

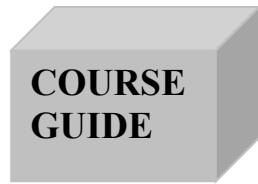
# MBF 739

# PROJECT EVALUATION

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**NATIONAL OPEN UNIVERSITY OF NIGERIA**



**MBF 739**  
**PROJECT EVALUATION**

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Published by  
National Open University of Nigeria

Printed 2008

ISBN: 978-058-030-1

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## **Introduction**

MBF 739: Project Evaluation is a semester course work of two credit units. It will be available to all students taking the MBF programme in the School of Business and Human Resources Management.

The course consists of 3 modules involving the subject area of Project Evaluation.

The course guide tells you what the course is all about and the relevant materials that you require to make your study very successful. Other vital information contained in this course guide deals with Assessment which consists of the Tutor- Market Assignments, and written examination.

## **The Course Contents**

The course contents consist of project evaluation from the project cycle to engineering evaluation, demand/market evaluation. It also includes financial and economic analyses of projects.

## **Course Aims**

The aims of this course are to expose you to the knowledge of how to evaluate projects either as a project initiator or an evaluator. It aims to sharpen your skills in the evaluation of either new projects or existing projects with a view to deciding whether they meet certain pre-determined investment criteria.

## **Course Objectives**

At the end of this course you should be able to:

- discuss the totality of project evaluation
- prepare simple project plans/business plans
- evaluate projects submitted to you for consideration

## **The Course Materials**

The main components of the course are:

1. The Course Guide
2. Study Units
3. References/Further Readings
4. Assignments

## Study Units

There are 15 units in this course and they should be studied carefully

### Module 1

Unit 1	The Project Cycle
Unit 2	Project Evaluations – An Introductory Format
Unit 3	Factors Affecting Location of Projects
Unit 4	Capacity and Production Planning
Unit 5	The Concept Of Engineering Evaluation

### Module 2

Unit 1	Manpower Planning and Evaluation
Unit 2	Demand Analysis
Unit 3	Supply Analysis
Unit 4	Competition and Marketing Plans
Unit 5	Project Cost Analysis

### Module 3

Unit 1	Projected Income Statement
Unit 2	Projected Cash Flow Statements
Unit 3	Projected Balance Sheets
Unit 4	Project Evaluation Criteria
Unit 5	Introduction to Economic Analyses

Units 1 to 3 provide you with the necessary background knowledge you require for your study. The remaining units 4 to 15 focus attention on the subject matter of project evaluation.

Each study unit will take at least two hours and it includes the introduction, objectives, main content, exercise, conclusion, summary, references and the Tutor-Marked Assignments (TMAs).

You are required to study the materials, reflect on them and do the exercises. Some of the exercises require that you visit some organisations and find out how they carry out project evaluation in practice. You should also read the textbooks and other recommended materials.

## **Assignments**

In each unit, you will find exercises which you are required to do. The exercises will enable you to have a better understanding of what you have studied.

## **Tutor-Marked Assignment**

In doing the Tutor-Marked Assignments, you are expected to apply what you have learnt in the contents of the study unit. The assignments are expected to be turned in to your tutor for grading. They constitute 30% of the total score.

## **Final Examination and Grading**

At the end of the course, you will write the final examination. It will attract the remaining 70%. This makes the final score to be 100%.

## **Summary**

The course MBF 739 – Project Evaluation will expose you to the knowledge and understanding of how to evaluate projects. When you complete the course, you would have been armed with the necessary knowledge required to evaluate projects.



Course Code	MBF 739
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## MODULE 1

Unit 1	The Project Cycle
Unit 2	Project Evaluation – An Introductory Format
Unit 3	Factors Affecting the Location of Projects
Unit 4	Capacity and Production Planning
Unit 5	The Concept Of Engineering Evaluation

### UNIT 1 THE PROJECT CYCLE

#### CONTENTS

1.0	Introduction
2.0	Objectives
3.0	Main Content
3.1	The Project Cycle – Meaning and Stages
3.1.1	The Project Idea Stage
3.1.2	The Project Identification Stage
3.1.3	The Project Evaluation Stage
3.1.4	The Project Selection Stage
3.1.5	The Project Execution Stage
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Readings

#### 1.0 INTRODUCTION

Ordinarily, a project is an undertaking that requires concentrated effort. Projects require commitment and deployment of resources. As a business manager of the future, you will encounter various projects in your work place or environment. Most of the projects are likely to be private sector driven. They may be manufacturing projects or they could be petrochemical or civil engineering projects. Your key task, as a project evaluator, is to carefully consider each and every project brought to your attention and see how *useful* or *valuable* they are.

Our first task and which we will accomplish in this unit is to examine the concept of a project cycle. This concept is very important as it gives us an overview of projects. The knowledge so gained, will lead us throughout the duration of this course.

## **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain a project cycle
- describe the sequences in a project cycle.

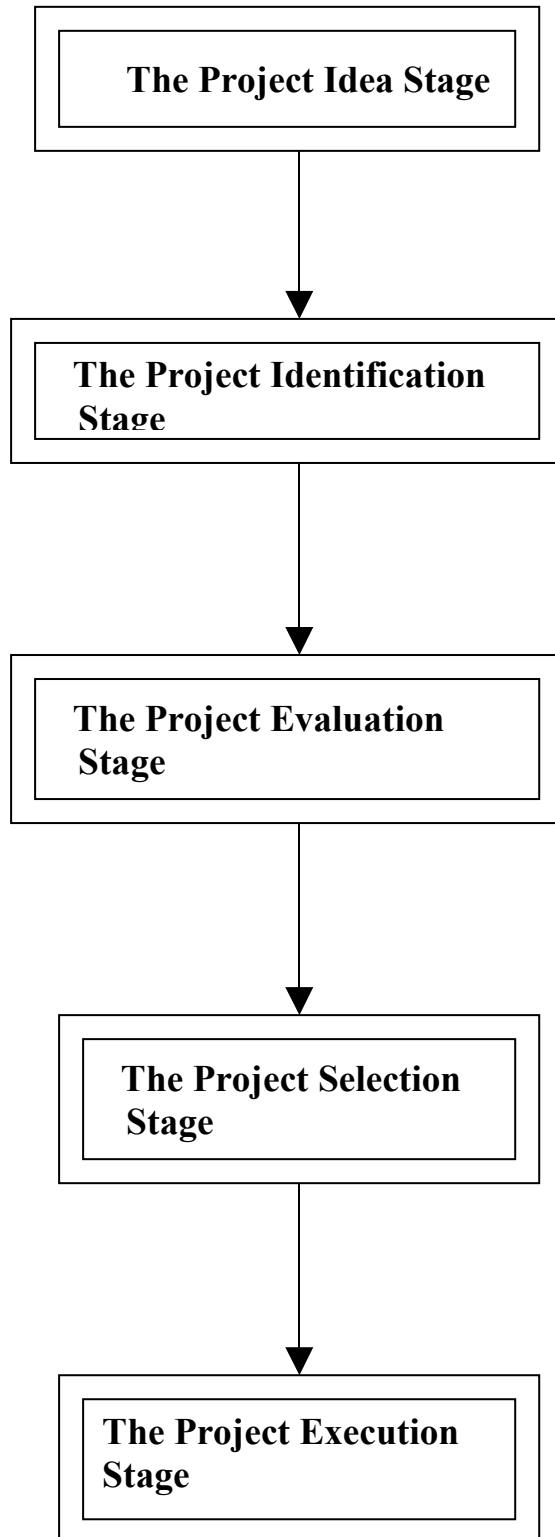
## **3.0 MAIN CONTENT**

### **3.1 The Project Cycle – Meaning and Stages**

A project cycle tries to describe the various stages that are involved, from the conception of a project idea to when the project is executed or actually takes off. Understanding a project cycle is very important as it enables us to get the total picture of a project. We will now examine the various stages of a project cycle.

Basically, projects consist of the projection of ideas and activities into new endeavours. As earlier discussed, projects may be public sector projects in agriculture, defence or transportation. A major railway link from Ibadan to Onitsha may constitute a major public sector project. A new brewery springing up at Enugu is a typical example of a private sector initiative. But whatever type of project that we are considering, we need to first understand what is usually known as the project cycle. So before we go into the real subject of our discussion – Project Evaluation, we need to build a strong background. This background is in the form of proper understanding of how a project is conceived. It explains who conceives a project. It also explains the flow of activities up to the execution of the project.

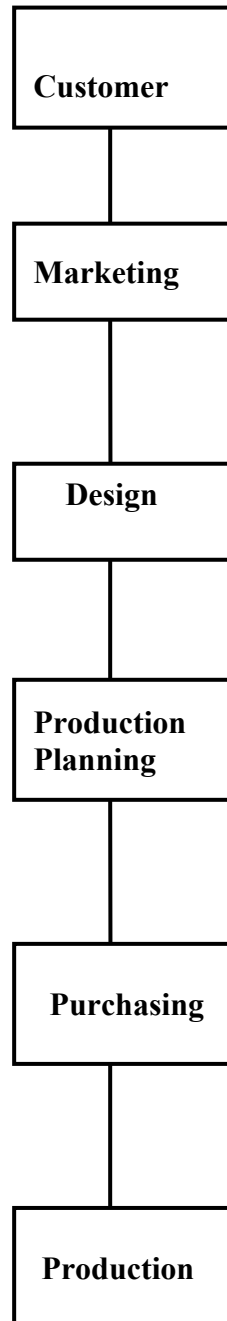
### The Project Cycle



**Figure 1** The project cycle

**SELF ASSESSMENT EXERCISE 1**

List the stages of a project cycle.



**Figure 2** A manufacturing project cycle

### **3.1.1 The Project Idea Stage**

The project idea stage is the first stage of a project cycle. The idea about a project arises from a variety of sources within the internal environment or market place.

