis is basically the same as that of location analysis and the key requirements identified for the location of the project may give guidance also for site selection. The selection of the specific site for the project could also be done simultaneously with choice of location and it shouldn't necessarily be done after location has been selected. Hence, when considering factors for location analysis, the factors used to evaluate potential sites may also be listed.

For sites available within a selected area, the following requirements and conditions are to be assessed:

Ecological conditions for sites- these include factors such as soil type, site hazards, seismic history, etc.

Environmental impacts- these include the nature of the project in relation to restrictions, standards and guidelines of the government concerning noise, air pollution, effects if it is close to reside3ntial areas, etc.

Cost of land- cost of land differs from site to site depending on the course of its proximity to main streets and other transport facilities, major markets, customers, etc. Hence, there will be some trade-off in here. To minimize cost of land, other qualities of the site may be compromised or vice versa.

I**nfrastructure**- This concerns the work involved in obtaining utility connections such as markets, resources, customers, etc and the cost associated with them.

Site preparation and development cost-Some areas are more appropriate for construction without much preparations and development efforts while other areas may need several works to make them ready for use. This will contribute to the cost of the land.

Strategy of the projects such as future expansion- some sites may be attractive with existing planned capacity but may not enable future expansion. After the project is in operation, the owners may think of expanding it in the future. Hence, a site that enables such as an expansion will be preferred.

The importance of each of these characteristics varies depending on the nature of the project, the type of civil constriction completed, the weight of the heavier equipment items, the type of effluent and the number of workers. Hence, different areas within the same region can be subjected to various restrictions and incentives, and environmental conditions may discourage the selection of sites close to an existing polluting industry such as abattoirs or sites within urban settlements in the immediate neighborhood.

Activity 4.4

Why location and site selection analysis is important for a project?

What is the difference between location and site analysis?

What is environment impact analysis?

4.5. Technology and Engineering Study

The technology and engineering study of project concerned about the technical feasibility of the project especially for construction projects like hydro-electric power projects and designing new products projects.

The technical assessment focuses on the technical resources available to the organization. It helps organizations determine whether the technical resources meet capacity and whether the technical team is capable of converting the ideas into working systems. Technical feasibility also involves evaluation of the hardware, software, and other technical requirements of the proposed system. As an exaggerated example, an organization wouldn't want to try to put Star Trek's transporters in their building currently; this project is not technically feasible.

The technical requirements will naturally be designed with the aim of defining a feasible project. However, the development of specific technical feasibility criteria can be useful to organize the information properly, increase overall transparency, and promote a stronger base for the recommendations provided at the end of the Appraisal Phase. Assessing technical feasibility can also highlight specific risks of the project that should be considered for the green light decision. Specific viability criteria, appropriate for the type of infrastructure and the corresponding services, should be used. Those criteria should address, at least, the following issues.

Does the infrastructure design meet the need specified during the Identification Phase?

Are the engineering and architectural requirements of the project achievable? If so, are they achievable at a price comparable with similar infrastructure?

Is the proposed technology (if a specific technology is being proposed, this may not always be the best approach as it may constrain innovation) proven or can the associated risks be properly managed or allocated?

Does the technical description of the project avoid, as far as possible, significant geo-technical risks? Does it avoid other unbearable technical risks?

Is there a complete assessment of geo-technical conditions (that showed the technical potential of the required construction on the site) that can affect the project, in terms of costs and time? This is particularly relevant for transport infrastructure, but it should be an assessment for all greenfield projects.

Is the scope of service viable from a regulatory perspective?

Can the service be specified in terms of outputs? If so, can the service be measured adequately though performance indicators? and

Can the main technological changes in the service delivery be satisfactorily estimated?

If the answer to all of the above questions is a confident yes, and no other exceptional technical issue was raised during this exercise, the project is technically feasible.

If the answer to some of the questions above is a confident no, the technical feasibility assessment should provide feedback to the technical requirements which should be appropriately changed, if possible, until a technically feasible project is obtained. If those changes are not possible, a recommendation for cancellation of the project should be considered.

It should be recognized that some projects do pose particular challenges for passing the technical feasibility assessment, specifically those that incorporate high levels of technical risks. The following characteristics highlight relevant technical risks associated with infrastructure initiatives.

Initiatives with technological complexities, such as projects that will use novel technology not significantly tested, or that will adapt technology not fully operational in the same conditions as the project under analysis;

Projects requiring difficult engineering innovations, such as works of art or complex transport structures (tunnels or bridges);

Projects built in particularly uncertain geo-technical conditions with consequences for a major part of the project costs (that is, a tunnel project or a large sea bridge);

Projects in areas with extraordinary natural risks in terms of weather or earthquakes; and

Projects with other complexities and uncertainties concerning the reliability of costs and time of construction, such as unknown or very old utility locations.

When a project has any of these characteristics it is even more important to soundly evaluate the technical feasibility to assess, as far as possible, the risks associated with the construction and operation of the asset. In particular, the following precautions should be considered.

Including industry experts in the project team;

Conducting careful evaluations of benchmarks and precedent projects with comparable risks, associated with an investigation of market interest; and

Including detailed information about the identified risks in the market sounding exercise, particularly searching for feedback of players in the construction industry or other relevant industries.

4.6. Organizational & Human Resource Study

4.6.1. Organizational Study

In general, the division of a company into *organizational units* in line with the marketing, supply, production, and administrative functions is necessary from operational and planning point of view.

The organizational set-up depends, largely, on the size and type of the industrial enterprise and the strategies, policies, and values of those in a position of power in the organization.

With this belief, the sections that follow briefly discuss the

managerial as well as technical issues in organizational design.

4.6.1.1 Plant Organization and Management

Definition: Organization is the means by which the operational functions and activities of the enterprise are structured and assigned to organizational units, represented by managerial staff, supervisors, and work force, with the objective of coordinating and controlling the performance of the enterprise and the achievement of its business targets**.**

The organization of an enterprise in general indicates the ***delegation of responsibilities*** to the various functional units of the company, which is often referred to as an organization.

The organization usually is designed primarily in line with the functions in the enterprise such as finance, marketing, purchasing, and manufacturing.

However, there is no unique organization pattern.

1. Organizational Functions

The ***organizational functions are the building blocks of the company that*** may be grouped into organizational units in line with the specific requirements of the individual company.

Organization of an enterprise commonly comprises the following organizational units:

General management of the enterprise
Finance, financial control, and accounting Personnel administration
Marketing, sales, and distribution
Supplies, transport, and storage
Production (such as main plant, service plants, quality assurance, maintenance and repairs)

Along with the above organization functions, the analyst has to consider the establishment of a number of ***cost centers.***

In this regard, the cost centers common to most manufacturing companies are the following:

1. ***Production cost centers*** are those areas of activity whereall

major industrial operations are performed within the context of a manufacturing establishment.

Service cost centers are those areas of activity that render the supplementary services necessary to the smooth running of the plant (social services, plant management, water supply, electricity, etc).

Administrative and finance cost centers comprise all activities related to managerial planning, control, and performance evaluation.

Larger factories maintain specialized centers for the following areas: Planning, Budgeting, Costing, Statistics, Personnel training, Accounting and finance, etc. For instance, costs and expenses related to administration and finance should be accumulated in one center under the designation of administration and finance. The same principle applies to the other, specialized cost centers.

2. Organizational Structure

The organizational structure of the company can take a number of shapes, the most common one being the pyramid shape, which has three organizational levels. These levels are:

Top Management,

Middle Management, and

Supervisor Management

4.6.1.2 Organizational Design

Objective:

The main objective in this case is to design the organizational set up needed to manage and control the project and the envisaged industrial establishment. To this end, as the organizational design for both the construction and the operating phase depends on internal and external project requirements and conditions, the analyst has to give due consideration to the same. Practically speaking, the design of the organization usually proceeds through the following steps:

State the goals and objective of the business

Identify the major functions that are necessary to achieve the goals Group (or relate) the necessary functions

Design the organizational framework or structure

Analyze, design, and describe all key jobs

Prepare recruitment and training program

The next few sections discuss the major functional areas in organizations.

General Management

The general manager with his office is responsible for the entrepreneurial functions.

The feasibility study should determine the *staffing requirements* for the office of the general manager in order to allow estimates of personnel and other overhead costs related to this office.

2. Accounting and Financial Control

An administrative unit in the form of a department has to be planned to provide the management with the financial and accounting information required for the efficient and economic operations of the enterprise. Production cost centers, service cost centers, and administration and financial cost centers are analyzed.

3. Marketing Organization

The marketing department is the organizational unit carrying out the marketing activities with an independent line function, which is designed taking in to account the nature of the product and the geographical distribution of its sales and distribution activities.

4. Organization of Supplies

The supply system includes the provision of inputs of materials and services, shipping of the goods, storage, and inventory control.

5. Organization of Storage

The flow of materials (purchasing – manufacturing – delivery) needs to be organized in order to ensure the operations of the factory goes smoothly & undisturbed.

Stock control must aim at keeping stocks of materials and products low to avoid unnecessarily high net working capital requirement, while maintaining the minimum stock required for sale and uninterrupted operation.

Organization of Production

The organization of the production plant is designed in accordance with the

production process and in line with the availability of human resources.

Like the other organizational units, the production section causes indirect costs, such as costs of plant management, general supplies, and services, which are included under factory overheads.

Organization of Quality Assurance

The quality assurance unit is responsible for the total quality of a product from its inception to its delivery to the end-users.

The scope and type of quality assurance depends on the industry and size of the project.

Labor and skills requirement vary in accordance with the level of quality assurance and the extent to which it will be responsible for quality monitoring of research, engineering, production, and service.

Organization of Maintenance

The structure of the maintenance unit also depends on the maintenance policy that is adopted by a given company.

In a situation where equipment suppliers or their agents are at hand, and where maintenance contractors can be easily found, the unit may only have to deal with preventive maintenance and emergency repairs, unless more maintenance operations will have to be undertaken in the unit otherwise.

If a maintenance unit is wholly dependent on its own resources, it will be responsible for both *preventive and corrective maintenance* of all plant equipment, auxiliary equipment, and buildings.

The unit should be mainly staffed with technicians, who should be directly involved in the daily maintenance operations.

9. Organization of Personnel

This deals with all subjects related to human resources such as *recruitment & training* of personnel and updating & developing skills and knowledge.

If management of the company staff and work force is relatively simple, there may not be need for a separate unit.

The study should determine the costs related to this organizational unit, and special attention should be given to costs arising during the start-up phase of the project.

4.6.2. HUMAN RESOURCE STUDY

1. Introduction

Once the production program, plant capacity, technological processes, and plant organization have been determined, the human resource requirements at various levels and during different stages of the project must be defined, as well as their availability and costs.

The successful implementation and operation of an industrial project needs diverse mix of human resources, categorically, composed of management personnel, staff, and workers with sufficient skills and experience.

Objective:

To determine the human resource requirement for the project in terms of quality, quantity, type, and cost.

The feasibility study, therefore, should identify and describe such requirements and assess *the availability of human resources as well as the training needs*.

Particular attention should be given to the definition and assessment of those *skills and experiences*, which may be *critical for the success* of the project.

The qualitative and quantitative human resource requirements of the project should be detailed in terms of:

The availability of personnel, quantity, and

type; Training needs and costs;

The cost estimates for wages, salaries, overtime, etc;

Other personnel related expenses (different benefit schemes); etc

Based on the qualitative and quantitative human resource requirements of the project, data will be provided for the financial analysis of the project.

2. Categories and Functions

The determination of human resources required is an important part of a feasibility study, because managerial or supervisory staff and skilled labor can be a critical factor for the success of a project.

The successful operation of well-designed industrial project will ultimately

depend on the *skill, experience, and productivity of workers, the staff, and management*.

Bad management or inadequate skills and experience of personnel in key positions can easily jeopardize a promising and carefully planned project. A project with great risk and uncertainties may prove, on the other hand, to be successful due to good management and qualified labor.

Human resources by category may be stated as:

General management,

Production management and supervision,

Administration (accounting, purchasing, etc), Marketing personnel,

Production control,

Machine operators, and Transport.

Socio–Economic and Cultural Environment

Human resource requirements not only depend on technology, economic, financial, or commercial factors, but also are determined to certain extent by social and socio- economic conditions in the country and location of the project.

Legislation and Labor Terms

Labor terms can be regulated by legislation or trade union contracts or can be based on common practices.

The prevailing rules regarding national holydays, shift work, working - hours, and annual, sick, & training leaves will have an impact on the effective number of working hours and days per year, and, therefore, affect the human resource requirement.

A. Labor Norms

The definition of human resources requirement should not depend on the adoption of labor norms prevailing in industrialized countries.

Rather it should be estimated on the basis of experiences of and comparisons with similar projects in the project country and region. This will help to estimate the realistic *effective machine hours and productivity*.

Occupational Safety

Minimum standards of occupational safety should be established and enforced. The study should assess the relevant existing regulations on occupational safety.

C. Health Care and Social Security

The project analyst should also identify and consider necessary plant components regarding arrangement for *health care and social security* for the human resource to be employed. The costs of such component need to be estimated and included in the cost tables.