New project ideas could originate from within an organisation or from outside the organisation. If the idea originates from within, it could be from a sales person who has encountered some success or problem with customers while performing his or her functions.

You will also realise that a new project idea could emanate from outside an organisation. Coming from outside an organisation, it could be requests from existing customers asking for bigger or better products. New project ideas may fall into any of the following categories.

- Proposal to add new products to existing lines: A company with existing product lines may decide to add new products to its existing lines.
- Proposal to expand capacity in existing lines: A company may have a proposal to expand capacity to enable it take advantage of enlarged market opportunities.

We need to stress that new project ideas may originate from any level in an organisation. A factory cleaner within an organisation may come up with a new product idea. Also an executive director in an organisation may also generate a new project idea.

### **3.1.2 The Project Identification Stage**

After the project idea stage, the next stage is the project identification stage. The project identification stage consolidates the idea stage. Project ideas are not really useful unless they are clearly identified and put down in a systematic manner for further processing.

The idea to introduce a new product into the market may come from a company salesman who is very familiar with the market. At the boardroom room level, the entire organisation has to see the project idea properly and clearly identify it as a possible area of business investment. The totality of the new idea would be considered.

### **3.1.3 The Project Evaluation Stage**

When a project has been identified, the next step is to evaluate the project. Project evaluation involves the estimation of the benefits and costs of a project. Benefits and costs should be measured in terms of cash flows.

We have to emphasise at this point that the estimation of the cash flow of a project is a very difficult task. It is difficult in the sense that the cash flow to be estimated is future cash flow. For example in the year 2007, we will try to estimate the cash flow for the year 2008.

In a corporate setup, the evaluation of projects should be carried out by a team of experts drawn from the various departments like production, marketing, accounts and administration. The team of experts should be objective in their evaluation of projects.

Alternatively, the evaluation of a project may be contracted to a third party like consultants. Contracting evaluation of projects to outside parties tends to eliminate bias.

### **3.1.4 The Project Selection Stage**

After the project evaluation stage, the next stage is the project selection stage. Faced with an array of projects with different values and worth, there is need to select which projects to embark upon. There is no standard procedure for selecting projects as this will differ between firms. The important thing to note is that the project selection function is a top management responsibility which in most cases goes to the Board of Directors of an organisation. In selecting projects, management usually considers the financial outlays involved and matches them with the financial capabilities of the firm. For example, a firm that has only N10,000,000 (ten million naira only) investment funds cannot be considering a new investment that involves a capital outlay of N40,000,000 (forty million naira only) except if it can source money externally e.g., from banks.

### **3.1.5 The Project Execution Stage**

The project execution stage is the final stage in the project cycle. After a project has been selected, it moves on to the execution stage. In most organisations, the responsibility for execution of projects is vested on a project management team raised by top management. The function of the team is to ensure that the budget for the project is spent entirely on the project and that the project is completed on schedule.

In an ideal organisation, the project management team usually prepares a monthly budget consideration report on projects for top management consideration. This is important for project monitoring and control.

## **SELF ASSESSMENT EXERCISE 2**

Discuss three sources of new project ideas.

## **4.0 CONCLUSION**

This unit has treated the concept of the project cycle which is a stepping stone into our study of project evaluation. Now that we have built the necessary background, we shall be discussing Project Analysis – an introductory frame work in the next unit.

## **5.0 SUMMARY**

In this unit we have discussed the concept of the project cycle. We have seen that it starts from the project idea stage, goes to the identification stage, to the evaluation stage. From the evaluation stage it moves to the selection stage and finally to the project execution stage.

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. Explain what you understand by the term “project cycle”.
2. List and discuss the various stages involved in a project cycle.

## **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe, (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

## **UNIT 2 PROJECT EVALUATION – AN INTRODUCTORY FORMAT**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objective
- 3.0 Main Content
  - 3.1 Project Evaluation – An Introductory Format
    - 3.1.1 The Technical and Engineering Segment
    - 3.1.2 The Management Segment
    - 3.1.3 The Demand and Market Segment
    - 3.1.4 The Financial Segment
    - 3.1.5 The Economic Segment
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

In the first unit, we discussed the concept of the project cycle which is very crucial to our understanding of project evaluation. In this unit, we will discuss project evaluation in a proper context. In doing this, we shall build an introductory format which will assist us in our discussion. Evaluation of a project involves a careful consideration of the totality of the project with a view to seeing how useful or valuable it is. Evaluation enables us to attach proper financial value to a project and also allows us the liberty of comparing it with other projects.

You will note that an analysis is not done in a vacuum. It is usually documented.

A problem usually encountered in project evaluation is how to arrange the work to make it readable or understandable.

A very simple format which we will adopt in the evaluation of projects is one that recognises the various functional aspects or units of an organisation.

### **2.0 OBJECTIVE**

At the end of this unit, you should be able to:

- explain the format for project evaluation.

### 3.0 MAIN CONTENT

#### 3.1 Project Evaluation – An Introductory Format

The introductory format for the evaluation of projects is the arrangement of our work into carefully defined segments. We will now discuss the various segments of project evaluation.

##### 3.1.1 The Technical and Engineering Segment

The technical and engineering segment of project evaluation tries to evaluate the total technical and engineering soundness of a project. It also tries to relate the project to the environment in which it is located.

We will now proceed to draw up a checklist for the technical and engineering segment of project evaluation.

**Table 1: A Checklist for the Technical and Engineering Segment**

Item	Have you covered this in your evaluation?
Land for the project Civil works and foundations Steel structures Factory building Offices Wind force and direction Availability of electric power Availability of generator Potable water Water bore hole with fittings Sewage Existing roads Access difficulties List of machinery / equipment Availability of raw materials Availability of professionals (labour) Availability of skilled labour Availability of unskilled labour	

### 3.1.2 The Management Segment

After evaluating the technical and engineering segments of projects, the next segment we need to discuss is the management segment. The management segment focuses attention on the management aspects of a project. Projects only become successful if they are well managed.

We do not need to over-stress the importance of management. Again, we need to evaluate the legal form of the organisation that is being evaluated and see if it can carry the project in question.

**Table 2: A Checklist for the Management Segment**

Item	Have you covered this in your evaluation?
The legal form of the business Organisational structure Who will manage the project Qualifications of key staff Number of employees Salaries	

### 3.1.3 The Demand and Market Segment

The next segment we shall consider is the demand and market segment. This segment focuses attention on the demand for goods and services and relates it to the market. An evaluation of the demand for goods and services is very important because demand translates to revenues. Also, we need to evaluate supply situations in the market. These two topics will be treated in detail later.

We will now examine a checklist for the demand and market segment.

**Table 3: A Checklist for the Demand and Market Segment**

Item	Have you covered this in your evaluation?
What is the population of the market? What is the nature of demand for the product? What are the factors affecting demand? What is the size of the market? What is the supply situation? What is the price of the demand? Market share Advertisement strategy Promotional strategy	

## SELF ASSESSMENT EXERCISE

List and explain five items that you hope to find in the checklist of the management segment of a project evaluation.

### 3.1.4 The Financial Segment

The financial segment of project evaluation focuses attention on the financial aspects of projects.

In discussing financial issues, we are considering all financial aspects of a project such as start-up costs, financial plans, revenues and costs and income statements.

**Table 4: A Checklist for the Financial Segment**

Item	Have you covered this in your evaluation?
Cost of land and buildings Cost of utilities Cost of machinery /equipment Revenues Expenditures Projected income statement Projected cash flow statement Projected balance sheet	

### 3.1.5 The Economic Segment

The last segment we will consider is the economic segment. The economic segment considers projects from the macro economic point of view. Economic analysis tries to measure the benefits and costs of projects in terms of their value to society as a whole.

**Table 5: A Checklist for the Economic Segment**

Item	Have you covered this in your evaluation?
Employment generating capacity Contribution to economic growth Contribution to government revenue Forward linkages of the project Backward linkages Externalities	

#### **4.0 CONCLUSION**

What we have achieved in this unit is to develop a format for conducting the evaluation of projects.

#### **5.0 SUMMARY**

We have discussed the format of project evaluation. We did identify the following as segments of project evaluation.

- The technical and engineering segment
- The management segment
- The demand and market segment
- The financial segment
- The economic segment

#### **6.0 TUTOR-MARKED ASSIGNMENT**

Discuss the key segments of project evaluation

#### **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

## **UNIT 3      FACTORS AFFECTING THE LOCATION OF PROJECTS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objective
- 3.0 Main Content
  - 3.1 Factors Affecting the Location of Projects
    - 3.1.1 Nearness to Markets
    - 3.1.2 Nearness to Sources of Raw Materials
    - 3.1.3 Nearness to Power Supply
    - 3.1.4 Nearness to Water Supply
    - 3.1.5 Availability of Good Road Networks
    - 3.1.6 Availability of a Good Rail System
    - 3.1.7 Nearness to Airports
    - 3.1.8 Availability of Land
    - 3.1.9 Political Considerations
    - 3.1.10 Intervention Projects
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

In Unit 2 we discussed the format for the evaluation of projects. In this unit, we shall discuss factors affecting the location of projects. This is important because it enables us as analysts to have a proper knowledge of the key issues relating to project locations. Understanding this unit will give you the advantage of knowing in advance what should be and what should not be when issues of project location are raised. For example if a project is located in an area without any justification, the project analyst should be aware of this based on his or her previous knowledge of project location issues.

### **2.0 OBJECTIVE**

At the end of this unit, you should be able to:

- explain the factors affecting the location of projects.

### **3.0 MAIN CONTENT**

#### **3.1 Factors Affecting the Location of Projects**

Whether in the private sector or the public sector, projects are located according to set guidelines. In the private sector, project location is based purely on economic guidelines, usually put in place by the various organisations. These guidelines regulate the ways and means by which projects are located. In the public sector, projects may be located according to a different set of guidelines and they may not be driven by profit motive. It is the discussion of these factors affecting the location of projects that will now take our time.

##### **3.1.1 Nearness to Markets**

A major factor affecting the location of projects is their nearness to markets. Most businesses are established primarily for profit.

A business organisation will make profit if the goods or services it produces are purchased by third parties. It is the difference between revenues and costs that constitute profit. You will easily and quickly realise that most populations that constitute markets are located mainly in the urban areas of Nigeria. So we shall hold firmly to the fact that the nearness to markets is a major factor influencing the location of most projects in Nigeria. Most of the entire population of Nigeria is located in such areas like Lagos, Onitsha, Port Harcourt, Kano, Ibadan, Abuja, etc. Because of this, most businesses and government establishments are located near the critical markets that they wish to serve. That is to say that businesses follow their markets. Concentrations of people or critical markets are very important to corporate officials who design marketing plans.

If you take a good look at your environment, you will realise that a lot of companies are located within Lagos. It is not by accident. Rather it is by design. Businesses are attracted to areas of core concentration of people who constitute vital markets.

##### **3.1.2 Nearness to Sources of Raw Materials**

Nearness to sources of raw materials is another strong factor affecting the location of projects, especially manufacturing concerns. Service based projects can locate without reference to any raw material source. But manufacturing concerns cannot afford to gloss over the issue of raw materials.

For a manufacturing concern, the raw material source is very important because in most cases, raw materials may constitute over 80% of a product. If a company decides to establish its factory very far away from its raw material source, it is going to end up spending a lot of money to transport raw materials from the source to its factory. This will mean added costs and in the long run, the company may not be able to compete effectively in its chosen market.

If you sit back and think deeply, you will see patterns of industrial locations that tend to suggest that most industrial projects are located close to the sources of raw materials. The Nigerian Coal Corporation Enugu is located in Enugu close to the source of coal.

Most cocoa processing firms are located in the western parts of Nigeria because cocoa is found in abundant quantities there.

In the eastern parts of the country, oil mills and vegetable oil plants litter the economic landscape simply because the oil palm grows wildly there and it is also the major raw material for palm oil manufacture and vegetable oil.

If you go up north, you will also realise that the tea producing company is located at the Mambilla Plateau because the plateau is very rich in tea cultivation.

### **3.1.3 Nearness to Power Supply**

Power supply is a very critical input in business, whether service based or manufacturing based. In the case of service-based concerns like banks, electricity will be needed to power computers, servers and other equipment needed to provide service to customers.

In a manufacturing concern, electricity is everything. Without electricity, a manufacturing concern is not likely to operate. Electricity is needed to mix chemicals, to drive machinery and equipment and to start electric motors etc.

So in the choice of where to locate, every concerned establishment or business should properly address the issue of power supply.

Interruptions in power supply create production problems for industries; this also translates to inability to meet production schedules, and inability to meet production schedules leads to frequent customer complaints for failed deliveries. Frequent failures to deliver goods on schedule may lead to loss of customers.

In our peculiar Nigerian situation, irregular power supply has taken its toll on the manufacturing sector and even service-based activities. The result of this poor public power supply has led most organisations to operate their own plants but with the attendant high operating costs of both fuel and servicing of generating plants.

### **3.1.4 Nearness to Water Supply**

Water is very important in business especially in manufacturing industries. Many manufacturing companies use a lot of water for manufacturing activities.

Soft drink manufacturers for example, use a lot of water in the production process.

In the agricultural sector, garri processing factories use a lot of water and they are attracted to areas where there is plentiful supply of water.

### **3.15 Availability of Good Road Networks**

Availability of good road networks is another major factor influencing the location of projects in the economic landscape. Road networks are very important. They are important for the movement of essential raw materials from raw material sources to factories and also for the movement of finished goods to the markets where they are needed.

Most investors in the economy are usually attracted to areas with good road networks. Good road networks reduce the cost of transportation.

### **3.1.6 Availability of a Good Rail System**

Another important factor influencing the location of projects is the availability of a good rail system. A good railway system ensures cheap transportation and evacuation of raw materials from their sources to factory locations and also the movement of finished goods to markets.

You may observe that the development of trading locations in Nigeria seemed to have followed the railway system. The North – Eastern railway system runs through towns today which have become trading posts. Aba, Umuahia, etc., all enjoy good trading activities because they are located along railway line routes.

### **3.1.7 Nearness to Airports**

Another identified factor affecting location of projects is nearness to airports. A lot of businesses tend to be located close to airports. Airports encourage quick movement of people to and from various locations. If you take a good look at the country today, the towns that are served with air links tend to be enjoying faster economic growth and development. Port Harcourt, Calabar, Enugu, etc., enjoy good air links which facilitate the movement of people.

### **3.1.8 Availability of Land**

In economic theory, there are four factors of production namely: land, labour, capital and the entrepreneur. Each of these factors is very important. However, Land appears to assume very important dimensions especially where large scale agricultural projects are involved. Very large agricultural projects like oil palm plantations require vast areas of land before they can become profitable. A cassava farm which will feed a garri processing plant needs to be very vast in terms of land space. You may realise that invariably projects are attracted to areas where there is adequate land.

### **3.1.9 Political Considerations**

The location of most business projects is driven mainly by economic motives. Private sector projects are mainly profit-driven and their location is based only on economic merits. Also the public sector, since the era of economic reforms, has bought the idea of economic reforms and is now locating projects based on economic merit and viability.

However, not all projects are located based on sound economic judgment. Political considerations occasionally play very important roles in deciding where a project will be located. For example an oil refinery may be located very far away from crude oil sources. The cost of transporting crude oil to the refinery may result in the refinery operating at a loss.

### **3.1.10 Intervention Projects**

Intervention projects are those projects which are conceived and located within specific areas to correct inequalities in distribution of resources. In the emerging political dispensation, the issue of uneven development has been brought to the front line of discussions. Complicating the discussions is the issue of resource control and the attendant political and social implications.

The Niger Delta region of Nigeria produces a major percentage of the oil revenues of Nigeria. Recent thinking is that the region has not received sufficient attention as a major oil producing region. Currently, the federal government is focusing attention on the region and a lot of developmental projects are now springing up in the area.

### **SELF ASSESSMENT EXERCISE**

List and discuss four factors that have influenced the location of industrial projects in your present environment.

## **4.0 CONCLUSION**

In this unit, we have discussed those factors which affect the location of projects in Nigeria. The projects may be private or public sector projects. The factors may be economic or in some cases be political.

## **5.0 SUMMARY**

In this unit, we have discussed those factors that affect the location of projects in Nigeria. They range from market driven forces to political forces. We have also discussed intervention projects which are a new feature in our economy.

## **6.0 TUTOR-MARKED ASSIGNMENT**

- a. Mention four factors that are likely to influence the location of projects in Nigeria.
- b. Discuss the four factors that you have mentioned.

## **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

## **UNIT 4      CAPACITY AND PRODUCTION PLANNING**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Capacity and Production Planning
  - 3.2 Concepts of Capacity
  - 3.3 The Nature of the Production Plan
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

In Unit 3, we discussed factors affecting location of projects. There we examined such factors as nearness to critical markets, nearness to sources of power and other factors. In this unit, we shall discuss capacity and production planning.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain capacity and production planning
- describe the practical applications in industry.

### **3.0 MAIN CONTENT**

#### **3.1 Capacity and Production Planning**

Our interest in capacity and production planning is for two main reasons. First, it could be that we are project initiators trying to draw up a business plan for a start-up project in which case we want to know well in advance what the capacities of our plants will be and the production plan. Understanding capacity of a project assists us to design and construct such items like cash flow statements, etc. On the other hand, we could be analysts on the other side of the fence. In this case, we must have been presented with a business plan or a project plan and have been asked to evaluate the project. So no matter on which side we are, we must understand capacity and production plans. No firm undertakes to produce goods without production plans. Production plans are linked to the firm's demand for goods and services. We shall now

discuss “capacity” in relation to production plans. The production plans are in relation to the manufacture of tangible goods.

### **3.2 Concepts of Capacity**

Ordinarily, capacity means “ability to do something”. But in project terms, the capacity of a plant is a reference to the output of the plant or machine. When discussing plant capacity, we should realise that there are three types of capacity namely:

- Installed capacity
- Attainable capacity
- Actual capacity

#### **Installed Capacity**

The installed capacity of a plant or machine is the maximum output in terms of tangible goods which the plant or machine is capable of producing at a given time. The capacity is usually given by the manufacturers of the equipment.

We can therefore define installed capacity in terms of the following:

- Number of goods produced per minute
- Number of goods produced per hour
- Number of goods produced per day
- Number of goods produced per year

In practice, we usually define installed capacity in terms of annual capacity. The best way to visualise installed capacity is to consider a Mercedes Benz car that has a speedometer limit of 200km per hour. In effect, 200km/hour is the maximum speed the car can attain according to the manufacturers. This 200km per hour is the installed capacity of the car.

#### **SELF ASSESSMENT EXERCISE 1**

A plant can produce 2000 sachets of water per hour, all things being equal. What is the installed capacity of the plant per annum?

#### **Attainable Capacity**

We have just discussed the installed capacity of a plant or machine and described it as the maximum output that a plant or machine can achieve. However in real life, no machine can work for 60 minutes in an hour, 24 hours a day and 365 days in a year without breaking down. There must

be production loss arising from servicing of the machines, changes in shift, repairs of machines, etc.

Because of these reasons, we now have a more realistic capacity which in the literature is known as the attainable capacity of a plant/machinery. The attainable capacity captures the effect of plant servicing and or repairs on production output.

Let us go back to our Mercedes Benz car. We said it has an installed capacity of 200km per hour. Practically, we know that no person will like to drive a car at a speed of 200km per hour. Everyone should be thinking of safety. We could agree amongst ourselves that 100km per hour constitutes a safe speed. In that line of thinking, we can now define 100km per hour as the attainable capacity of the car. This is the speed at which a sane person can drive the car.