5. Project Related Requirement

Staff and labor requirements have to be planned for the implementation or

pre-production phase as well as for the start-up and operating phases.

1. Pre-Production Phase

When estimating labor requirements, a distinction should be made between the pre-production and operating phases.

For the pre-production phase, the managerial staff, supervisors, and some foreman (supervisor) and specialized machine operators have to be recruited in advance, in order to attend the construction of buildings, installation of equipment, and to be trained themselves.

Foreign expertise may also be required. The man-month and periods of service should be specified.

The number of persons required together with costs and periods of service should be indicated.

The persons required at this phase should be kept to *a minimum to maintain pre-production costs as low as possible.*

2. Operating Phase

The profile of employees maintained in the pre-production phase may not be sufficient at some point in the operating phase as the plant maximizes the utilization of its production capacity.

In other words, capacity utilization is usually improved gradually and additional shifts may be introduced, bringing about increased production and possibly additional requirements in certain personnel categories.

A distinction should be made between *variable and fixed wage and salary cost*, as well as between the local and foreign labor components.

6. Availability and Recruitment

Particular attention should be paid to *the availability (supply and demand) of management staff, supervisors, and relevant categories of skilled labor.* The following factors should be given due consideration when the availability and recruitment of human resources are analyzed:

The general availability of relevant human resource categories in the

project region and country;

- The supply and demand situation in the project region (human resource);

  Recruitment policy and methods; and

  Training policy and program

A certain *technology, safety hazards, sophisticated machinery and equipment, and other factors may justify special skills and experience.*

In recruitment planning, the ability of the project to attract the human resources required is important.

The competitiveness will depend both on *the wages and salaries offered and on the social security and fringe benefits.*

The presence of a developed and diversified infrastructure in the project region is usually of importance in a situation where certain categories of employees are scarce and difficult to recruit.

The methods and means of retaining key personnel for long period, *probable terms of employment, and possible fringe benefits* to employees and their families should be identified.

The policy regarding key personnel is of particular importance and the recruitment of key personnel (such as managers, supervisors, and skilled labor) has to be dealt with in special ways.

Recruitment is combined with intensive training of key personnel in order to meet quality requirements.

Foreign expertise may be recruited, which may be an expensive solution and not in conformity with the objective of giving priority to domestic human resources, however.

Training Plan

Lack of experienced and skilled personnel can constitute a significant **bottleneck** for project implementation and operation in developing countries.

Thus, extensive training program should be designed and carried out as part of the implementation process of investment projects.

Training may be organized during the pre-production stage at the plant site, at the plant of joint venture partners, or suppliers of technologies and equipment, in similar factories in the country or abroad, or at specialized training institutes.

Managerial and technical personnel, especially recruited experts, or expatriate personnel can provide training at the factory.

The timing of training programs is of crucial importance, since personnel should be sufficiently trained in order to be able to take up their positions as- and when-required.

Thus, personnel at various levels should have undergone training necessary before production starts, during the pre-production, and construction stage.

Cost Estimates

The manning table prepared for each department can be used for estimating labor costs.

A distinction should be made between variable and fixed costs.

The study should present the *estimated labor costs for each department and function.*

Underlying assumptions such as average wages and salaries for different categories are to be presented.

When estimating the total wage and salary costs, provision should be made for the following **personnel overhead costs:**

Social security, fringe benefits, and welfare costs;

Annual deposits to pension funds;

Direct and indirect costs of training;

Payroll taxes;

Installation grants and subsistence payments; etc

Summary

Feasibility study is an analysis that takes all of a project's relevant factors into account; including economic, technical, legal, and scheduling considerations to

ascertain the likelihood of completing the project successfully. Project managers use feasibility studies to discern the pros and cons of undertaking a project before they invest a lot of time and money into it. A feasibility analysis is used to determine the viability of an idea, such as ensuring a project is legally and technically feasible as well as economically justifiable. It tells us whether a project is worth the investment in some cases, a project may not be doable. There can be many reasons for this, including requiring too many resources, which not only prevents those resources from performing other tasks but also may cost more than an organization would earn back by taking on a project that isn't profitable.

Review Questions

PART I: True or False

WRITE "TRUE" IF THESTATMENT IS CORRECT OR "FLASE" IF THE STATEMENT IS INCORRECT

A promising project may be failed due to inappropriate Production Program and Plant Capacity

Market analysis is a process of assessing the level of demand for product or service to be produced from the project

Market and demand analysis is NOT key process in determining the feasibility of a project.

Concise and systematic assessment of information on the market and market environment market research.

Time series analysis is becoming a very simple task with advanced technologies.

PART II: CHOOSE THE BEST ANSWER FROM THEIR ALTERNATIVES

Resources refers to

Manpower

Machinery

Materials

All of the above

Which one of the following is undertaking in the normal condition in the feasible normal capacity.

Installed equipment

Technical plant conditions

Organizational and management aspects

Availability of inputs

All

Which one of the following is the importance of input study.

. To determine the types of raw materials and supplies required

. To determine the Availability of basic raw material suppliers

. To determine the Quantity of raw materials needed for the plant

. To determine the Quality of raw materials and supplies available and needed

. All

Which one of the following is not the requirement of raw materials and factory supplies except

User Demand

Quantity Required

Qualitative Properties

None

Which one of the following is not the objective of supply marketing

Cost Minimization

Risk maximization and Reliability of Suppliers

Cultivating Relations with Suppliers

All

Which one of the following is odd

Price

Place

Promotion

Distribution

None

Part III: Short Answer and Workout

Based on what you learnt in this chapter answer the following questions.

What is market demand analysis?

List the contents of market demand analysis.

Discuss the qualitative and quantitative methods of demand analysis.

Discuss about production program and plant capacity analysis

Explain the raw material analysis of project feasibility

Why location selection and environmental impact assessment is important for project feasibility?

Assume that you are a project analyst in ABC Company and you are requested to forecast the sales volume of this company based on the following information. Quantity demanded in the base year is assumed as 500 units and quantity in the following year is 700 units. In addition, income increased from Br.2, 000 to 2,200. The current per capita annual demand for the product of ABC Company is assumed as 5kg and the estimated population level for year four is 50 million.

Required:

a. What would be the projected per capita demand for the product four years from now?

What would be the aggregate demand for year four?

Assume that the following data were collected for six years in order to estimate the future demand by taking the number of household as an explanatory variable.

Year	No. of households (X)	Historical sales (Y)
1	500	3,235
2	750	3,530
3	600	2,887
4	950	3,194
5	1,213	4,785
6	1,149	4,372

Required:

Determine the sales function

Forecast the demand level for the next coming four years if the number of households:

Increases by 30 for the first two years of forecast.

No change in population level in the third year of forecast and

Decreases by 45 in the last year of forecast.

CHAPTER FIVE

FINANCIAL ANALYSIS

Dear reader, can you list the dimensions of project feasibility analysis from chapter 4? In the previous chapter you have read about different feasibility study aspects. This chapter focused on financial analysis and in chapter six you will also study about the economic analysis of project specifically.

After successful completion of this chapter you will be able to understand:

The definition of financial analysis

The aim of financial analysis

How to estimate project cost

How to evaluate project feasibility by using discounted and non-discounted project cash flow

Introduction

Financial analysis is analytical work required to identify the critical variables which are useful for likely to determine the success or failure of an investment. Its concern is to determine, analyze and interpret all the financial consequences of an investment that might be relevant to and significant for the investment and financing decisions. This topic discusses the viability of projects from financial significance to stakeholders and to the economy in general. The following section focuses on the purpose of financial analysis, project cost estimation, discounted and non-discounted method of project evaluation techniques and financial analysis in uncertain conditions.

5.1. Purpose of Financial Analysis in Project Planning

Investors transfer the liquid financial resources (his own personal money or borrowed money) into production assets with the objective of producing and obtaining future benefits. This process is known as investment, a long term commitment of scarce resources.

The long-term commitment by the investor needs the transformation of liquid financial resources (own or borrowed) into productive assets for financing an investment project. Project financing includes the design of proper financial structure, considering the adequacy of the financial plan, and the optimization of project financing from the different actors or beneficiaries point of view. Therefore, the scope and objective of financial analysis are to determine, analyze and interpret all the financial consequences of an investment that might be relevant for and significant for the investment and financing decisions. Financial analysis is essentially undertaken for the following purposes:

It provides an adequate financing plan for the proposed investment

It determines the profitability of a project

It assists in planning the operation and control of the project by providing management information to both internal and external users

It advises on methods of improving the financial viability of a project entity

It illustrates the financial structure of the project and its existing and potential financial viability.

Therefore, the purpose of financial analysis is not just to document the expected impact of the project, liquidity, credit worthiness, financial efficiency, etc, of the various agents involved; it should also be part of the process of project design itself.

5.2. Methods of Financial Analysis

To assess financial viability of a project a range of tools and methods can be used and various types of financial statements can be prepared. This includes:

Resource flow statements

Profit and loss statements

Cash flow statements and

Balance Sheet

5.3. Project Cost Estimation

The analysis of financial costs and benefits is a key step in the project preparation process, which seeks to ascertain whether the proposed project will be financially viable in the sense of being able to meet **the burden of servicing debt** and satisfy **the return expectations** of the promoters.

5.3.1. Project Life

A convenient starting point for establishing the period for financial analysis is the technical life of the major investment item. In some projects, the technical life (physical life) of the major investment item may be quite long. However, the economic life of the same item might be shorter because of expected technological obsolescence (as rapidly changing technology will make a major investment obsolete in short period), frequently changing tastes and preferences of customers, international competitiveness, and the extent of natural resources or mineral deposits available.

A distinction may be made between the physical life and economic (or optimal) life of an asset. **The physical life** of an asset represents the number of years it can be used to produce a certain output by regular maintenance and repair, which, of course, tends to cost more and more as the years roll by. **The economic life** of an asset, however, refers to the optimum number of years the asset should be used to produce a certain output. In short:

Physical life is a period, often longer, over which a fixed asset can continue to function, notwithstanding its acquired obsolescence, inefficiency in operations, high costs of maintenance, or the obsolescence of its products.

Economic life is the period during which a fixed asset is capable of yielding service to the owner. The economic life of an asset is defined, conceptually, as the period after which the asset should be replaced to minimize the sum of operating and maintenance costs and capital costs expressed on an annual basis.

5.3.2. Initial Investment Costs

Initial investment costs are defined as the sum of fixed assets (fixed investment costs plus pre-production expenditures) and investment in networking capital. Fixed assets constitute the resources required for construction and equipping an investment project whereas the networking capital corresponds to resources needed to operate the project totally or partially. At the pre-investment stage, in this regard, the following two mistakes are frequently made:

Networking capital, meaning current assets minus current liabilities, is either excluded at all or included in insufficient amount that, in turn, might be causing liquidity problems for projects.

Total investment costs are sometimes confused with **total assets,** the latter constituting fixed assets plus pre-production expenditures plus current assets.

The amount of total investment cost is, in fact, smaller than total assets, since it is composed of fixed assets and net working capital, the latter being the difference between current assets and current liabilities. The section following discusses, in detail, the components of the total investment cost.

5.3.2.1. Fixed Investment Cost

The fixed investment cost represents the total of all items of outlay associated with fixed assets in the project, which are supported by long-term funds. It is the sum of the outlays on the following major components:

A) Land and Site Development:

The cost of land & site development is the sum of broad range of costs, the following being the major ones:

Basic cost of land including conveyance (transfer) and other allied charges,

Premium payable on leasehold,

Cost of leveling and site preparation,

Cost of laying approach roads and internal roads,

Cost of gate ways,

Cost of tube wells, etc.

Buildings and Civil Works:

The cost of buildings & civil works depends on the following two basic factors:

- The kind of structures required, and
- The specific requirements of the manufacturing process

It covers the costs of the following major items:

Buildings for the main manufacturing plant;

Buildings for auxiliary services like steam supply, workshops, etc; Laboratory, water supply, etc;

Warehouses, open yard facilities, etc;

Non-factory buildings (e.g. guesthouse, cafeteria, clinics, etc);

Garages, sewage, drainage, and other civil engineering works.

Cost of Plant & Machinery:

It is fundamental component of the project cost.

Costs of Imported Machineries and Equipments:

CIF import value (including shipping, freight, and insurance costs) Import duty (if any),

Clearing, loading & unloading, and local transportation & insurance charges

Costs of Indigenous Machineries and Equipments:

FOR (Free on Rail) costs (in other words, purchase price plus freight charges),

Sales taxes (if any),

Rail way freights and transportation charges up to the site

Cost of stores and spares acquired with machineries and equipments

Foundation & Installation charges (depending on the specific requirements of the project)

The cost of plant equipments and machineries is based on the latest available price quotations being adjusted for possible escalation.

[Latest rate of annual inflation applicable to the Plant Equipment and Machinery) Multiplied by [Length of the delivery period]

D) Technical Know-how and Engineering Fees:

Technical consultants or collaborators, (local or foreign), may involve for making:

Project preparation report,

Choice of technology,

Selection of the plant machinery and

equipments, Detailed engineering services, etc

The cost paid for these services in setting up the project is a component of the project cost. However, any royalty payable (annually) on transfer of technology, which is typically a percentage of sales, is an operating expense and hence, accounted in the projected profitability statement.