### **Actual Capacity**

Actual capacity refers to the real output that a plant can achieve given the market situation. We should realise that the actual capacity of a plant depends on a lot of factors. First is the issue of the market for the plant's output of goods. A plant should produce only what it can sell at a given time.

Again financial resources can limit the output of a plant because firms require finance to purchase raw materials and other inputs for production.

### **3.3 The Nature of the Production Plan**

The production plan shows exactly the proposed output of a plant or project under consideration. In constructing the production plan, information on the plant capacity, shift arrangements, raw material sourcing, etc., are all used. Below is the production plan of a vegetable oil refining plant that uses palm kernel oil as base raw material.

You are requested to properly study the production plan and make sure you understand it.

#### **An Example of a Production Plan**

##### **The Plant**

The plant under consideration is a modern vegetable oil refining plant using palm kernel oil (PKO) as base raw material. The installed capacity of the plant is 50 metric tons per day of 24 hours.

Working on a shift of 10 hours, an output of 20.83 tons is possible, while two (2) shifts of 10 hours each will yield daily output of 41.66 tons of refined vegetable oil. Because of the need to accommodate plant repairs, servicing, public holidays, etc., the plant will be operated for 300 working days in a year. Proposed capacity is based on 2 shifts of 10 hours each per day.

To ensure that there is uninterrupted supply of palm kernel oil to feed the plant, the project promoter already has in operation 26 Muar ban Lee Palm Kernel Oil (PKO) expellers with a total Installed capacity of 220 tons/day.

**Table 6: Annual Capacity/Production Plan (Metric Tons)**

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4 – 5</u>
	2007	2008	2009	2010- 2011
Installed Capacity	18,250	18,250	18,250	18,250
Attainable Capacity	16,425	16,425	16,425	16,425
Proposed Capacity	12,498	12,498	12,498	12,498

Proposed capacity is based on the following:

Year 1 to 5: 2 shifts of 10 hours each per day and 300 working days/year.

Attainable capacity is 90% of installed capacity.

Installed capacity: Installed capacity is 50 tons per day x 365 days.  
This translates to 18,250 tons per annum

### **Production Activities**

<b>STAGE ONE</b>
------------------

#### **Palm Kernel Crushing**

Stage one of production involves the crushing of palm kernel to yield palm kernel oil (PKO). The residues are palm kernel cake (PKC) and palm kernel sludge.

Palm kernel cake is sold to feed mills as a major ingredient for animal feed. Palm kernel sludge is sold to soap manufacturers.

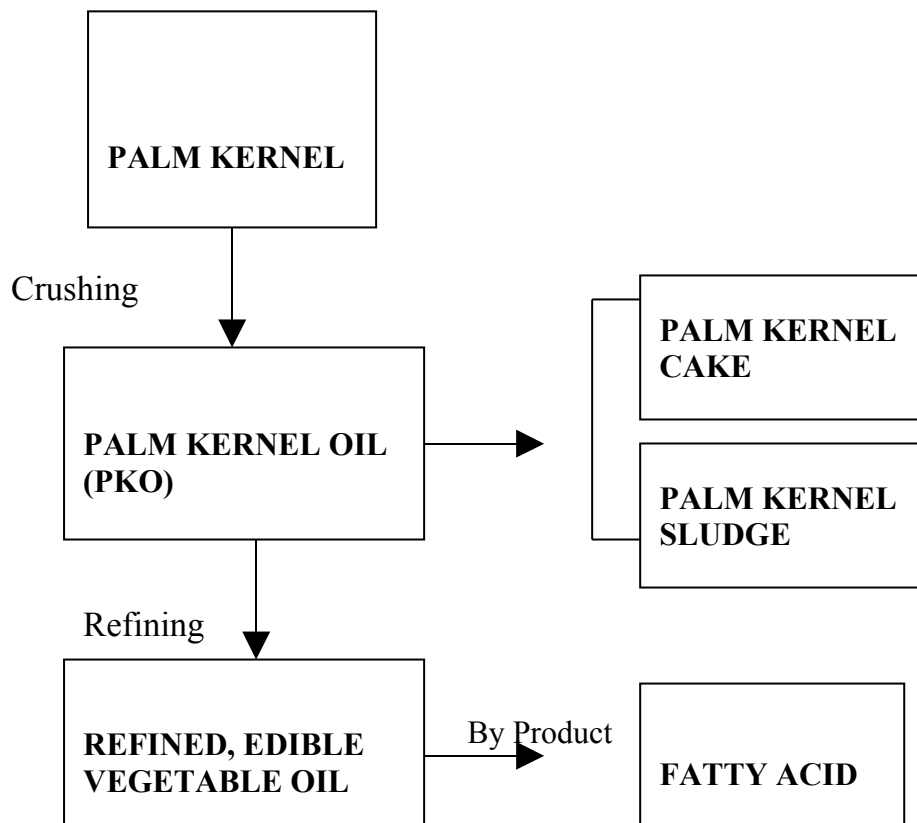
### Refining Of Oil to Yield Edible Vegetable

#### STAGE TWO

Stage two of production involves the refining of the crude Palm Kernel Oil (PKO) to yield edible vegetable oil.

In refining of the oil, fatty acid is collected. The fatty acid is sold to soap manufacturers.

#### Activity Flow



**Figure 3: Activity flow in a vegetable oil refining plant**

#### Machine and Equipment Required

The vegetable oil refining plant consists of the following equipment broken down into various sections:

1. Continuous oil pre-treatment section
2. Continuous bleaching section
3. Continuous physical refining and deodorising section

4. Thermal oil heating unit
5. Water cooling and recirculation system
6. Steam generation and distribution system

These machinery and equipment will be sourced from overseas. However, in addition, the following items form part of the equipment required but they will be sourced locally:

1. 2 units crude oil tank 200 tons
2. 1 unit refined oil tank 300 tons
3. 1 unit fatty acid tank 50 tons
4. 1 unit furnace oil tank.

## **Vegetable Oil Refining**

### **Process Description**

#### **Pre Treatment**

The crude oil received in the crude oil tanks, if required, is given a hot water treatment and allowed to settle to remove settled impurities along with water. The oil is then heated till drying and transferred to high shear mixer wherein the requisite quantity of phosphoric acid is dosed in to allow conversion of non hydratable phosphotides. The acidulated mixture is then given a retention time for complete reaction of phosphoric acid in the reaction vessel.

#### **Bleaching**

The heated oil (acid conditioned, degummed or neutralised) enters the inlet mixing tube of the vacuum bleacher. Bleaching earth is proportioned by a valve dosing system that also deaerates the earth before it enters the vessel. The earth is introduced under the oil spray in the mixing tube for improved mixing, so that earth does not enter the bleaching vacuum system. The earth absorbs any residual gums and soap as well as trace metals, colour bodies and other polar impurities. The bleacher has multiple agitated compartments and operates under vacuum to ensure complete moisture and air removal. The dried oil and earth mixture is discharged by the bleacher discharge pump to one of the filters where the spent earth is removed. The filtered oil is collected in the bleached oil receiver. The bleached oil pump sends the oil for deodorizing via one of the alternating polish filters.

## Filter Management

The standard bleaching system is based on the use of two filters of which one is on line while the other is being cleaned and prepared for the next cycle. When a filter has reached maximum capacity, as indicated by high feed pressure, it is taken offline for cleaning and replaced by the other filter.

The cleaning procedure begins by first pressurising the filters with steam to expel residual oil into the Heel Tank and dry the spent filter cake. The oil recovered from the filter cake is collected in the tank and can usually be recycled to the bleacher. After drying, a bottom discharge valve on the filter is opened and the leaves pneumatically vibrated so that the spent cake is dislodged and discharged via a hopper. The filter is then closed and prepared for the next batch. Before going online again it can be pre-coated with filter aid and/or bleaching earth in order to seal the filter.

## Raw Material Requirements

The key raw material required for the refining of vegetable oil is palm kernel oil (PKO). The rest are additives.

**Table 7: Raw Material Requirement**

<b>Material</b>	<b>Sources</b>	<b>Unit Cost ₦</b>
Palm kernel oil	Open markets in Onitsha, Owerri	N130,000/Ton
Citric acid	Pharmaceutical firms, open markets at Aba, Port-Harcourt, Owerri and Lagos.	N200/kg
Phosphoric acid	Freely purchased in chemical shops at Aba and other locations nationwide.	N300/kg
Bleaching earth	1) Vin George Ventures 7 Association Avenue, Lagos 2) Open markets at Aba, PH, Onitsha etc.	N88,000 per Ton

### Annual Input-Output Analysis

The annual input–output analysis seeks to determine the inflow of manufacturing raw materials and their corresponding outflow of products. It assumes 300 working days per annum. It aggregates the daily input-output analysis.

**Table 8: Annual Input – Output Analysis**

Input	Output
32,889.60 tons of Palm Kernel	(1) 13,155.84 tons of Palm Kernel Oil (PKO) (2) 18,418 tons of Palm Kernel Cake (PKC) (3) 1,315 tons of Palm Kernel Sludge.
13,155.84 tons Palm Kernel Oil (PKO)	(1) 12,498 tons of Vegetable Oil (2) 657.84 tons of fatty acid

**Table 9: Summary of the Proposed Production Plan (Tons)**

Year Ended 31<sup>st</sup> Dec

	Year 1 2007	Year 2 2008	Year 3 2009	Year 4-5 2010-2011
1. Refined vegetable oil	12,498	12,498	12,498	12,498
2. Palm kernel cake (PKC)	18,418	18,418	18,418	18,418
3. Palm kernel sludge	1,315	1,315	1,315	1,315
4. Fatty acid	657.84	657.84	657.84	657.84

## 4.0 CONCLUSION

We have discussed capacity and production planning which are very important aspects of a project because they both relate the project to the market. Capacity and production plans enable the firm to plan well in advance what to produce and in what quantity too.

## 5.0 SUMMARY

We have discussed capacity and production planning and have established the link between them. We also used an example of a vegetable oil refining plant to explain the production plan.

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. What do you understand by the installed capacity of a plant?
2. How is it different from the attainable capacity?

## **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999): *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

## **UNIT 5 THE CONCEPT OF ENGINEERING EVALUATION**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 The Concept of Engineering Evaluation
    - 3.1.1 Identification of Plant and Equipment
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

In Unit 4, we discussed capacity and production planning. There we discussed installed capacity, attainable capacity and actual capacity. In this unit, we shall discuss the concept of engineering evaluation.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the concept of engineering evaluation
- discuss engineering evaluation.

### **3.0 MAIN CONTENT**

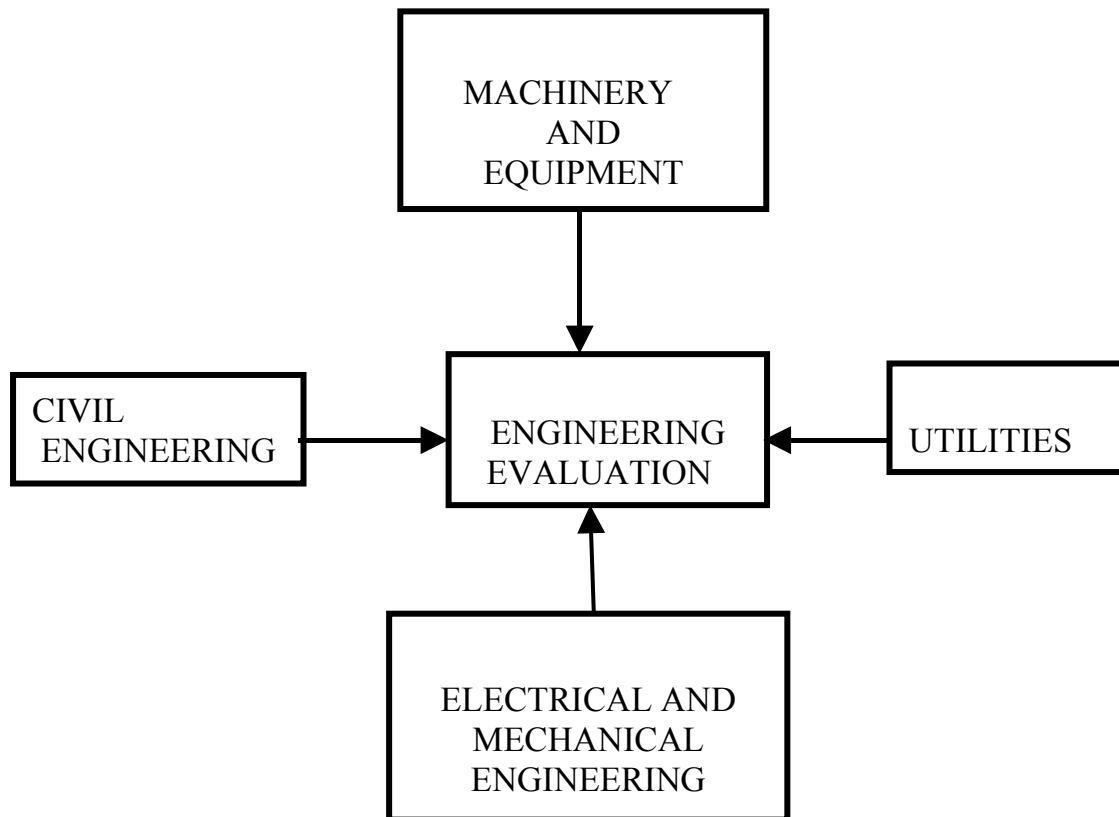
#### **3.1 The Concept of Engineering Evaluation**

A project consists of many sub-segments depending on its nature. There may be mining projects or manufacturing projects. As we discussed earlier, engineering is a major segment of many projects. Also projects have their management segment, marketing segment, etc. The purpose of engineering evaluation is to evaluate and break-down in simple terminology the engineering feasibility of a project. For example, a project may be a manufacturing project.

The type of questions we need to ask will involve the manufacturing processes and the equipment that are involved. In a manufacturing project, engineering evaluation will entail the following:

1. Identification of plant and equipment

2. Identification of the necessary raw materials
3. The production process.



**Figure 4: Components of engineering evaluation**

### 3.1.1 Identification of Plant and Equipment

In a manufacturing project, the most important element, apart from land and buildings is the plant and machinery that will be used for manufacturing.

Plant and machinery are usually supplied by the manufacturers. In practical terms, when a manufacturer (vendor) is supplying a manufacturing or equipment, the vendor should give sufficient details of the machine.

The details of the machine will assist the project evaluator. All projects do not have the same layout and features and it is the duty of the project evaluator to segregate the project under study and see whether it is feasible or not from an engineering perspective.

### Technical Support and Maintenance

Businesses that are technical in nature require that machinery and equipment should operate at maximum efficiency. Operating at maximum efficiency means that the relevant machinery and equipment should be routinely serviced. There is also the requirement that repairs be carried out on equipment, if breakdown occurs.

In most practical cases, technical support can be arranged for a small business. Technical support can be provided by an engineering firm which can carry out repairs on machinery, generators etc.

### **SELF ASSESSMENT EXERCISE**

List and discuss three information about a manufacturing plant that are important to a project evaluator.

**Table 10: A Plant/Machinery Checklist**

<b>Item</b>	<b>Do you have information on this?</b>
Components of the plant/machine.	
The installed capacity of the machine	
attainable capacity of the machine	
electricity consumption	
Heating power	
Overall weight of machine	
Overall length, width and height.	
Material used e.g. steel	
Structure of the machine	
Screw speed	
Thickness of product to be produced	
Compressed air requirement	
Quality and quantity of	
Water required	
Water temperature	
Electric power voltage	
Electric power capacity	
Type of material feeder	
Take-up force	
Clamping method and force	
Production process	

### **A Practical Business Idea for a Class Discussion**

#### **A Palm Oil Production Plant**

Palm oil is an important food item in the Nigerian diet. It is primarily used in cooking and is rich in vitamin A. It is used as industrial raw material by soap and vegetable oil industries, hence its industrial

importance. Put together therefore, we have a product that has a wide market and presents good investment opportunities for a small scale investor.

### Technical Considerations

The project considered in this write-up is a medium sized palm oil plant. Since the basic raw material for the project is fresh fruit bunches (FFB) from the oil palm tree, the problem of raw material sourcing is not likely to arise. The basic and necessary machinery for the project are the boiler/steriliser, rotary stripper; digester and clarifier.

### The Production Process of Palm Oil

Quartered fruit bunches are introduced into the boiler/steriliser and left for about 30 minutes under hot steam for boiling and sterilisation to take place. The quartered bunches are then fed into the rotary stripper which strips the fruits from the quartered bunches which are still at a very high temperature of about 110<sup>o</sup>c. The loose fruits from the rotary stripper are then fed into the horizontal digester for maceration. In the digester, the palm fruits are beaten into a paste. Hot water which is introduced into the digester forces the thick paste and water into the oil clarifier unit. In the clarifier, the oil is separated from the water and palm oil is collected from a tap. Investors are advised to use the tenera oil palm fruit because of its high oil yielding abilities.

**Table 11: A Total Engineering Overview of a Mining Project**

<b>Stage 1</b>		
Rail Link	Roads	Airport
The Mining Complex	Water and Sewerage	Power Generation

<b>Stage 2</b>		
Mine	Smelter	Semi-Finished goods
Mine offices	Workshop	Refinery

<b>Stage 3</b>		
Ore Bin	Ore Crushers	Conveyors
Cranes	Main Building	Sulphuric acid tanks

**Table 12: Further Engineering Checklist**

Item	Has this been covered in your evaluation?
Site design Site engineering Surveying Quality control Drawing control Welding supervision Safety engineering Civil works Rigging Piping Electrical Instrumentation Mechanical Heaters Furnaces Quantity surveying Plan layout Plan design Site planning Security.	

#### 4.0 CONCLUSION

Engineering evaluation is very important in projects that have an engineering content. It helps the project evaluator gain a better insight into the engineering feasibility of a project under evaluation.

#### 5.0 SUMMARY

We have discussed the concept of engineering evaluation. We have seen it as the simple evaluation and break down (in simple terminology) of the engineering feasibility of a project. We discussed the components of engineering evaluation.

#### 6.0 TUTOR-MARKED ASSIGNMENT

Why is the engineering evaluation of a project important?

#### 7.0 REFERENCES/FURTHER READINGS

Leon Ikpe (1999). *A Guide to Small Business Investment*. Lagos: Impressed Publishers.

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

#### MODULE 2

Unit 1	Manpower Planning and Evaluation
Unit 2	Demand Analysis
Unit 3	Supply Analysis
Unit 4	Competition and Marketing Plans
Unit 5	Project Cost Analysis

## **UNIT 1     MANPOWER PLANNING AND EVALUATION**

### **CONTENTS**

1.0	Introduction
2.0	Objectives
3.0	Main Content
	3.1    Manpower Planning and Evaluation
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Readings

### **1.0    INTRODUCTION**

In Unit 5, we discussed the concept of an engineering evaluation of a project. Engineering evaluation of a project as we saw seeks to evaluate the engineering soundness of a project. This is very crucial especially when the project will be ranked or compared with another project.

Every enterprise requires labour. It is labour that coordinates the other factors of production like land and capital. In terms of project evaluation, our concern is to look at the project and examine the human resources aspects. In terms of manpower planning and evaluation, we need to examine the following:

- Key employees
- The key responsibilities
- The qualifications
- Hours of work
- Training and development of the staff
- Remuneration of the staff

## 2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain manpower planning and evaluation
- discuss the practical applications in industry.