Expenses on Foreign Technicians and Training of Local Technicians Abroad

Travel expenses of technicians to- and -from abroad,

Boarding and lodging,

Salaries and allowances, etc

Miscellaneous Fixed Assets and Expenditures:

These are not parts of the direct manufacturing process but necessary to run the organization as an entity. For instance, the following costs are classified under this major group:

Furniture and office equipment;

Tools, vehicles, railway siding, diesel generators;

Transformers, boilers, piping system;

Laboratory and workshop equipment;

Effluent treatment plants and firefighting equipment;

Expenses for procurement (acquisition) of patents, licenses, trademarks, and copyrights (for using a given technological package);

Deposits made with the electricity board, and so on.

5.3.2.2. Pre-Production Expenditures

Pre-production capital expenditures include the following:

Establishment and Capital Issue Expenses

Establishment Expenses: These are expenditures incurred during the registration and formation of the company, including:

Legal fees for preparation of the memorandum & articles of association, similar documents, and for capital issues as well

Expenses for incorporating the company

Capital Issue Expenses include:

- Underwriting commission and brokerage
- fees, Fees to managers and registrars,
- Printing and postage expenses,
- Advertising and public announcements,
- Listing fees and stamp duty expenses for processing of share applications and allotment, etc

Pre-Operative Expenses

Expenditures for Preparatory Studies

The major cost categories under this heading are the following:

Expenditures for pre-investment studies such as opportunity, pre-feasibility, feasibility, and support or functional studies

Consultant fees while project preparation

(Note also that preliminary expenses for identifying the project, conducting the market survey, and preparing the feasibility report can be presented under this heading as well.)

Other Pre-Operative Expenditures are:

Salaries, fringe benefits, and social security contributions for personnel (i.e. for project implementation team);

Travel expenses;

Preparatory installation (workers camps, temporary houses, and stores);

Engineering services & supervision of plant erections and constructions

Pre-production marketing costs and promotional activities; Training costs (fees, travel, and living expenses);

Interest and insurance during construction; and so on

Costs incurred until the commencement of commercial production include the following:

Rent and taxes,

Traveling expenses,

Interest & commitment charges on borrowings,

Start-up expenses, trial runs, and commissioning expenditures (that include fees payable for supervision of start-up operations, wages and salaries of workers, fringe benefits and contributions for social security, wasted materials, supplies and utilities consumed, etc).

iii. Initial Cash Losses

Most projects incur cash losses in the initial years. Promoters do not disclose such losses because they want the project appear attractive to financial institutions. Failure to make a provision for such losses generally affects the liquidity position & impairs the operations.

Remarks:

In general, one of the following two practices is followed when ***the pre production expenditures are accounted for:***

All pre-production expenditures may be capitalized and amortized over a period of time that is usually shorter than the period over which equipments are depreciated. [As ***deferred revenue expenditures, which is capitalization of pre-production expenditures***]

Part of the pre-production expenditures may initially be allocated, where attributable, to the respective fixed assets [i.e. ***partial allocation of pre-***

production expenditures]. However, pre-production expenditures that are not attributable to fixed assets are, in total, capitalized and then, amortized over years [i.e. ***partial capitalization of pre-production expenditures***]

Note also that the magnitude of the pre-operative expenses is directly related to the project implementation schedule. In this regard, delay in implementation tends to push up these expenses. Often, financial institutions allow for some delay (for instance, 20 - 25%) in the implementation schedule and, thus, permit caution in estimating the pre-operative expenses. Since the pre-operative expenses are incurred up to the point of initial plant set-up, they are assets and hence, can be capitalized either being apportioned to fixed assets or else the firm may treat them as deferred revenue expenditures and subsequently write-off their value over a period. Similar costs incurred after the point of time plant & machinery is set-up and started commercial production, however, are treated as revenue expenditures.

Activity 5.1

What is project financial analysis?

Why financial analysis is important?

What are the types of cost that needed for project planning?

5.3.3. Working Capital (WC) Requirements

In estimating the working capital requirement and planning for its financing, the following points have to be born in mind:

The WC requirement consists of the following:

Raw materials & components (indigenous as well as imported) Stocks of goods in process (WIP)

Stocks of finished goods

Debtors (receivables)

Operating expenses (prepaid insurances, prepaid rents, etc) Consumable stocks (supplies)

The principal sources of WC finance are:

WC advances provided by commercial banks (short term or medium term WC loans)

Trade credits (Account Payables)

Accruals and provisions (such as salaries & wages payables, taxes payable, interest payables, etc)

Long-term sources of financing (long-term debts and equity)

In operational terms, there are limits to obtaining WC advances from commercial banks. They are in two forms:

The aggregate permissible bank finance is specified as per the norms of lending, followed by the lending bank; or else

Against each current asset, a certain amount of margin money (from long-term sources) has to be provided by the firm.

Nowadays, banks are free to follow their own norms of lending. Yet, many of them follow the second method suggested by the *Tandon Committee* (Chandra, 2002). According to this method, the **maximum permissible bank finance** is calculated as follows:

Current assets as per the norms laid down by the Tandon Committee (0.75) _ *Non-bank current liabilities like trade credits & provisions*

The implication of this norm is that **at least 25% of current assets must be supported by long-term source of finance**. That is, certain part of the working capital requirement has to come from long-term sources of finance, which is referred to as **"margin money for working capital".** In this regard, the margin money for working capital is an important element of the project cost, which constitutes the initial investment in networking capital. However, it may sometimes be utilized for meeting over runs in capital cost, which, in turn, leads to working capital problem (and sometimes a crisis) when the project is commissioned.

To mitigate the working capital problems (or crisis), financial institutions stipulate that a portion of the loan amount, equal to the margin money for

working capital, be blocked initially so that it can be released when the project is completed.

[Note that the margin money for working capital is provided from long-term sources.]

The margin requirement varies with the type of current asset. There is no fixed formula for determining the margin amount. The range with in which margin requirements for various current assets lie are as follows (Chandra, 2002):

Raw materials	10 to 25%
WIP	20 to 40%
Finished goods	30 to 50%
Debtors	30 to 50%

5.3.4 Investment Required During Operations

The economic lifetime of the various investments such as buildings, machineries and equipments, transport equipment, etc is often different. In order to keep a plant in operation, therefore, each item must be replaced at the appropriate time. Hence, the replacement cost should be estimated and included in the feasibility study.

The total investment cost includes investment in fixed assets and current assets made initially and subsequently during operations. **Fixed Assets** comprise fixed investments and pre-production capital costs. In this regard, total fixed investments can be projected for each year of the construction period until full production is reached. The estimate includes supplies (stores), packing, transport, and installation charges. Exhibit 5.1 depicts the components of the total fixed investment cost.

Exhibit 5.1: Total Fixed Investment Costs

No.	*Items*	*Year*			
		0	*1*	*2*	*n*
1	Land purchase				
2	Site preparation & development				
3	Civil works, structures, and buildings				
4	Plant machinery and equipment				
5	Auxiliary and service plant equipment				
6	Environmental protection (requirements and standards): Site preparation Civil works Plant machinery & equipment				
7	Incorporated or allocated to fixed assets (project overheads): Technology related costs Project implementation costs Miscellaneous project overhead costs				
8	Contingency Allowance				
9	***Total fixed investment cost*---------- *Foreign currency share (%)* ----------				

5.3.5. Cost of Production

It is essential to make realistic forecasts of production or manufacturing costs for a project proposal in order to determine the future viability of the project. Deficiencies in the production process usually leads to unexpected losses, which coupled with low capacity utilization caused by wrong sales forecasts may quickly push a promising establishment out of operation. In general, given estimated production, the cost of production will be determined.

Production costs should be calculated as total annual costs and preferably as cost per unit produced. The overall production costs should be broken down at least into the main cost items, for instance, into the following four major categories:

Factory costs,

Overhead costs,

Depreciation costs, and

Cost of financing

Production costs must be determined for the different levels of capacity utilization and for an operational period. **The sum of factory and administrative overhead costs is defined as operating costs.**

5.4. Profitability Projections

Once estimates of sales revenue and overall production costs are made, the next step is the projection of profits or estimation of working results. Projection of profitability is important and often referred by term loan providers. The profit/loss schedule is prepared as depicted in the Exhibit below:

Exhibit 5.2: Profit/Loss Schedule

Expected Sales ……XXXX
Cost of production (including depreciation) ……(xxxx)
Gross Profit (A-B)…… XXXX
Total Sales Expense ……xxxx
Total Administrative expense including depn……xxxx
Royalty and know how payables……xxxx
Total Operating Expenses (D + E + F)……(XXXX)
Earnings before Interest and Tax (C-D)…… xxxx
Interest Expense ……(xxxx)
Profit before tax, gains, and losses (H-I)…… xxxx
Other income (gains) (added)……xxxx
Other expenses/losses (deducted)……(xxx)
Profit/losses before taxation (J+K-L)……xxxxx
Provision for taxation (M x Tax rate)……xxxx
Profit after tax (M-N)…… xxxx
Dividend: Preferred capital ……xx
Equity capital …… xx xxxx
Retained Profit/Retained Earning …… xxxx
Net cash accrual to the firm
(P+Depn. +Non-cash losses/expenses – Non cash gains/benefits).. xxxx

5.5. Capital Budgeting Techniques of Project Evaluation

Dear reader! Do you remember capital budgeting technique from the course "Financial Management"? Capital budgeting is one of the area that financial manger makes decision either to accept a long-term project investment or not. Therefore, in this part you will read more about the techniques of evaluating projects financial feasibility based on its' expected future cash flow.

The capital budgeting decisions for a project require analysis of:

Its future cash flows,

The degree of uncertainty associated with these future cash flows, and

The value of these future cash flows considering their uncertainty.

To evaluate investment projects and select the one that maximizes wealth, we must determine the cash flows from each investment and then assess the uncertainty of all the cash flows. In this section, we look at six techniques that are commonly used to evaluate investments in long-term projects. These are classified as follows:

Capital Budgeting Techniques

Non-Discounted Cash Flow Methods OR Traditional Methods	**Discounted Cash Flow Methods OR Modern Methods**
A) Pay-Back Period Method **(PB Period)** B) Accounting Rate of Return Or Average Rate of Return **(ARR Method)**	A) Net Present Value **(NPV)** Method B) Profitability Index **(PI)** Method C) Internal Rate of Return **(IRR)** Method

5.5.1. Non-discounted Cash flow Method

i. Payback Period Method (PB)

Pay-back period is the time required to recover the initial investment in a project. Payback period is defined as *the length of time required for the stream of cash proceeds produced by an investment to equal the original cash outlay required by the investment.*

$$\textbf{Payback period} = \frac{\textbf{Initial Investment in projects}}{\textbf{Annual cash inflow}}$$

It is the number of years required to recover the investment. In case of unequal cash inflow, it can be found out by adding up the annual cash inflow till the total is equal to the investment. Many firms use the payback period as a decision criterion because it is easy to calculate. Cash inflow is the sum of net profit after tax and depreciation which is a non-cash expense.

Acceptance Rule

Management of the firm may establish a norm or standard for acceptable payback period, usually based on cost of capital. It is called —cut-off point. **The project which gives shortest payback period is to be selected**. The rationale behind this choice is: The shorter the payback period, the less risky the project and the greater the liquidity.

Merits of Pay-back method

The following are the important merits of the pay-back method:

It is a very simple measure of economic feasibility.

It is very easy to apply, calculate and interpret.

It is easy to understand.

It emphasizes the liquidity and solvency of a firm.

It weighs early returns heavily and ignores distant return.

It takes less time to calculate and hence the cost of analysis is low.

Limitations

It ignores the time value of money. All cash flows are treated and weighted equally regardless of the time period of their occurrence.

It ignores all cash inflows after the pay-back period. I.e. it does not measure the profitability of a project.

It does not show the economic return on investment.

It fails to consider the magnitude of cash inflows i.e. varying cash-flow patterns.

Exercise 1

Project cost is Br. 30,000 and the cash inflows are Br. 10,000, the life of the project is 5 years. Calculate the pay-back period. **Solution:**

PB = Br. 30,000/Br. 10,000 = 3 Years

The annual cash inflow is calculated by considering the amount of net income on the amount of depreciation project (Asset) before taxation but after taxation.

Uneven Cash Inflows

Normally the projects are not having uniform cash inflows. In those cases the pay-back period is calculated, cumulative cash inflows will be calculated and then interpreted.

$$\text{Pay-Back Period} = \text{Base Year} + \frac{\text{Balance of Initial Investment to be recovers}}{\text{Next Year CFAT}}$$

Exercise

Certain projects require an initial cash outflow of Br 25,000. The cash inflows for 6 years are given as follows:

Year	Cash inflows (Br)	Cumulative Cash Inflows (Br)
1	5000	5,000
2	8000	13,000
3	10,000	23,000
4	12,000	35,000
5	7,000	42,000
6	3,000	45,000

The above calculation shows that in 3 years Br. 23,000 has been recovered Br. 2,000, is balance out of cash outflow. In the 4th year the cash inflow is Br. 12,000. It means the pay-back period is three to four years, calculated as follows:

Pay-back period = 3 years+2000/12000×12

months = 3 years 2 months.

Post Pay-back Profitability Method

One of the major limitations of pay-back period method is that it does not consider the cash inflows earned after pay-back period and if the real profitability of the project cannot be assessed. To improve over this method, it can be made by considering the receivable after the pay-back period. These returns are called post pay-back profits.

Exercise: From the following particulars, compute:

Payback period.

Post pay-back profitability and post pay-back profitability index.

Cash outflow Br.100,000

Annual cash inflow (After tax before depreciation) Br. 25,000

Estimate Life 6 years

b) Cash outflow Br.100,000

Annual cash inflow (After tax depreciation)

First five years Br. 20,000

Next five years Br.8, 000

Estimated life	10 Years
Salvage value	Br. 16,000

Solution

(a) (i) Pay-back period

$$\frac{\textit{Initial investment}}{\textit{Annual cash inflows}}$$

=100,000/25,000

4 Years

Post pay-back profitability

=Cash inflow (Estimated life – Pay-back period)

=25,000 (6 – 4)

=Br. 50,000

(iii) Post pay-back profitability index

$$= \frac{50{,}000}{100{,}000} \times 100 = 50\%$$

(b) Cash inflows are equal, therefore payback period is calculated as follows:

Year	Cash Inflows (Br.)	Cumulative Cash Inflows (Br.)
1	20,000	20,000
2	20,000	40,000
3	20,000	60,000
4	20,000	80,000
5	20,000	100,000
6	8,000	108,000
7	8,000	116,000
8	8,000	124,000
9	8,000	132,000
10	8,000	140,000

Post pay-back profitability

Cash inflow (estimated life – pay-back period)

8,000 (10–5)

8000×5 = 40,000

Post pay-back profitability index

$$\frac{40,000}{100,000} \times 100 = 40\%$$

Accounting Rate of Return or Average Rate of Return (ARR)

This method take into account the total earnings expected from an investment proposal its full life time. The method is called accounting rate of return method, because it uses the accounting concept of profit i.e., income after deprecation and tax as criterion for calculation of return.

$$ARR \quad \frac{Average\ net\ operating\ Income\ (Cashflows)}{Initial\ Investment}$$

ARR measures profitability from the conventional accounting stand point by relating the required investment or sometimes the average investment to the future annual net income

Decision Rule: Choose the project with the higher

ARR ***Example***

Assume a company that is evaluating to buy or not to buy a machine. The purchase price is $400,000 with estimated life of 5 years. The forecasted yearly are $50,000, 150,000, 150,000, and 100,000.

Thus the average O.I (cash flow) = $\frac{(50,000 \quad 150,000 \quad 150,000 \quad 200,000)}{5}$

$110,000

Assume the company uses straight-line method to depreciate the machine, with no salvage value

$$\text{Annual Depreciation} \quad \frac{400{,}000}{5} \quad 80{,}000$$

$$ARR \quad \frac{\text{Average net O.I} \quad \text{Annual Deprn}}{\text{Initial Investment}}$$

$$\frac{\$110{,}000 \quad 80{,}000}{400{,}000} \quad 0.075 \quad 7.5\%$$

If the ARR (K) is more than 7.5% reject the purchase, otherwise accept.

If average Investment is used, i.e. taking average of book value.

$$\text{Average Investment} = \frac{(400{,}000 + 320{,}000 + 240{,}000 + 160{,}000 + 80{,}000 + 0)}{6}$$

$$= 200{,}000$$

Or

$$\frac{400{,}000 + 0}{2}$$

$$\frac{200{,}000}{}$$

$$\text{ARR} = \frac{110{,}000 - 80{,}000}{200{,}000}$$

15%

Decision: IF ARR is more than 15% reject, otherwise accept ***Merits of ARR***

It is easy to calculate and simple to understand.

It is based on the accounting information rather than cash inflow.

It is not based on the time value of money.

It considers the total benefits associated with the project.

Limitations

It ignores the time value of money.

It ignores the reinvestment potential of a project.

Different methods are used for accounting profit. So, it leads to some difficulties in the calculation of the project.

Accept/Reject criteria

If the actual accounting rate of return is more than the predetermined required rate of return, the project would be accepted. If not it would be rejected.

Activity 5.1

What is capital budgeting technique?

List both discounted and non-discounted project cash flow evaluation techniques

Why post-payback analysis important?

Explain the decision criteria of each non-discounted methods.

5.5.2. Discounted Cash flow Method

Brain storming Question

What is time value of money from your financial management course knowledge?
What is present value (PV)?
What is net present value (NPV)?
What is future value (FV)?
What is internal Rate of Return (IRR)?

In your Financial Management course you have learnt about the "Time Value of Money" and "Capital Budgeting Evaluation Techniques". This part is highly related with those topics in your previous term courses.

1. NET PRESENT VALUE (NPV) METHOD

Net present value (NPV) is the excess of the present value (PV) of cash inflows generated by the project over the amount of the initial investment (I):

NPV = PV of Cash inflow – Initial Investment Cost

$$NPV = PV - I$$

The present value of future cash flows is computed using the so-called cost of capital (or minimum required rate of return) as the discount rate. In this

method *cash inflows are considered with the time value of the money*. Net present value describes as the summation of the present value of cash inflow and present value of cash outflow. Net present value is the *difference between the total present value of future cash inflows and the total present value of future cash outflows.* If the investment i.e. cash outflow is made in the initial year, then it is present value will be equal to the amount of cash actually spent. If the cash outflow is made in the second and subsequent year also, its present value also should be found out by applying the appropriate rate of interest which is the firm's ***cost of capital***. *It is the minimum rate of return expected to be earned by the firm on the investment proposals*. Similarly all the cash inflows (i.e. Net profit after tax + Depreciation) are also to be discounted at the above rate in order to find out the present value of cash inflows occurring in the future periods. Then the net present value is to be found out by subtracting the present value of cash outflows from the present value of cash inflows.

We can represent the net present value using summation notation, where t indicates any particular period, CF_t represents the cash flow at the end of period t, r represents the cost of capital, and n the number of periods comprising the economic life of the investment:

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - Co \qquad Co$$

Cash inflows are positive values of CF_t and cash outflows are negative values of CF_t. For any given period t, we collect all the cash flows (positive and negative) and net them together. To make things a bit easier to track, let's just refer to cash flows as inflows or outflows, and not specifically identify them as operating or investment cash flows.

Example: Let`s assume that there were two projects; project A and Project B invested $1000, 000 initial investment at cost of capital of 10%. Annual cash flows for both projects are given below. What is the net present value of both projects and which project has to be accepted?

Year	Project A		Project B	
	End of Year Cash Flow	**PV at the End of 2010**	**End of Year Cash Flow**	**PV at the End of 2010**
2011	$400,000	$363,636	$100,000	$90,909
2012	400,000	330,579	100,000	82,645
2013	400,000	300,526	100,000	75,131
2014	400,000	273,205	100,000	683,013
2015	400,000	248,369	100,000	620,921
Total		**$1,516,315**		**$1,552,620**

The net present value of project A is $516,315:

NPV of A = $1,516,315 - $1,000,000 = $516,315

Similarly, the Net Present Value of project B is $552,620:

NPV of B = $1,552,620 - $1,000,000 = $552,620

These NPVs tell us if we invest in project A, we expect to increase the value of the firm by $516,315. If we invest in project B, we expect to increase the value of the firm by $552,620.

Net Present Value Decision Rule

A positive net present value means that the investment increases the value of the firm; the return is more than sufficient to compensate for the required return of the investment. A negative net present value means that the investment decreases the value of the firm the return is less than the cost of capital. A zero net present value means that the return just equals the return required by owners to compensate them for the degree of uncertainty of the investment's future cash flows and the time value of money. Therefore,

Acceptance Rule:

- **Accept** the project if **Project's NPV > 0**
- **Reject** the project if **Project's NPV < 0**

Decision: Accordingly, project A increases the value of the firm by $516,315 and project B increases it by $552,620. If these are ***independent projects***, both should be taken on because both increase the value of the firm. If A and B are ***mutually exclusive projects***, such that the only choice is either A *or* B, then project B is preferred since it has the greater NPV.

Merits of NPV Method

The important one is that it recognizes the time value of money.

It is the best method for the selection of mutually exclusive projects.

It considers all cash flows over the entire life of the project.

It is consistent with the objective of maximizing the wealth of shareholders.

It is superior to the other methods.

It is simple to find out the acceptable projects.

Limitations

It is difficult to calculate.

It is difficult to work out the cost of capital. Unless the cost of capital is known, this method cannot be used.

It may not give correct answer when the projects with different investments are compared, in such cases, profitability index method will be better.

It is not suitable for the projects having different effective lives. NPV method favors long lived projects.

Both NPV and IRR methods may often give contradictory results in the case of alternative proposals which are mutually exclusive.

It assumes that intermediate cash inflows are reinvested at the firm's cost of capital which is not always true.

INTERNAL RATE OF RETURN

Internal rate of return *is the rate of which is the sum of discounted cash inflows equals the sum of discounted cash outflows.* In other words it is the rate at which equals the aggregate discounted cash inflow with the aggregate discounted cash outflows. *It is the rate of discount which reduces the net present value of an investment to zero.* It can be stated in the form of a ratio

$$IRR = \frac{\text{Cash inflows}}{\text{Cash out flows}} = 1$$

The ***IRR*** is defined as the *discount rate that equates the present value of a project's expected cash inflows to the present value of the project's costs*:

PV (Inflows) = PV (Investment costs),

Or, equivalently, the IRR is the rate that forces the NPV to equal zero:

$$CF_0 + \frac{CF_1}{(1 + IRR)^1} + \frac{CF_2}{(1 + IRR)^2} + \cdots + \frac{CF_n}{(1 + IRR)^n} = 0$$

$$NPV = \sum_{t=0}^{n} \frac{CF_t}{(1 + IRR)^t} = 0.$$

In other word, the discount rate that causes the equation (and the NPV) to equal zero is defined as the IRR. For a realistic project with a fairly long life, ***the trial-and-error approach is a tedious***, ***time consuming task.***

Procedures:

The trail rate of return is taken arbitrarily.

The second trail rate and even third trail rate of determined.

The second total rate of return is determined by considering initial cost of the investment and present value cash inflows arrived at as per the trail rate of return. If the present value of cash inflows arrived at as per the first trail rate of the return is less than the initial cost of the investment, then, the second trail rate has to be lower than the first trail rate. On the other hand if the present value of cash inflows arrived at as per the first trail rate is more than the initial cost of investment, the second trail rate has to be higher than the first trail rate.

After determining the present value of a project at two or three trail rate of return, the trail rate of return at which the present value is very closely to initial cost of the project is roughly taken as the initial rate of return. If greater accuracy in the IRR is desired, then the exact IRR can be determined as follows.

IRR= 1+ (( ))

R_1, R_2 = are randomly selected rates

NPV_1 = higher net present value

NPV_2 = the lower net present value

Merits of IRR Method:

It take into account the time value of money and can be applied where the cash inflows are even or unequal

It considers the profitability of the project over its economic life.

Cost of capital or pre-determined cut off rate is not a pre requisite for applying IRR.

IRR provides a ranking of various proposal because it is percentage return

Demerits of IRR method:

It is a complicated method and may lead to cumbersome calculations

The underlying assumption of IRR that the earnings are reinvested at IRR for the remaining life or the project is not a justifiable assumption.

The results obtained through NPV or PI methods may differ from that obtained through IRR depending on the size, life and timing of the cash flows.

Internal Rate of Return Decision Rule

The internal rate of return is a yield—what we earn, on average, per year. How do we use it to decide which investment, if any, to choose? The decision rule for the internal rate of return is to invest in a project if it provides a return greater than the cost of capital. The cost of capital, in the context of the IRR, is a hurdle rate—the minimum acceptable rate of return.

Acceptance Rule:

- **Accept** the project if **Project's IRR > k**
- **Reject** the project if **Project's IRR < k**
- **Project may be accepted if IRR = k**

Rationale for the IRR Method

Why is the particular discount rate that equates a project's cost with the present value of its receipts (the IRR) so special? The reason is based on this logic: (1) The IRR on a project is its expected rate of return. (2) If the internal rate of return exceeds the cost of the funds used to finance the project, a surplus will remain after paying for the capital, and this surplus will accrue to the firm's stockholders. (3) Therefore, taking on a project which IRR exceeds its cost of capital increases shareholders' wealth. On the other hand, if the internal rate of return is less than the cost of capital, then taking on the project will impose a cost on current stockholders. It is this "breakeven" characteristic that makes the IRR useful in evaluating capital projects.

Comparison and Contrast of IRR and NPV

Technique *Comparison of both the techniques*:

Both techniques use Discounted Cash Flow (DCF) method.

Both recognize the time value of money.