## 3.0 MAIN CONTENT

### 3.1 Manpower Planning and Evaluation

In general terms organising manpower in an organisation is the process of assigning duties amongst personnel and coordinating efforts towards the attainment of the firm's objectives. But before organising, there must be a plan. It is the plan that leads to the shaping of an organisation's structure.

Conceptually, the project initiative in structuring the organisation should be concerned about two critical things.

- Job definitions in the project under consideration
- Departmentalisation which follows job definitions.

In doing this, similar jobs are grouped together to form a department. The most common way of organising a project is by function. For example a manufacturing plant may be divided into three functional units namely:

- Production
- Marketing
- Finance

There are two uses of the manpower plan. The first use is by the project initiator. When the project initiator is structuring the project, the manpower plan definitely is a critical component. The project initiator needs to know well in advance who the key employees will be. The key employees will depend on the nature of the business in question. If the business is, for example, soap manufacturing, then a lot of the core production staff should be industrial or pure scientists plus other core support staff. Apart from that, each employee should have their various responsibilities. For example, in a soap plant, you will have core production staff and also quality control staff. They have different responsibilities. And of course, the qualifications of the various staff including their years of experience should be properly documented and evaluated.

The second use of the manpower plan is that financial institutions like banks, before granting loans or overdraft for a project, usually insist on being convinced of the management skills that will be available or are actually available in the firm that seeks to borrow money. They will look at the people concerned, their qualifications and match them with the jobs allocated to them.

Hours of work and the salary and wages of the entire work force are another critical input. The salary and wages of those working on a project is actually expected to hover around the average for the industry.

In practical terms, the manpower of a project can be grouped into two namely:

- Direct labour
- Indirect labour

When we talk about direct labour in a manufacturing project, e.g., a soap plant, we are talking about staff attached to the actual production of the soap. The production manager, production supervisor and factory attendants are all direct labour.

Indirect labour on the other hand are those workers who do not work directly on the manufactured goods but indirectly. They include accounting and admin staff, marketing staff and others.

We have an example of a manpower plan. It contains the following:

- Manpower requirements of the project broken down into direct and indirect labour
- Remuneration of the staff

### **SELF ASSESSMENT EXERCISE**

List and explain four departments that could be found in a big manufacturing firm.

**Table 13: Manpower Requirements of the Project****(a) \_\_\_Indirect Labour\_**

<b>Post</b>	<b>Specifications</b>	<b>Job Functions</b>
General manager	Degree in sciences, engineering or management but with previous experience in a water packaging outfit	To oversee the general management of the factory
Accounts/admin. officer	OND Accounting with at least 2 years post qualification experience	General administration and keeping of the books of account. Reports to the General Manager
Marketing officer	B.Sc or HND Marketing with previous experience in marketing of packaged water	Reports to the general manager and is in charge of marketing of the company products
Sales clerk	Senior Secondary School Certificate or GCE	Reporting to the marketing officer, the sales clerk will be responsible for all clerical duties concerning sales
Accounts clerk	Senior Secondary School Certificate or GCE	Reporting to Accounts/admin officer, the accounts clerk will be responsible for clerical accounting duties including receipt of cash.
Secretary	OND secretarial studies with at least 2 years experience in a busy organisation	Reporting to the general manager, the secretary will be in charge of all secretarial duties
Drivers	FSLC but with good knowledge of the environment	Carriage and general distribution of the company products
Security staff	FSLC	General security duties

**(b) Direct Labour**

<b>Post</b>	<b>Specifications</b>	<b>Job Functions</b>
Production manager	HND water technology with at least 2 years experience post NYSC	To oversee the production function in the water plant
Shift supervisors	OND in science with relevant experience	To supervise production shifts
Technicians	City & Guild/Trade Test	Maintenance of the mechanical and electrical components of the plant
Laboratory technician	OND Laboratory Science	Reporting to the production manager, the laboratory technician will be in charge of quality control
Factory attendants/machine operators	Senior Secondary School Certificate or GCE	General factory duties including operation of the water filling machine, pre-market packaging of the sachet water and loading.

**(c) Summary of Manpower Requirements Including Outlays**

	<b>No Required</b>	<b>Annual Outlays (₦)</b>
<b>Indirect Labour</b>		
General manager	1	420,000
Accounts/admin officer	1	240,000
Marketing officer	1	240,000
Sales clerk	3	360,000
Accounts clerk	2	240,000
Secretary	1	180,000
Driver	3	288,000
Security staff	4	336,000
<b>Sub-Total</b>	<b>16</b>	<b>2,304,000</b>
<b>Direct Labour</b>		
Production manager	1	360,000
Technicians	2	288,000
Shift Supervisors	4	720,000
Laboratory technician	1	180,000
Factory attendants/machine Operators	12	1,296,000

<b>Sub-Total</b>	<b>20</b>	<b>2,844,000</b>
<b>Grand Total</b>	<b>36</b>	<b>5,148,000</b>
<b>Staff Welfare</b>		<b>514,800</b>
<b>Total Salary, Wages/Welfare</b>		<b>5,662,800</b>

#### **4.0 CONCLUSION**

This unit has treated manpower planning and evaluation which is a critical aspect of evaluation of projects. The unit has focused attention on the manpower aspects of a project

#### **5.0 SUMMARY**

In this unit, we have discussed manpower planning and evaluation. We have seen how manpower planning involves the assigning of duties to personnel and have also tried to relate manpower to a firm's objectives. We also saw that departmentalisation is a critical aspect of a proper manpower plan. Also we discussed the use of the manpower plan. We saw that the manpower plan can be used by two different groups of people – the project initiator and the evaluator.

#### **6.0 TUTOR-MARKED ASSIGNMENT**

Why is a manpower plan important in a start-up project?

#### **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

## **UNIT 2     DEMAND ANALYSIS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 The Demand Analysis – Analytical Framework
  - 3.2 Analysis of a Population Data
  - 3.3 Potential Customers
  - 3.4 Evaluating the Size of the Market
  - 3.5 Forecasting Future Demand
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

In Unit 1, we discussed manpower planning and evaluation. Here we saw the fact that labour is one of the most important aspects of a project whether a start-up or an on-going one. We also used an example to drive home our point.

In this unit, we shall discuss demand analysis. Demand analysis is one first steps towards looking at a market.

Demand analysis is the starting point of our discussions concerning the project and the external environment which is the market. A project is established for a purpose –to serve a market.

The demand analysis is the measurement and forecasting of demand for goods and services of a project. It is like a peep into the future, which as you know, is unknown. A project will survive if the products and services produced by the project are acceptable to the market. Acceptability means that consumers are willing to pay for the goods or services. Demand analysis is a tool used by the project initiator to analyse the total picture of the market that he/she wants to play in.

Likewise, providers of loanable funds like banks also conduct demand analysis to ensure that the projects they wish to sponsor financially have the chances to survive in the market. So from whatever angle you look at it, demand analysis is important.

## 2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain what a demand analysis is
- discuss how to conduct demand analysis.

## 3.0 MAIN CONTENT

### 3.1 The Demand Analysis – Analytical Framework

To arrange our discussion in an orderly manner, we will try to build an analytical framework that we shall use to do demand analysis. The framework will guide us to take an architectural view of the subject matter. In taking an architectural view, we shall be looking at the larger picture. The analytical framework we shall adopt will follow the sequence below:

- Get total population data and make projections.
- Study the details of the population.
- Define the good or service for which demand analysis is being conducted.
- Define demand again to guide your direction.
- Look at factors affecting demand.
- Using both quantitative and qualitative techniques, generate conditional demand.
- Generate projections for demand using quantitative and qualitative methods.

**Table 14: Census 2006: Nigerian Population Data**

Abia	2,833,999
Adamawa	3,168,101
Akwa Ibom	3,920,208
Anambra	4,182,032
Bauchi	4,676,465
Bayelsa	1,703,358
Benue	4,219,244
Borno	4,151,193
Cross River	2,888,966
Delta	4,098,391
Ebonyi	2,173,501
Edo	3,218,332
Ekiti	2,384,212
Enugu	3,257,298
FCT	1,405,201

Gombe	2,353,879
Imo	3,934,899
Jigawa	4,348,649
Kadunna	6,066,562
Kano	9,383,682
Kastina	5,792,578
Kebbi	3,238,628
Kogi	3,278,487
Kwara	2,371,089
Lagos	9,013,534
Nasarawa	1,863,275
Niger	3,950,249
Ogun	3,728,098
Ondo	3,441,024
Osun	3,423,535
Oyo	5,591,589
Plateau	3,178,712
Rivers	5,185,400
Sokoto	3,696,999
Taraba	2,300,736
Yobe	2,321,591
Zamfara	3,259,846
<b>Total</b>	<b>140,003,542</b>

### 3.2 Analysis of a Population Data

We have seen that the starting point of our discussion of a proper demand analysis is to study the population. But we should also understand that getting the total population figure is not the end of the job. We should go further and analyse the population. The purpose of the analysis is to understand certain characteristics of the population. For example, a manufacturer of lipstick has nothing to do with the total population. Rather what is important to the manufacturer is the total female population. There are other aspects of the population that we consider important. Age distribution of a population is one of such aspects. The age distribution of a population is important because it breaks down the population into the various age brackets. Perfect knowledge of the age distribution of a population enables a would-be investor have an idea of his total feasible market well in advance. For example, a manufacturer of baby toys will not be interested in the total population of Nigeria. What will interest the manufacturer is the total number of babies in the population. We have stressed the importance of population data in the understanding of demand analysis. We will go a step further to provide a checklist of further information that is required when we are analysing a population data.

**Table 15: Analysis of a Population Data-A Checklist**

Item	Have you built this into your demand analysis?
Population of Nigeria by state Population by local government area Population of Nigeria by sex Population distribution by types of household Population distribution by age Population distribution by literacy level Population distribution by level of economic activity Population distribution by material status Population distribution by type of disability Persons arriving Nigeria by nationality Persons arriving Nigeria by age group Persons departing Nigeria by nationality Persons departing Nigeria by age group	

### 3.3 Potential Customers

A starting point for our discussion is to properly define who the potential customers of the business are or will be. Customer definition is not an easy task as we shall soon see.