Both take into account the cash inflows over the entire life of the project.

Both are consistent with the objective of maximizing the wealth of shareholders.

Both are difficult to calculate.

Contrast i.e., points of difference

Unless the cost of capital is known, NPV method cannot be used.

Calculating cost of capital is not required for computing IRR.

NPV assumes that intermediate cash flows are re-invested at firm's cost of capital whereas IRR assumes that intermediate cash inflows are reinvested at the internal rate of the project.

The results of IRR method may be inconsistent compared to NPV method, if the projects differ in their (1) expected lives or (2) investment or (3) timing of cash inflow

IRR method favors short-lived project so long as it promises return in excess of cut-off rate whereas NPV method favors long-lived projects

IRR may give negative rate or multiple rates under certain circumstances. NPV does not suffer from the limitation of multiple rates.

PROFITABLILITY INDEX (PI) OR BENEFIT COST RATIO

PI is found out by comparing the total of present value of future cash inflows and the total of the present value of future cash outflows.

The ***profitability index*** (PI) *is the ratio of the present value of change in operating cash inflows to the present value of investment cash outflows:*

$$PI = \frac{\text{PV of future cash flows}}{\text{Initial cost}} = \frac{\sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}}{CF_0}.$$

Here CF_t represents the expected future cash flows, and CF0 represents the initial cost. The PI shows the *relative* profitability of any project, or the present value per dollar of initial cost.

Mathematically, the NPV, IRR, and PI methods will always lead to the same accept/reject decisions for *independent* projects: If a project's NPV is positive, its IRR will always exceed r, and its PI will always be greater than 1.0. However, these methods can give conflicting rankings for *mutually exclusive* projects.

Suppose the present value of the change in cash inflows is $200,000 and the present value of the change in cash outflows is $200,000. The NPV (the difference between these present values) is zero and the PI (the ratio of these present values) is 1.0.

Ex2: Looking at project A and B in our previous example, the PI for project A is:

$$\text{PI of A} = \frac{\$1{,}516{,}315}{\$1{,}000{,}000} = 1.5163$$

And the PI for project B is:

$$\$1{,}552{,}620$$

$$\text{PI of B} = \frac{\$1{,}000{,}000}{} = 1.5526$$

The PI of 1.5163 means that for each $1 invested in project A, we get approximately $1.52 in value; the PI of 1.5526 means that for each $1 invested in project B, we get approximately $1.55 in value.

Profitability Index Decision Rule

The profitability index tells us how much value we get for each dollar invested. If the PI is greater than one, we get more than $1 for each $1 invested—if the PI is less than one, we get less than $1 for each $1 invested. Therefore, a project that increases owners' wealth has a PI greater than one.

Activity 4.3

What are the discounted methods of project evaluation?

What is the difference between modern and the traditional method of project evaluation?

What are the merits and demerits of NPV?

What is the difference between independent and exclusive projects?

5.6. Financial Analysis under Conditions of Uncertainty

Forecast of demand, production, and sales may not be exact the future is uncertainty. Similarly, assumptions concerning the estimates of production and investment costs, prices, or the lifetime of the project may not always be correct. When dealing with an investment under conditions of uncertainty, three variables should particularly be examined:

Sales revenue,

Production cost,

and Investment cost.

A host of individual items enters into these variables, all of which are composed of a **price and a quantity** variable. The most common reasons for uncertainty are inflation, changes in technology, false estimation of the rated capacity level, and the length of the construction and operating period. Uncertainty analysis,

among others, includes ***Sensitivity Analysis, Scenario Analysis, and Break-Even Analysis.***

1. Sensitivity Analysis

Sensitivity analysis, sometimes called "what if" analysis, answers questions like:

What will happen to NPV (or other criteria) if sales are reduced?

What will happen to NPV if the economic life of the project is reduced?

With the help of sensitivity analysis, it is possible to show how the net cash returns or the profitability of an investment alter with different values assigned to the variables needed for the computation such as unite sales price, unit cost, sales volume, etc. The element of uncertainty could be reduced at this stage by finding the **optimistic** and **pessimistic** alternatives and, thus, determining the commercially most realistic combination of project inputs for the business environment (or scenario) favored by the decision makers.

The variables having the greatest share of cash inflows and outflows are then subject to variations of quantities, prices, or both parameters at the same time. This exercise can be performed by assigning values to the critical variable corresponding to reasonably **pessimistic, normal,** and **optimistic scenarios** and by the computation of the discounted cash flows to determine NPV, calculate the IRR, or use any other criteria and ratios chosen as a yardstick for investment appraisal. With the help of sensitivity analysis, it is possible to identify the most important project inputs, such as raw materials, labor, and energy and to determine any possibilities of input substitution as well as the critical elements of the marketing concept.

Sensitivity analysis, as a popular method for assessing risk, has certain merits:

It forces management to identify the underlying variables and their interrelationships

It shows how robust or vulnerable a project is to changes in the underlying variable

It indicates the need for further work. If the NPV or IRR is highly sensitive to changes in some variables, it is desirable to gather further information about that variable.

It is intuitively very appealing as a technique since it articulates the concerns that project evaluators normally have.

Notwithstanding its appeal and popularity, sensitivity analysis suffers from several shortcomings, the following being the main ones:

It merely shows what happens to NPV when there is a change in some variable, without providing any idea of how likely that change will be.

Typically, in sensitivity analysis, only one variable is changed at a time. In the real world, however, variables tend to move together.

It is inherently a very subjective analysis. The same sensitivity analysis may lead one decision maker to accept the project while another may reject it.

2. Scenario Analysis

In sensitivity analysis, typically one variable is varied at a time. If variables are inter-related as they are most likely to be, it is helpful to look at some plausible scenarios, each scenario representing a consistent combination of variables. For example, a project may be evaluated under three different scenarios:

The base case scenario where the demand and price are expected to be normal.

The scenario where the demand is high, but the price is low.

The scenario where the demand is low, but the price is high.

3. Break-Even Analysis

In sensitivity analysis, we ask what will happen to the project if sales decline or costs increase or something else happens. A financial manager will also be interested in knowing how much should be produced and sold at a minimum to ensure that the project does not “lose money”. Such an exercise is called break-even analysis and the minimum quantity at which loss is avoided is called **the break-even point**. The break-even point may be defined in accounting terms or financial terms

The break-even point may be defined in accounting terms or financial terms. **a.**

Accounting Break-even point: The accounting break-even point is simply the sales level that results in a zero project net income.

Cash Break-even point: The sales level that result in zero operating cash flow.

Financial Break-even point: The sales level those results in a zero NPV.

Summary

Financial analysis is one of the crucial elements that help to know whether a proposed project idea is finically viable or not to implement. In financial analysis cost estimation of the project is a key component that starts from estimating its' investment cost to the operation costs (working capital). The project cost estimation includes; fixed cost estimation such as initial investment cost, land cost, building cots, machinery cots, engineering and other professional cost and pre-production and production costs. Projects financial feasibility can be farther evaluated by using discounted and non-discounted project cash flow. The tradition project cash flow method not considers the time value of money which includes; payback period, accounting rate of return. Whereas the discounted method takes in to account the time value of money by discounting the future cash flow through NPV, IRR and profitability index (PI).

Review Questions

PART I: True or False

WRITE "TRUE" IF THESTATMENT IS CORRECT OR "FLASE" IF THE STATEMENT IS INCORRECT

Financial analysis is analytical work required to identify the critical variables which are useful for likely to determine the success or failure of an investment.

the scope and objective of financial analysis are to determine, analyze and interpret all the financial consequences of project investment.

the economic life of the same item might be shorter because of expected technological obsolescence.

to determine the project net working capital, their values are always positive .

The total investment cost includes investment in fixed assets and current assets made initially and subsequently during operations.

PART II: CHOOSE THE BEST ANSWER FROM THEIR ALTERNATIVES

why project management undertaking financial analysis

It provides an adequate financing plan for the proposed investment

It determines the profitability of a project

It assists in planning the operation and control of the project

All

Which one of the following financial analysis is important to evaluate the company position

Resource flow statements

Profit and loss statements

Balance Sheet

Cash flow statements

Which one of the following is not important point that helps to determine initial investment cost.

Gross investment

Tax saving or liability

Transportation

None

All except D

The principal sources of WC finance are

short term or medium term WC loans)

Trade credits (Account Payables)

salaries & wages payables

taxes payable and interest payables

all

which one of the following is not grouped under production cost

Factory costs

Periodic cost

Overhead costs,

Depreciation costs

Which one of the following is not importance of payback period

is a very simple measure of economic feasibility.

It ignores the time value of money

It is very easy to apply, calculate and interpret.

It is easy to understand.

Project cost is Br. 60,000 and the cash inflows are Br. 25,000, the life of the project is 8 years. The payback period is

3 years

2 years

2.4 years

3.4 years

Which one of the following is not advantages of accounting rate of return

It is easy to calculate and simple to understand.

It ignores the reinvestment potential of a project.

It is based on the accounting information rather than cash inflow.

It is not based on the time value of money.

Which one of the following is not advantages of net present value

It is difficult to calculate.

It is the best method for the selection of mutually exclusive projects.

It considers all cash flows over the entire life of the project.

All

Part III: Short Answer and Workout Questions

What is financial analysis of project?

What are initial investment costs?

What are the working capital costs during operation?

List types of discounted and non-discounted cash flow evaluation techniques.

What is the acceptance criterion for NPV?

What are the limitations of payback period?

What is the payback period for the following set of cash flows?

Year	Cash Flow
0	-$4,400
1	900
2	2,500
3	3,800
4	1,700

SARO, Inc., imposes a payback cutoff of three years for its international investment projects. A) If the company has the following two projects available, should they accept either of them? B) Calculate net present value at 10% and decide which project has to be accepted?

Year	Cash Flow A	Cash Flow B
0	-$40,00	-$60,000
1	25,000	8,000
2	10,000	20,000
3	10,000	30,000
4	5,000	425,000

The GM Corporation is trying to choose between the following two mutually exclusive design projects:

Year	Cash Flow A	Cash Flow B
0	-$20,000	-$3,000
1	10,000	2,500
2	10,000	2,500
3	10,000	2,500

If the required return is 9 percent and GM applies the profitability index decision rule, which project should the firm accept?

If the company applies the NPV decision rule, which project should it take?

Explain why your answers in (a) and (b) are different.

CHAPTER SIX

ECONOMIC ANALYSIS OF PROJECTS

Dear reader! In the last two chapters you have learnt about project feasibility study. This chapter also particularly focuses on economic analysis of project feasibility. In this chapter you will read about the meaning of economic analysis, the differences between financial and economic analysis, the purpose of economic analysis, shadow prices and etc.

After the completion of this chapter you will be able to:

Understand what the economic analysis of project is.

The difference between project financial analysis and economic analysis. Project shadow prices and its' conversion factors.

Introduction

Economic analysis is one step forward in the project planning effort. Because as compared to financial analysis, which should assess the impact of a project on the income of its owners, economic analysis is a form of more general tool of cost benefit analysis. The use of the word "economic" implies the analysis is undertaken is from the point of view of the nation or the economy as a whole. It can be seen as a cost benefit analysis from the social and national perspective. It ascertains the overall country impact of a project. In other words, it is the measure of the costs and benefits of a project to the society. The exercise of project appraisal is not accomplished till the proposed project is also viewed from the economic viewpoint. Therefore, this unit focuses on economic analysis and items included in it.

6.1. Distinction between Financial and Economic Analysis

The reason for conducting both financial and economic analysis is to view the project from various angles and to obtain different perspectives. Decision makers need both profiles in order to evaluate the project and to design the necessary fiscal and monetary measures to meet its financial requirements.

Even though the tools of analysis are the same, financial analysis is concerned with private profitability and is based on financial flows which relate to:

market prices for products and inputs

the terms of credit and borrowing in

general tax and subsidy policy

Financial depreciation and other financial conventions.

The financial analysis focuses on money profits accruing to the project entity. Various financial indicators are used to evaluate the entity's ability to meet its financial obligation and to finance future investment.

Economic analysis, on the other hand, is concerned with public "profitability" which is based on economic resource flows. It measures the project's effect on the efficiency of the whole economy. In economic analysis shadow prices (set of prices that is believed better reflect the opportunity cost) are used. Economic resource flows relates to:

Social opportunity costs (shadow prices) which adjust market prices to take into account differences based on tax and subsidies, external costs and benefits, monopolistic pricing, price control and rationing, quantitative trade restrictions, over-valued (or under valued) exchange rate and labor opportunity costs.

Divergence between real rate of interest and nominal (financial) rate of interest, and difference between private and social/public rate of discount.

Economic analysis consists mainly of adjustments to information used in financial analysis and of a few additional ones. The methodology and the criteria used to evaluate a project using financial and economic information are the same. However, the main difference lies in the value that the NPV and IRR take. This difference occurs because of the difference of:

the items considered as inputs and outputs of the project

the prices used in the valuation of the project inputs and outputs

the treatment of taxes, subsidies and other transfer payments.

The following table and the discussion that follows best explain the difference between economic and financial analysis.

Factors	**Financial Analysis**	**Economic Analysis**
Pricing of inputs	Domestic market price	Shadow prices
Treatment of transfer payments, tax, subsidy, etc	All included	Excluded
Externalities	Excluded	Included
Discount rates	Takes into account the current lending rate	The economic discount rate

1. External costs and Benefits (Externalities)

Some real costs and benefits attributed to the project do not appear among its inputs and outputs when it is analyzed from the company's viewpoint and they do not enter in the calculation of NPV and IRR. The reason is they are considered as "external" to the organization. But they are internal from economy's angle and included in the calculation of IRR and NPV. Because, somebody pays for such externals and somebody receives the benefits of such externals even if it is not the enterprise. Therefore, to the extent they can be measured and evaluated they are included in the economic analysis. Examples of externalities include access to roads, energy lines, sewerage services, flood control dams etc. Externalities in short are costs or benefits to the economy as a whole that are attributed to the project but not taken into account in estimating quantities and values for the project inputs and outputs.

2. Prices of Inputs

As it is shown in the table above, another difference between financial analysis and economic analysis is that even inputs and outputs are "internal" to both

the single firm and the economy, they are valued differently. In financial analysis the need is to value input over output at actual market prices while in economic analysis shadow prices are employed. Consequently, using different prices will give different economic and financial NPV and IRR, even if the inputs and outputs are identical in physical terms.

Domestic/market price is a price we can get in the market. It is set by cost plus certain percentage of margin. Whereas, shadow price is estimated price. They are not observed prices. One cannot find them in the market. They are estimated by the macro planners and are taken as given by the project analysts in all types of projects.

3. Transfer Payments

The third reason why financial and economic NPV and IRR might differ emanates from the treatment of taxes, subsidies and other transfer payment. Transfer payments are payments that are made between different persons or organizations but are not related to any particular resource cost. This payments affect the distribution of income but do not affect the volume of resources available to the country is economy.

Taxes and custom duties from which the enterprise is not exempted are taken as costs in financial analysis. But they are excluded from economic analysis because they do not reflect the commitment of real resources. Similarly, subsidies paid to the enterprise from the government are viewed as transfer payments and are omitted in economic analysis, but they are treated like any other revenue of the enterprise in the financial analysis that is, IRR and NPV calculations.

4. Discount Rate

In financial analysis the discount rate used is simply the rate the sponsors expect they will have to pay for borrowed funds or the rate they wish to receive on capital invested. However, in economic analysis accounting or shadow prices are used, which are believed to be more competitive, to receive signals

that will guide the allocation of resources and the structure of domestic production.

For economic analysis purpose, all the inputs and outputs of the project are valued at world price which are formed independent of whatever distortions prevail in the domestic market. These world prices are known as accounting or shadow prices estimated as border prices in the form of Cost Insurance and Freight (CIF) for the imported and FOB (Free On Board) for the exported commodities.

Activity 6.1

What is the economic analysis of project?

What is the difference between the economic and financial analysis?

List the factors of that makes both analysis different and justify.

6.2. Objectives/Reasons for Economic Analysis

In project planning there are two main objectives to economic analysis. These are:

- to provide information for making decisions on the acceptability of projects from the national point of view, and
- to provide information of value for project design and planning, macro-economic planning and economic research.

Economic analysis broadens the analysis from confining attention to the project itself to investigating the impact of the project on the national economy. Economic analysis is the core of project analysis and evaluation. It is made to ascertain the overall country impact of a project. It is a measure of the costs and benefits of a project to the society. The exercise of project appraisal is not accomplished till the proposed project is also viewed from the economy viewpoint.

Economic analysis substitutes shadow price (economic prices) for market prices because market prices do not reflect their true or scarcity prices. Regardless of their difference, financial analysis is the base for economic

analysis. It provides the necessary information to be used for economic analysis.

Social Cost Benefit Analysis/Economic analysis is done because of the following reasons.

***Inflation**:* is a general price increase of commodities (Inputs and outputs). When high degree of inflation prevails in any economy, the project's inputs and outputs do not reflect their real value. Therefore, the price of these inputs and outputs should be adjusted using the world price by conducting economic analysis.

Currency over valuation: when the foreign currency is over valued (eg., dollar), most developing countries are exercising devaluation of their currency in order to reflect the world price. For example, our birr is depreciated from time to time whenever the value of dollar is appreciating. ($1 = Br. 8.00, $1 = Br. 8.65 etc.)

Existence of under employment: in developed countries like Ethiopia, the domestic prices are distorted and do not reflect the real value of inputs and outputs. In other words, the market prices and economic prices are not the same. One of the highly distorted market is the labor market. Unskilled and semi-skilled labor market is highly affected because workers are paid less and the payment is employees not the same for all doing the same job. Therefore, for economic analysis purpose this distortion should be adjusted.

***Existence of income/wealth inequality**:* due to this inequality price may not reflect the social equalities. As a result project analysts shift to apply social pricing techniques (that is shadow pricing techniques).

Externalities: are costs and benefits to the economy as a whole and that are attributed to the project but are not taken in to account in estimating quantities and values for the project inputs and outputs. Since they are not paid for by a particular firm, financial analysts ignore them. But someone has covered their cost (government), thus their value should be included in the economic pricing technique.

***Existence of tariffs, customs and duties**:* existence of these restrictions and impositions by the government may increase the price of commodities. This cost needs to be excluded in the economic analysis because it does not reflect the commitment of real resources.

The existence of the above mentioned factors demands economic analysis so that the value of inputs and outputs of a project can reflect its real value. Markets like commodity market, labor market, foreign exchange and capital markets are highly distorted in developing countries. Therefore, adjustment of price to reflect the real cost of resources should be made using shadow prices, which is a set of prices that better reflect the opportunity costs of goods and services in their best use. The objective of economic analysis is utilization or best use of the scarce resources of a nation.

Economic analysis, to achieve its intended purposes, should follow the following steps. These are:

***Step 1**:* Identify and eliminate transfer payments. As it is explained above, transfer payments like duties, taxes etc should be eliminated. Turning the economic analysis.

***Step 2**:* Identify linkages and externalities

***Step 3**:* Identify the effect on the use or creation of traded goods

***Step 4**:* Identify the effect of the project on the employment of labor.

A frequent cause of confusion is that project analysis can be applied in different ways, from different perspectives. This may give the impression that there are conflicting measures of project worth. The following table attempts to clarify the techniques used to analyze projects, their objectives and indicators that can be calculated at each analysis level.

Levels of Project Analysis

	Perspective	**What is measured?**	**Indicator**
Financial analysis	Owners or lenders	Change in private income for owners or lenders	FNPV, FIRR
Economic analysis	National economy	Change in national income	ENPV, EIRR
Distributional analysis	All groups affected by the project. eg., government, lenders, workers, owners, etc	Distribution of change in national income	Proportion of ENPV going to target group or cost of income change for target group

Note: FNPV, FIRR stands for financial NPV and IRR respectively

ENPV, EIRR stands for economic NPV and IRR respectively.

More recently, there has been a renewal of interest in the distributional impact of projects associated with attempts to determine the fiscal impact of projects (effect on government income). Although it is not always straightforward in principle it should always be possible to show how the income of different groups is affected by project. The easiest way to do this is to show how projects economic net present value ENPV (discounted value of the change in national income), is allocated between different groups. Normally, the ENPV may compose of positive income steams for some groups and negative ones for others. In other words, in reality there are losers and gainers of the income of the project. Identifying these groups is known as *distributional analysis*.

Activity 6.2

Explain why the social cost benefit analysis is important?

6.3. Shadow Prices

Shadow prices are a set of prices that are believed to better reflect the opportunity cost of resources in their best use. They are employed instead of domestic market prices in guiding the allocation of resources since the latter is distorted and using them would lead to resource misallocation.

Shadow prices for economic analysis are based on the opportunity costs. If costs can be broken down into basic resource categories on an opportunity cost basis, all that remains to be done is to value the basic categories according to their opportunity cost.

6.3.1. Opportunity Cost

Before we proceed to the discussion of shadow price and its calculation, let us first outline the opportunity costs of resources because opportunity cost is the most important concept underlying economic analysis. It is defined as the next best alternative foregone in undertaking a course of action. Whenever, there is an opportunity cost, there is an argument for using shadow prices. Opportunity cost can best be explained by reference to examples commonly used in the economic analysis of projects: land, labor and capital.

a) Opportunity Cost of Land

In economic analysis land is not usually treated as a capital value. The opportunity cost of land is defined by its next best alternative use. Urban land can be used for houses, offices, shops and factories. Rural land is normally used for crops, pasture, forestry or sometimes conservation.

The opportunity cost of rural land is likely to be very important in the assessment of any agricultural or agro industrial project. When agricultural land is being used, the opportunity cost is the value of the alternative crop produced less the other costs involved in producing the crop. For urban land the opportunity cost is usually defined by rental values.

b) Opportunity Cost of Labor

Opportunity cost of labor is the value of the worker's output in the next best alternative. It usually varies significantly between occupational groups and often between regions. In determining the opportunity cost of labor it is important to identify the potential source of labor (urban or rural). Project appraisal also distinguishes between skilled and unskilled labor. The most common assumption is that skilled labor is in scarce supply and has an opportunity cost equal or greater than its market price, while unskilled labor is in excess supply and has an opportunity cost below its market price.

The first assumption implies that skilled workers are able to obtain the same salary whether they work on the project in question or on another project. This assumption is reasonable for most countries including Ethiopia. For our country, on the other hand, the labor category assumed to be in excess supply is formal sectorial rural and urban unskilled labor. The largest potential source of unskilled labor is the agricultural sector.

Skilled labor was assumed to be relatively scarce and so the opportunity cost of skilled manpower was assumed to be the same as the market price. The opportunity cost is assumed to consist of outputs of the various sectors in proportion to the estimated employment of skilled labor in each sector.

c) Opportunity Cost of Capital

In principle the opportunity cost of capital (investment funds) for an individual, a company or an economy is the rate of return available on the next best alternative project. For an individual or company the bank interest rate may give a reasonable guide. Because the alternatives to investing in a project is to lend to a bank that pays a periodic interest. However, it is not easy to directly estimate the opportunity cost of capital for an economy at large because economic analysis using shadow prices is not applied consistently to all projects.

d) Opportunity Cost and Traded Goods

Traded goods are those items, which can be imported or exported. The opportunity cost of traded goods to an economy is defined by their border

prices (CIF for imports and FOB for exports). This can be understood using the following example.

Assume that the country produces sugar to satisfy the local market. The alternative to production of the sugar is to import the sugar. The value of the sugar produced is then the CIF (Cost Insurance and Freight) price, which has been saved. Similarly, if a textile factory use locally produced cotton as raw materials the alternative is to export the raw material (cotton). The opportunity cost of using the cotton for the textile project is the export price (FOB) foregone. There are four main types of traded goods. The basic for their valuation can be summarized as:

- Imported input (opportunity cost: foreign exchange foregone i.e., the input price plus the cost of transport and handling to the project)
- Locally produced import substitute (opportunity cost: foreign exchange saved (the import price) plus transport and handling costs from boarder to the point of sale minus transport from the project to the point of sale.
- Exported output (value foreign exchange earned (the export price) minus transport and handling from the project to the boarder.
- Diverted export as an input.

Opportunity Cost and Non-Traded Goods

Most projects, in addition to imported inputs and exported outputs, use inputs and produce outputs that are not traded internationally. Goods and services produced and sold in a country only are defined as non-traded. They do not enter world trade either because of their nature, eg. Electricity, unskilled labor, inland transport etc or due to trade barriers and other special reasons such as high transport cost, government policy etc.

The value of non-traded items is estimated by decomposing them in to traded and non-traded elements. The former is valued at boarder price directly and the later at specially estimated shadow prices or at domestic prices multiplied by conversion factor. (Conversion factors are covered in the following section of this material).

Activity 6.3

1. What is opportunity cost? Give examples.

6.3.2. Conversion and Adjustment Factors

Shadow prices are often applied using either conversion factors (CF's) or adjustment factors (AF's). Ideally, all project inputs and outputs should be valued directly at accounting price/shadow price or boarder prices. However, this is not always possible because some of the goods and services are not traded and for them you know only the domestic price. This price most of the times is distorted due to several reasons. Therefore, it should be translated into shadow prices using conversion factors.

Conversion factor (CF) is the factor by which we multiply the actual price(s) in the domestic market of an input or output to arrive at its economic price, when the later cannot be observed or estimated directly.

6.3.2.1 How and How Many CF's should be estimated?

A CF is estimated by taking the ratio of border prices to domestic price/s of the goods. We can estimate commodity specific, service specific or sector specific conversion factors, depending on the degree of aggregation desired.

Most literatures show that at least three conversion factors need to be estimated. These are:

Standard Conversion Factor (SCF): SCF is an all-inclusive conversion factor used in place of commodity specific CF's or sectorial specific CFs. It is a summary and approximation of the distortions in the domestic market. It is estimated as the ratios of the values of imports and exports of the country at boarder prices (CIF and FOB) to their value at domestic prices. Algebraically,

$$CF = \frac{\text{World Price / Shadow Price}}{\text{Domestic Market Price}}$$

Shadow Wage Rate (SWR): it is the opportunity cost of labor or marginal productivity of labor. In principle shadow wage rate is

determined by the opportunity cost of labor which may be adjusted for any difference between the shadow price and market price of the commodities produced by workers in their alternative occupations.