Sometimes confusion arises as to who is a customer because people also fail to distinguish customers from consumers.

The term consumer refers to the person or one who uses a product (or service) for his/her personal satisfaction or benefit. In the industrial sector, the consumer is the one who changes the form of a product to alter its identity. For example, a soap manufacturer will buy caustic soda and use it to manufacture soap. He is the consumer of the raw material. On the other hand, a customer may be a consumer or a dealer who buys a product and eventually resells the product. Also even for a service, the business should clearly identify the types of consumers that they wish to serve. For example, there may be many types of hotels because of the types of customers that need to be served namely:

- hotels for students
- hotels for travellers
- hotels for high-class individuals

**Table 16: A Potential Customer Checklist**

<b>Item</b>	<b>Has this been taken care of in the plan?</b>
What type of business are you planning? What products or services will you offer to the market? Who is your potential customer? How do you define your potential customer? What are your customer characteristics? What are their income levels? Who are the consumers of your product or service? Are the consumers different from the customers? Where are your customers located?	

### 3.4 Evaluating the Size of the Market

Apart from identifying who the potential customers of the small business are, there is the need for us to go ahead and evaluate the size of the market for our products or services. The evaluation of the size of the market is very important because it gives us a picture of the total market size in terms of naira and kobo.

A standard analysis should state the market size of the product or service in question. The size of the market is usually estimated by using both qualitative and quantitative methods. To enable us approach our studies carefully, let us follow the following steps in our effort to evaluate market size:

- Define demand
- Examine factors affecting demand
- Examine demand for intermediate and capital goods
- Build market demand.

#### Defining Demand

For us to be able to properly prepare demand analysis, we need to define demand and understand what we mean by demand.

For purposes of our study, we shall define demand for a product or service as the total quantity of goods or services that able customers in a defined area are willing to buy at set prices. In effect therefore, demand refers to a set of quantities that customers are willing to buy at different

prices. In the traditional economic setting, the demand curve is downward sloping (with a price and quantity axis).

It will also be very important for us at this particular time to define and distinguish between two types of demand – total market demand and project demand. Total market demand refers to the total demand within a set geographical area like Nigeria. For example we can make a statement that the total demand for beer in Nigeria is 10 million bottles per annum. The meaning of the statement is that in Nigeria, the total quantity of beer demanded is 10 million bottles at the current ruling prices. But we also need to define another type of demand which we shall call project demand.

Project demand is a subset of the total market demand. If a market for a product or service already exists, the project demand is the project's share of total market demand. If a market is saturated with goods, new projects may face the difficulty of selling their products or services. By and large, it is important to focus attention on a project demand. Mistakes which tend to be fatal occur when analysts confuse market and project demand.

### **Factors Affecting Demand**

We have just defined demand which is very important in our study. But we need to go a step further to examine the factors affecting demand in the market place. It is going to help us build a good demand schedule. In the traditional economic platform, one of the most important factors affecting demand is price. If we assume a well behaved demand curve, then the higher the price of a product, the smaller the quantity that will be bought. Also the lower the price, the greater the quantity that will be purchased. This appears to be a rational behaviour especially where human beings are involved.

Another important factor affecting demand for a product or service is the income of the population. Given a basket of income available to purchasers, it is logical to believe that the higher incomes people receive, the more goods and services they are likely to purchase. So we can say with a measure of confidence that a population with a higher income is more likely to purchase more goods and services than a population with a lower income.

Apart from income, population is another major factor affecting demand in any given setting. It is certain that a large population certainly demands more goods and services than a smaller population. A major aspect of any population which we should not forget is the ethnic and religious structure of the population. The ethnic structure of a population

affects the type of goods and services that will be demanded. For example, in the Nigerian setting, palm oil tends to sell much more in the Southern States than in the North because most Southerners tend to use palm oil in cooking. But in the Northern States, groundnut oil seems to be more available and by implication the people use more of it for their cooking. Also, religion is another aspect of any population that needs to be looked at while drawing up any demand schedule. Again in the Nigerian setting, pork is not an acceptable diet for Muslims but most Christians eat pork. These are the type of critical inputs you need when you are trying to build a demand schedule. Prices of other goods also tend to affect demand. For example, tea and sugar are said to be complementary goods since they go hand in hand. It is therefore logical to say that the price of tea at any given time will affect the demand for sugar. In the same fashion, bread and butter also appear to be complementary goods.

### **Demand for Intermediate and Capital Goods**

When we largely discussed demand our general thinking appeared to be that the goods discussed ought to be consumer goods. But that is not always true. There are some goods which are generally known as intermediate and also capital goods. It is important that we understand these two types of goods.

We shall go ahead to discuss intermediate goods as goods which are not purchased for immediate consumption but rather are used in the production of consumer goods. For example flour is an intermediate good mostly used in the manufacture of bread. Tyres also appear to be intermediate goods if purchased by a car manufacturers. But a tyre is also a consumer product if purchased by Mr. Solomon for use in his car. On the other hand, capital goods are those goods that are used for the manufacture of both intermediate and consumer goods. A manufacturing plant is a capital good. One thing we need to know about capital goods is that they last for very long periods because of their nature.

### **Building a Market Demand**

We have defined what demand for a product or service is generally. Also we understand what a population is.

Let  $X$  = No. of persons in a population  
 $Y$  = average number of a given product consumed by each person in that population per annum

Then  $XY$  = Total market demand per annum for the product in question

## **SELF ASSESSMENT EXERCISE**

There are 400,000 persons in a city called Madas. Each person in the city drinks a bottle of water daily. What is the annual demand for water in Madas.

### **3.5 Forecasting Future Demand**

Some of us will assume that building the demand schedule for a product is all that is required; but that is not true because the analyst should be able to forecast future demand for the product in question or the service as the case may be. Forecasting future demand appears to be a very difficult task because there is a lot of uncertainty attached to the forecast of a future event. Ordinarily, the demand for many goods may be either stable, erratic or outrightly unpredictable. Social change, structural adjustments, change of taste and technology all add up to make forecasting a difficult task especially of demand.

Usually, there are two basic approaches that are available when trying to forecast demand namely:

- Qualitative techniques
- Quantitative techniques

#### **Qualitative Techniques**

Qualitative techniques are mainly desk methods which are based on reports obtained from various sources. One of the sources could be expert opinion obtained from a pool of experts in an industry. The experts usually are seen to be knowledgeable about a product or industry and therefore are in a position to forecast what the future demand for a product is likely to be. Another way of obtaining information for use in forecasting demand is known as the sales force composite method.

With this method, salesmen in a particular industry can provide expert data on demand. But in most cases, the data and the forecast that they provide differ significantly from that provided by a panel of experts. The general belief is that since salesmen operate at the grassroots level, they are more knowledgeable about the demand for products and the accompanying forecast.

#### **Quantitative Techniques**

The majority of the data generated are often unreliable, biased and plagued by a subjective state of mind of the people making the forecasts. Also, we think they are clumsy data in the hands of the entrepreneur.

Quantitative techniques in forecasting, however, are less subjective and are more or less based on past data.

In the main they are mathematical in nature and tend to be more accurate. One of the quantitative techniques used is the time series approach. The time series approach generally has become very popular with analysts who are trying to forecast the demand for a good or service. The general feeling is that time is a crucial explanatory variable that explains the future. According to this thinking, past data can explain relationships between the demand of a commodity and time. For example, we can display the relationship between demand and time in a graphical way.

#### **4.0 CONCLUSION**

We have fully discussed the demand analysis. We discussed the analytical framework for preparing a demand analysis. We also discussed the analysis of a population data which we said is very crucial. We defined demand and discussed the evaluation of market size and then went further to discuss the forecasting of demand.

#### **5.0 SUMMARY**

Understanding demand analysis is our first practical step towards understanding the format of a market.

#### **6.0 TUTOR-MARKED ASSIGNMENT**

Why do you think that the analysis of a population data is important when building a demand analysis?

#### **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

## **UNIT 3     SUPPLY ANALYSIS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 The Supply Equation
  - 3.2 Analysing Supply Data
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

In Unit 2, we discussed demand analysis which basically looked at the market from the demand side. In this unit, our task is to look at the market from the supply side. Basically when an investor is contemplating an investment in the manufacture of goods for the market, he/she tries to evaluate the nature of the market for the proposed goods or services. Understanding the nature of the market will involve understanding demand as well as supply.

Supply analysis in project analysis tries to focus attention on the supply side of the market. The potential investor will like to know who the current suppliers of the goods or services are. Because this will guide him/her in understanding what is known as the demand/supply gap. Supply analysis tries to identify the supply of given goods or services. It tries to identify who the suppliers are and their locations.

Generally, in measuring the supply of a good, the following should be taken into consideration:

- The domestic supply of the good or service;
- The foreign supply of the good or service. (the imported quantity);  
and
- The export of the good or service (export quantity).

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain what a supply analysis is
- discuss it in relation to project evaluation.

### 3.0 MAIN CONTENT

#### 3.1 The Supply Equation

Consider a firm called Abando Nigeria Limited that wishes to set up a liquid soap manufacturing plant in Nigeria. The firm now wants to analyse the supply of liquid soap in Nigeria. As we have said, there are three key items to consider. Those three items are:

- The domestic supply of the liquid soap;
- The foreign supply of the liquid soap;
- The export of the liquid soap in question.

Let    A     =     the domestic supply of a good  
        B     =     the foreign supply of a good  
        C     =     the export of the good

Then supply  $X = (A + B) - C$ .

This is called the supply equation.

You will notice that C is the exported quantity and which will not be available for local consumption.