The conventional approach to estimating the shadow wage rate is to adopt the following procedure:

determine the opportunity cost of labor (OC) by finding out the next best alternative occupation for labor of the category under consideration and the number of days worked (N).

estimate the additional costs (AC) associated with transfer to work with the project from the alternative occupation.

Estimate a conversion factor for the output of the worker in the alternative occupation without the project (CF_W)

The shadow wage rate is then given by:

$SWR = OC \times N \times CF_W + Ac$

Where: **OC** = opportunity cost

N = Number of days

CFW = Conversion factor

Example*:* if the average daily wage rate of a worker is Birr 5 and workers are able to work for 250 days per year, and if it is estimated that the conversion factor for the alternative output of the workers is 0.95. The extra cost of transferring the worker to the new occupation (to the project) is Birr 150,000 per year, what is the SWR for the unskilled workers?

Solution:

OC = 3 Birr, N = 250 days, CF_W = 0.95, A = 150,00 Birr

SWR = 3 x 250 x 0.90 + 150,000

Birr. 150,675 per year

In economic analysis the concern of project analysts is to know the economic price of labor (ER_L), which is calculated as: Market Wage Rate (MWR) times shadow wage rate. (EP_L = MWR x SWR). If there is no distortion in the market wage rate, there could be equality of MWR and EP_L.

When you estimate the EP_L you have to know the original place or source of labor and the foregone output. For example, assume if some member of the family migrates from rural area to the project site (to work) there is a foregone output that is the output that he/she can produce in the families plot of land. In the project he/she is paid the MWR, which may be higher than the previous work. Therefore, there is some distortion, which need some adjustment using conversion factors.

The conversion factor can be calculated as follows:

$$CF = \frac{\text{foregone output}}{\text{Market wage rate}} = \frac{\text{Daily Wage Rate}}{\text{MWR}}$$

Example

If a person comes from the rural area where he can produce from one hectar of land 10 quintal of Teff and one house hold has 5 members. The price of one quintal of teff is Br. 250. What is the opportunity cost/foregone output?

The yearly output of the family in their original place (rural area) is Br. 2500 (250 x 10). The average yearly price of labor in the family is Br. 500 (2500/5). Therefore, the foregone output of the person is Br. 500/250 = Br. 2 per days assuming that the person can work for 250 days per year. Therefore, the opportunity cost or foregone output from his region is Br. 2 per day. However, if he is paid Br. 6/day or more in the project, this shows that there is some distortion in the market wage rate. In order to adjust this distortion you have to calculate the conversion factor.

$$CF = \frac{\text{Foregone output}}{\text{MWR}} = \frac{2}{6} = \underline{0.333}$$

If the cost of labor in the financial analysis shows Br. 100,000, the economic cost would be Br. 33,300 (0.333 x 100,000). If the CF>1, it shows that labor is overprice whereas if CF<1, it shows that labor is under-priced in the project.

Foreign Exchange: this is also another national economic parameter. In most developing countries the capital market is distorted. When there is a shortage of foreign exchange, the official exchange rate understates the value of foreign exchange. Therefore, shadow exchange rate (SER) should

be used in project analysis. Use of a SER should encourage those projects which either save or earn foreign exchange and discourage those projects which use foreign exchange.

Shadow exchange rate (SERS) are usually expressed as conversion factors to be applied to the official exchange rate rather than as a rate of Birr to the dollar or pound. The reasons is that we are concerned with the value of foreign exchange as a whole rather than the value of particular currencies. The following formula can be used for calculating SER:

Formula 1:

$$SER=\frac{M+T_M+X-T_X+S_X}{M+T}$$

Where:

M = the total value of imports

TM = the total value of import duties

X = the total value of export

Tx = the total value of export taxes

Sx = the total value of export subsidies

This formula assumes that additional foreign exchange expenditure affects the level of imports and exports in proportion to their value in total trade.

Formula 2:

$$SER=\frac{M+T_M}{M}$$

This formula assumed that additional foreign exchange expenditure only affects the level of imports.

Discount Rate (DR): estimation of the discount rate (DR) is always a problem area in economic analysis. It is the rate at which the streams of costs and benefits are discounted in estimating the NPV and IRR of a project. DR is another national economic parameter and should be determined by national planners. DR is however, the most difficult to estimate. It is important to have information about the availability of funds, interest rate, sources of funds and import and export values.

To conclude, these are the major national economic parameters used to make economic analysis. All parameters (shadow prices) reflect opportunity cost. They are very important for project planners because they show the alternative side of the project, what it will contribute to the economy and to the society.

Once the financial and economic analysis are done and if the project is worthwhile to take, it should be put into action, that is, it should be implemented. The next unit is devoted to the discussion of project implementation.

Summary

Project economic analysis aims to ensure that scarce resources are allocated efficiently, and investment brings benefits to a country and raises the welfare of its citizens. The financial analysis, which assesses the impact of a project on the income of its owners, economic analysis is a form of more general tool of cost benefit analysis. Financial and economic analyses have similar features. Both estimate the net-benefits of a project investment based on the difference between the with-project and the without-project situations. However, the financial analyses of the project compare benefits and costs to the enterprise, while the economic analyses compare the benefits and costs to the whole economy. While financial analysis uses market prices to check the balance of investment and the sustainability of project, economic analysis uses economic price that is converted from the market price by excluding tax, profit, subsidy, etc. to measure the legitimacy of using national resources to certain project. Financial and economic analyses also differ in their treatment of external effects (benefits and costs), such as favorable effects on health.

Economic analysis substitutes shadow price (economic prices) for market prices because market prices do not reflect their true or scarcity prices. Regardless of their difference, financial analysis is the base for economic analysis. It provides the necessary information to be used for economic analysis. Therefore, the economic analysis of project conducting due to:

Inflation

Currency overvaluation

Existence of underemployment

Existence of income

inequalities Externalities

Existence of tariffs, customs and duties

Review Questions

PART I: True or False

WRITE "TRUE" IF THESTATMENT IS CORRECT OR "FLASE" IF THE STATEMENT IS INCORRECT

The financial analysis focuses on money profits accruing to the project entity.

Economic analysis, is concerned with public "profitability" which is based on economic resource flows.

Economic resource flows not relates to Social opportunity costs.

The main reason for making economic analysis is to provide information for making decisions on the acceptability of projects.

In Economic analysis, to achieve its intended purposes the first step is Identify linkages and externalities

Opportunity cost of labor is the value of the worker's output in the next best alternative.

Shadow prices are a set of prices that are believed to better reflect the opportunity cost of resources in their best use.

PART II: CHOOSE THE BEST ANSWER FROM THEIR ALTERNATIVES

Which one of the following factors that will differentiate financial analysis with economic analysis

Pricing of inputs

Treatment of transfer payments

Discount rates

All

Economic analysis is done because of the following reasons.

Inflation:

Currency over valuation

Existence of under employment

All

The basic for their valuation of traded goods

Imported input

Locally produced import substitute

Diverted export as an input

All

PMI states that there are two risk types : business and insurable.

Which of the following are considered insurable risks?

Employee replacement costs

Opportunity costs

Sunken costs

Damage caused by a bonded contractor

A and D

The total amount of risk that is calculated for a project is found by

Multiplying the sum of each the risk times the amount at stake

Calculating the cumulative sum of the probability for each risk and multiplying this value times the consequence of

occurrence of the risk events

Cannot be calculated since all risks are not know

The amount of project reserves available

Part III: Short Answer

Based on what you learnt in this chapter answer the following questions:

What is economic analysis?

What is the difference between financial and economic analysis?

What is shadow pricing?

What is opportunity cost?

CHAPTER SEVEN

PROJECT IMPLEMENTATION

Aims and Objectives

After reading this unit you should be able to:

understand project management

explain project planning and control

understand pre-requisite for project implementation and

outline the causes of project failure

Dear reader! Remember that the feasibility analysis aspects you have learnt so far since chapter four. Identifying feasible project is not an end job by itself since you implement it. Do you think implementation is the last step in project management? We need proper planning for implementing projects and post-implementation review of the project. Of course, implementation is not the last step in project management. In this particular chapter, you will learn about project planning, controlling, monitoring, implementation and evaluation.

7.1. Introduction

The importance of implementation phase of a project is not over emphasized because a nicely designed project may fail or the expected benefit may not be realized due to poor implementation.

Implementation begins immediately after the final decision on the project and ends when it starts rendering the benefits envisaged. ***While in earlier stages of project planning there was more thinking and less action, in this stage more action and less thinking is needed***. It is a point at which conclusions are reached and the decisions made are put into action.

7.2. Project Management

In order to accomplish the construction and supervision tasks of the project cycle good project management system is needed that can perform physical and financial performance analysis while the project is put into action.

Project management is a management discipline in which people work together for a common goal. It involves planning, organizing, staffing, directing and controlling to achieve a specified objective of the project. The project team should prepare an implementation schedule and should work for it in order to put the project into action. This schedule also serves as a yardstick against which performance can be evaluated (controlling). It can be used to evaluate the physical process per time, cost and/or effort.

7.2.1 Project Planning

Projects involving few activities, resources, constraints and inter-relationships can be visualized easily by the human mind and planned informally. However, when a project become larger and complex, informal planning has to be substituted by formal planning. The need for formal planning is indeed much greater for project work than for normal operations. Without effective planning, there may be chaos.

Project planning serves several important functions. The major ones are:

It provides a basis for organizing the work on the project and allocating responsibilities to individuals.

It is a means of communication and coordination between all those involved in the project.

It induces people to look ahead.

It instills a sense of urgency and time consciousness It establishes the basis for monitoring and control.

A comprehensive project planning covers the following activities.

Planning the project work. The activities relating to the project must be spelt out in detail and they should be scheduled and sequenced properly. Planning the manpower and organization. The manpower required for the project must be estimated and the responsibility for carrying out the project work must be allocated.

Planning the financial aspects of the project through budgeting. Planning the information system.

Project planning can be facilitated using planning tools/techniques. The two important tools of planning are the Gantt chart and the network techniques. The Gantt chart is a pictorial device in which the activities are represented by horizontal bars on the time axis. In network techniques, the activities, events and their inter-relationships are represented by a network diagram. Most projects fail as a result of poor project management team and lack of coordination and poor monitoring activity of the team. One of the main tasks of project management team is to organize people and physical resources in a proper way. The team also should be transparent for both the management and operational workers of the project.

7.2.2 Project Control

No sooner is the project launched; control becomes the dominant concern of the project manager. Indeed, once the launch phase is over, planning and control become closely interviewed in an integrated managerial process.

Project control involves a regular comparison of performance against targets, a search for the causes and deviation, and a commitment to check adverse variances. It serves two major functions:

it ensures regular monitoring of performance, and

it motivates project personnel to strive to achieving project objectives.

Effective control is critical for the realization of project objectives. Yet, control of projects in practice tends to be ineffective. The basic reasons may be:

Characteristics of the project: most of the projects are large, complex undertakings involving many organizations and people. This renders the task of control difficult.

People problems such as lack of experience, training, competence and inclination to control projects.

Poor control and information system: one of the factors which inhibits effective control is the poor quality of control and information system. The main weaknesses observed in the control and information system are:

Delay in reporting performance

Inappropriate level of detailness of the data Unreliable information.

The project team also should perform monitoring and evaluation activities. They are briefly explained as follows:

1) Monitoring

Monitoring is a timely gathering of information on project inputs, outputs and complementary activities that record the progress of a project towards the achievement of its objectives. Monitoring is not a one-time activity rather it is done throughout the life of the project. It compares the actual outputs and inputs with the expected or planned levels of input to be used and output to be produced. Monitoring result should alert project managers and policy makers to actual and potential implementation problems requiring connective action. It requires a simple, clearly, and easily operational systems. Monitoring can be done through field visits and interviews. Regardless of the way it is going to be done, the whole purpose of monitoring system is to improve the effects of the project management team, while they are involved in putting the project to action as per the schedule.

In developing a system of monitoring, the following points should be taken into consideration:

it should focus sharply on the critical aspects of project implementation

it must lay more emphasis on physical milestones and not on financial targets

it must be kept relatively simple of made over-complicated, it may lead to redundant paper work end diversion of resources

it must be viewed that monitoring is not an end in itself rather as a means to implement the project successfully.

Evaluation/ Variance Analysis

Evaluation is primarily concerned with comparing the actual project efforts and impacts against the established standard/plans in order to determine the variance. Mostly it is considered as a post action. But it can be considered as both ongoing and ex-post action of the project's control effort. The ongoing evaluation is done throughout the life of the project but the ex-post evaluation is an action taken at the final performance of the project. The ex-post analysis/evaluation is inadequate for project control because it is a backward looking rather than forward looking and it does not use the data effectively to provide integrated control. Ex-post/post audit action of a project control:

provide a documented log of experience that may be valuable in improving future decision making

enable the firm in identifying individual with superior abilities in planning and forecasting

help in discovering systematic biases in judgment

induce healthy caution among project sponsors, and

serve as a useful training ground for promising executives who need broader business experience and exposure.

Evaluation is mainly concerned with determining whether the planned benefits of the project have materialized and distributed to the beneficiaries of the project. Evaluation takes longer time than monitoring. Similarly, it also requires more specialist skills both from within and outside the project.

Activity 7.1

What is project implementation?

Why there is more action than thinking in implementation phase?

Explain the elements if project management.

7.2.3 Human Aspects of Project Management

A satisfactory human relation system is essential for the successful execution of a project. Without such a system, the other systems of project management, however sound they may be by themselves, are not likely to work well. While technical problems can often be solved with additional investment of resources, people's problems may not be amenable to satisfactory solution in the short span of the project life.

To achieve satisfactory human relations in the project setting, the project manager must successfully handle problems and challenges relating to authority, orientation, motivation and group functioning. Individuals with a certain responsibility in the project should be given appropriate authority so that they can make a right decision and take action on a timely basis. A project manager also has to strengthen the managerial orientation of project personnel so that project goals and objectives can be effectively achieved within the constraints of time and budget.

The project manager functions within the boundaries of a socio-technical system. Most of the factors of this system – organizational structure, technical requirements, competencies of project personnel are more or less "given" for him. The principal behavioral factor which he can influence is the motivation of the project personnel. In order to succeed in motivating project personnel, the project manager must be a perceptive observer of human beings, must have the ability to appreciate the variable needs of human beings, must have skill in several styles of management suitable to different situations, and must be sensitive to the reactions of people so that he can act supportively rather than threateningly.

In a large complex project, many persons drawn from different functions, departments, and organizations are involved. This leads to formation of groups, formal and informal. This group should be effective; who are satisfied and committed and who strive for attainment of project objectives.

7. 3 PRE-REQUISITES for SUCCESSFUL PROJECT IMPLEMENTATION

Time and cost over runs are common in every country's is development projects. Due to such time and cost over-runs, projects tend to become uneconomical, resources are not available to support other projects, and economic development is adversely affected. What can be done to minimize this problem and thereby improve the prospects of successful completion of projects? While a lot of things can be done to achieve their goal, the more important ones appear to be as follows:

1. Adequate Formation

Often project formulation is deficient because of one or more of the following shortcomings:

superficial field investigation

poor assessment of input requirements

omission of project linkages

poor judgments because of lack of experience and expertise

deliberate over estimation of benefits and under estimation of

costs undue hurry to get started.

Therefore, managers must take care to avoid the above deficiencies sot that the appraisal and formulation of the project is thorough, adequate, and meaningful.

2. Sound project organization

A sound organization for implementing the project is critical to its success. The organization should give attention to the human side of the project, rewards and penalties should be related to performance and authority and responsibility should be equivalent.

3. Proper implementation planning

Once the investment decision is taken and often even while the formulation and appraisal are being done – it is necessary to do detailed implementation planning before commencing the actual implementation.

4. Advance action

When the project appears to be viable and desirable, advance action on the following activities may be initiated:

acquisition of land

securing essential clearances

identifying technical collaborators/consultants

arranging for infrastructure facilities

preliminary design and engineering,

and calling of tenders.

5. Timely availability of funds

Once the project is approved, adequate funds must be made available to meet its requirements as per the plan of implementation – it would be highly desirable if funds are provided even before the final approval to initiate advance action.

6. Judicious equipment tendering and procurement

In order to avoid time and cost over runs it is important to place a tender and choose the right supplier of the necessary input of the project.

7. Better contract management

Since the substantial portion of a project is typically executed through contracts, the proper management of contracts is critical to the successful implementation of the project.

8. Effective monitoring

In order to keep a tab on the progress of the project, a system of monitoring must be established. This helps in:

anticipating deviations from the implementation

plan analyzing emerging problems

taking connective action

7.4. WHY DO DEVELOPMENT PROJECTS FAIL?

Dear reader! Think about the following questions:

Have you ever heard that projects failed to complete?

Have you ever observed that some projected extended project life? Why do you think projects failed to implement?

In most developed countries the failure rate of projects outweigh than those, which are successful. In most cases the following are the basic reasons for project failure.

Poor project planning and preparation

Delay in implementation

Cost and time over runs

Shortage of raw materials

Shortage of skilled manpower

Lack of coordination among different project implementers or executive agencies like electric power suppliers, road agencies, water and sewerage authority etc

Lack of community participation in project planning and implementation. Project initiators should see in the first place whether the project is demand – driven or not. Development projects must be "felt-need of the society" rather than a stranger to a particular community of the project area. Otherwise, the project will not achieve its intended purpose. In general, project to be successfully implemented; it should consider all social issues.

Summary

To implement a project means to carry out activities proposed in the application form with the aim to achieve project objectives and deliver results and outputs. Its success depends on any internal and external factors. Some of the most important ones are a very well organized project team and effective monitoring of project progress and related expenditures.

Overall management has to be taken over by the lead partner and project manager, who is often employed or engaged by the lead partner. The project management has to have an efficient management system and always has to be flexible to current needs and changed situations, as the project is rarely implemented exactly according to the initial plan. Nevertheless, the partnership should aim to deliver quality results and outputs. Quality means meeting expectations described in the application and those agreed within the partnership.

Review Questions

PART I: True or False

Write "TRUE" IF THESTATMENT IS CORRECT OR "FLASE" IF THE STATEMENT IS INCORRECT

A sound organization for implementing the project is critical to its success.

In order to avoid time and cost over runs it is important to place a tender and choose the right supplier of the necessary input of the project.

Poor project planning and preparation leads to loss on project.

Shortage of raw materials in one project may not be negative effect on return.

PART II: CHOOSE THE BEST ANSWER FROM THEIR ALTERNATIVES

The primary components of the quality management function are :

A. quality planning

quality control and assurance

quantitative measurement

quantitative assessment of the project

“A” and “B”

Setting the number of defects before the lot is rejected, is a direct responsibility of :

a functional worker

the project manager

management

the accounting department

Measured quality of a manufactured product is :

Always constant

Continually decreasing

Subject to a certain amount of variation

Continually increasing

On a project the project manager should strive for a "Quality Level" that :

is the highest level possible

is as close to the project objectives as possible

Represents the least cost to the project.

Exceeds the specified requirements of the project.

The main reason for project failure is

Delay in implementation

Cost and time over runs

Shortage of raw materials

All

Which one of the following is limitation of formulating the project except

superficial field investigation

good assessment of input requirements

omission of project linkages

all

what are special consideration while developing system monitoring

it should focus sharply on the critical aspects of project implementation

it must lay more emphasis on physical milestones and not on financial targets

it must be kept relatively simple of made over-complicated, it may lead to redundant paper work end diversion of resources

it must be viewed that monitoring is not an end in itself rather as a means to implement the project successfully.

All

Part III: Short Answer

What is project planning?

Why project planning is important?

What are the functions of project control?

What are pre-requisites for successful projects?

Why a development projects sometimes fail?

Answer Key

CHAPTER ONE

PART ONE

TRUE

FALSE

FALSE

FALSE

TRUE

PART TWO

E

C

A

D

E

D

D

D

B

A

CHAPTER TWO

PART ONE

TRUE

TRUE

FALSE

TRUE

FALSE

TRUE

PART TWO

B

C

B

D

E

D

E

CHPTER THREE

PART ONE

TRUE

TRUE

TRUE

TRUE

FALSE

PART TWO

D

C

F

D

C

C

CHAPTER FOUR

PART ONE

TRUE

TRUE

FALSE

TRUE

TRUE

PART TWO

D

E

E

D

B

E

CHAPTER FIVE

PART ONE

TRUE

TRUE

TRUE

FALSE

TRUE

PART TWO

D

C

E

E

B

B

C

B

CHAPTER SIX

PART ONE

TRUE

TRUE

FALSE

TRUE

FALSE

TRUE

TRUE

PART TWO

D

D

D

E

B

CHAPTER SEVEN

PART ONE

TRUE

TRUE

TRUE

FALSE

PART TWO

E

C

C

B

D

B

E

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Assignment for the Course ***Project Analysis and Evaluation*** (AcFn 424)

This assignment is to be completed and to be sent to the University for evaluation. Its maximum mark is **30%.**

Do not try to complete the assignment until you have covered all the chapters and have answered the review questions presented at the end of each chapter.

Please do not forget to write your **Name, ID No**. and **Address** on this cover page and also your **Name** and **ID No.** on each page of your answer sheet.

Part –I Multiple Choices: Choose the best Answer and put your answer on separate answer sheet. (1 Pt. each)

Which one of the following is/are not common characteristics of project and operation?

Performed by people

Constrained by limited resources

Planned, executed, and controlled

All of the above

None of the above

Identify the **incorrect** statement about the project:

Project is an investment activity in which specific resources are committed within a given time frame

Project is a repetitive activity that is goal oriented and has a particular set of constraints.

Project has organizational boundaries.

It is an activity which is likely to have a partially or wholly independent administration.

_____ is type of project based on identified unsatisfied demand project can be created or on unsatisfied basic needs.

Donor driven project

Need driven

Political driven

Demand driven

B & D

Project idea emanate from all except one.

Investment identification missions by donors

Unsystematic discussions

Observation of constraints

Solutions to tackle catastrophes

None of the above

At _____ stage, the project is being seriously considered as a definite investment action in Baum approach.

Identification

Financing

Preparation

Implementation

Negotiation

Of the following one should **not** considered in opportunity study.

Natural resources,

The existing agricultural base

Previous demand for consumer goods

Imports substitution and export possibilities

Expansions of existing capacity

All of the above

Which activities should be done to have effective project planning?

Identification of alternatives and strategy

Conducting SWOT analysis

Setting objectives

Why projects?

They are inefficient means to achieve growth.

They are mechanisms for encouraging unfair income distribution

They are powerful to solve immediate problems.

Among the following, one does **not** indicate the common features of projects and operation works:

They are performed by people

They have the same life span for their achievements

They are affected by limitation of resources

Both have similar objective designed for their achievement.

E. A&C F.B&D

Which one is/are **not** project parameter:

A. Quality
B. Time
Scope
D. Cost
E. None

During preliminary selection, the analyst should eliminate project proposals that:

Are technically unsound and risky
Have no market for the output
Have inadequate supply of inputs
Are very costly in relation to benefits
Profit promising

Which one is/are **no**t common characteristics of projects and programs?

They require resources for their achievement.
Generating outputs of value
Both have the same period and objectives
They Serve as instrument for the execution of development plans
All F. None

Of the following alternatives one is **false** about project control. Identify:

Project control used for a regular comparison of performance against targets

B. Project control is used for searching the causes and deviation of actual performance from plan

Project control involves commitment to check adverse variances.
Effective project control is critical for the realization of project objectives.
None

Which one is **incorrect** about project monitoring:

Project monitoring is a onetime activity in a life of the project.

Project monitoring compares the inputs and outputs with the expected.

It deactivates the policy makers and project managers in project performance.

It is used to record the progress of a project towards the achievement of its objectives

E. A&B F. A&C

Among the following all are the factors that can result to deficiency in project formulation, ***but***:

superficial field investigation

adequate assessment of input requirements

Wise judgments based on experience and expertise

Right estimation of benefits and costs of a project.

Except A

Part- II: Write "TRUE" if the statement is correct and "FALSE" if the statement is incorrect and put your answer on separate answer sheet (1pt.each)

Projects under taken by government and business organizations have the same objectives of generating profit.

Unlike Projects, programs have specific beneficiary group.

Project selection is meaningful only when it is placed within a broader development framework.

In developing countries, the private sector remains to be the major source of project ideas.

Feeling of feasibility is not a good basis for identification of potentially promising projects that worth considering.

P**art III: Short Answer (5 mark)**

Discuss in detail the approaches of project identification **(2 Pts.)**

Explain the problems in project identification **(1 Pts.)**

Discuss about the project cycle and its approaches **(2Pt).**

Part IV: Work Out (5 mark)

Assume that the following data were collected for six years in order to estimate the future demand by taking the number of household as an explanatory variable.

Year	**No. of households (X)**	**Historical sales (Y)**
1	600	2,235
2	850	4,530
3	700	3,887
4	950	3,194
5	1,113	5,885
6	1,150	4,372

Required:

Determine the sales function **(1 Pts).**

Forecast the demand level for the next coming four years if the number of households: **(2 Pts.)**

Increases by 50 for the first two years of forecast.

No change in population level in the third year of forecast and

Decreases by 60 in the last year of forecast.

The **Dream Corporation** is trying to choose between the following two mutually exclusive design projects at the required return of 9%:

Year	Cash Flow A	Cash Flow B
0	-$20,000	-$3,000
1	10,000	2,500
2	10,000	2,500
3	10,000	2,500

If the company applies the NPV decision rule, which project should the firm accept and why? (**1 point**)

If the company applies the payback period decision rule, which project should the firm accept and why? (**1 Point**)