**Table 17: Value of Output of Selected Items**

<b>Products</b>	<b>N,000</b>
<b>Food and Drinks</b>	
Flour	4,125,417
Sugar	350,333
Confectionery	1,002,738
Biscuits	4,700,211
Beer	3,665,544
Soft drinks	124,668
Wine spirit	84,598
<b>Electrical Equipment</b>	
Refrigerators	244,228
Record Players	n.a
Loud speakers	13,204
Radio cassettes	3,680
Air conditioners	319,361
Television sets	2,528
Electrical cables	48,969
<b>Vehicle Assembly</b>	
Motor cycles	235,633
Passenger cars	1,447,874
Pick up	n.a
Other commercial vehicles	1,078,980

<b>Building Materials</b>	
Paints	863,479
Cements	2,221,060
Tiles	299,135
Roofing sheets	2,705,982
Steel and iron rods	718,785
Wire-nails and wire products	207,520
PVC pipes and fittings	84,149
<b>Petroleum and Chemicals</b>	
Soap detergent	4,618,792
Lubricants	1,673,035
Safety matches	138,841
Batteries	527,551
<b>Textiles</b>	
Cotton textiles	6,679,028
Synthetic fabrics	2,998,946
Knitted fabrics	994,827
Garments	31,477
<b>Paper Conversion</b>	
Exercise Books	260,487
Light and flexible packaging	301,541
corrugated cartons	824,430
Paper bags	384,835
Tissue paper	194,928

**Table 18: Exports by Products**

<b>Description</b>	<b>(₦ Million)</b>
Live animals and animal products	137.1
Vegetable products	438.8
Food industry products	876.6
Of which tobacco products	0.0
Fats and oil	8.2
Mineral products	4,914,042.1
Chemical and allied products	389.6
Plastic, ethers, esters of cellulose, rubber, etc.	3245.2
Hides, leather and fur	6806.1
Wood, charcoal and wood products	39.6
Paper-making material and articles thereof	621.7
Textiles and textile article	1000.1
Footwear, headgear, umbrellas, feathers, hair	228.8
Stone, plaster, cement asbestos, mica products	42.6
Natural pearls, gemstone and other precious metals	0.0
Base metals and articles of base metal	5645.0
Machinery and appliances (other than electrical)	4508.8
Transport equipment	190,409.0

Instruments and apparatus (photos, clocks, etc)	536.4
Miscellaneous manufactured articles	9.1
Arms and ammunitions	0.0
Works of art, collector pieces and antiques	0.1
Other goods and product	40.9

**Table 19: Imports by Product Section**

Description	(₦ Million)
Live animals and animal products	108,636.4
Of which live animals	97.7
Vegetable products	103,549.2
Food industry products	84,374.6
Of which tobacco products	14018.3
Fats and oil	4,823.8
Mineral products	88,348.1
Chemical and allied products	133,367.4
Plastic, ethers, esters of cellulose, rubber, etc.	121,732.9
Hides, leather and fur	2,432.4
Wood, charcoal and wood products	4048.3
Paper-making material and articles thereof	44,498.2
Textiles and textile article	27,775.7
Footwear, headgear, umbrellas, feathers, hair	3,258.6
Stone, plaster, cement asbestos, mica products	15,568.2
Natural pearls, gemstone and other precious metals	44.4
Base metals and articles of base metal	136,046.2
Machinery and appliances (other than electrical)	409,123.4
Transport equipment	265,034.9
Instruments and apparatus (photos, clocks, etc)	13,464.9
Miscellaneous manufactured articles	9,357.58
Arms and ammunitions	23.3
Works of arts, collector pieces and antiques	6.6
Specials items.	48.4

### 3.2 Analysing Supply Data

We have agreed that the investor should evaluate the market in terms of determining the level of supply of the goods or service in the market. But in practical terms, there is the urgent need to identify every supplier and the suppliers' location. This will assist in the preparation of a marketing plan. Some analysts believe that getting information on the actual supply data is all that is important. That is not true. In practical terms, there is the need to find out the following facts about supply in an industry:

- No. of players or suppliers in an industry;
- Their current installed capacities;

- Their current actual operating capacities;
- Anticipated expansion plans;
- Critical labour costs in the industry;
- Raw materials costs in the industry and the likely direction; and
- Categorising the suppliers into their various categories – big, medium or small players.

### **SELF ASSESSMENT EXERCISE**

Explain the supply equation and its relevance.

### **4.0 CONCLUSION**

The supply analysis attempts to identify the components of the supply of given goods and services as well as the supplies and their locations.

### **5.0 SUMMARY**

The supply analysis seeks to analyse the supply of goods and services. It enables the would-be-investor or analyst to have a clear picture of the supply in the market place. Understanding supply is a must if we are to understand the nature of competition in industry.

### **6.0 TUTOR-MARKED ASSIGNMENT**

Discuss the three components of supply that make up the supply equation.

### **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

## **UNIT 4      COMPETITION AND MARKETING PLANS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Body
  - 3.1 Analytical Framework
  - 3.2 The Nature of Competition
  - 3.3 The Marketing Plan
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

We have discussed market demand when we were looking at market analysis. We also discussed supply. We now want to move ahead and see how both of them interplay in what is known as the market.

In this intellectual journey, we have put ourselves in the shoes of the would-be-investor or analyst who wants to understand the nature of competition in the market. Every firm takes market demand as given and no firm can single-handedly change demand which we said depends on a lot of factors. Also, every firm takes supply to the market as given because no firm is able to control the supply to the market from other competitors.

It is because of this that we really need to understand the nature of competition in the market. Every dynamic environment creates opportunities and problems for firms. A company must be able to respond constructively to this market setting, analyse the opportunities and threats, and then formulate marketing plans to remain in the competition.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the meaning of competition
- discuss marketing plans and how they are designed.

### 3.0 MAIN CONTENT

#### 3.1 Analytical Framework

We know where we are coming from and we also know where we are going. Our task is to discuss the competition and also the marketing plan. To guide us so that we do not forget our direction, we shall propose an outline – a type of framework that should guide us when evaluating competition and also the design of marketing plans.

Marketing plans are very crucial from the point of view of the project initiator as well as from the project evaluator.

**Table 20: Competition: A Framework for Analysis**

Industry Outlook	Demand for the product or service Usefulness and desire Stability of demand Supply capacity of industry Labour costs Raw material costs Taxation Permits Regulation
Company's Position in the Industry	Market position of the firm in the industry Products offered Standing of the products The location of the firm Comparative location Relative efficiency of the firm's equipment cost advantages Relative financial strength Ability of company management

#### 3.2 The Nature of Competition

In every industry, competition exists. It is not a matter of sheer bad luck or coincidence. Competition occurs because every firm in an industry wants to sell its products and also get market share to the detriment of other players.

In the market, the state of competition depends on five basic forces as shown in Figure 5. Therefore, any discussion on competition must take into consideration these five basic forces since they cannot be glossed over. The first force exists within the industry where we see firms all jockeying for position. Here, all firms unleash their strategies and fight

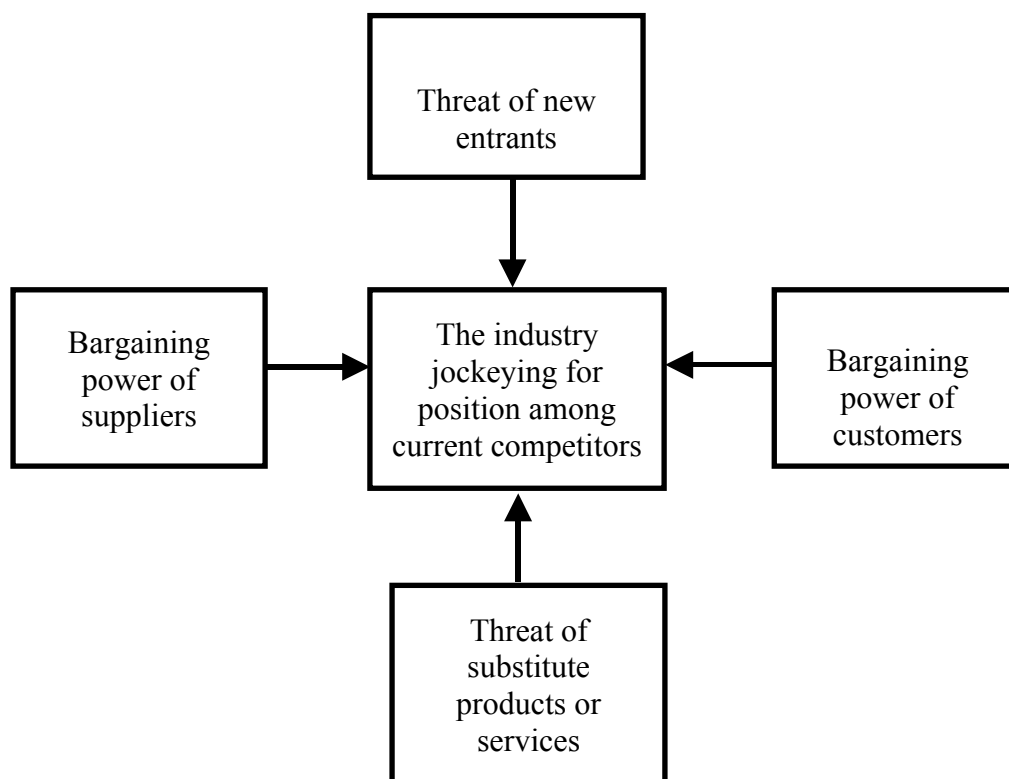
each other. In the end, some firms emerge as clear leaders, some emerge as followers, while others might close shop.

The second force is the threat of new entrants. New entrants into an industry bring in new capacity. But we should note that the threat of entry depends on the barriers present and also the reaction of existing players. We should also not forget the forces arising from suppliers. Strong suppliers can exert strong bargaining power on market participants to the extent of raising prices and influencing the price of goods generally. Powerful buyer groups, when they exist in an industry, tend to influence prices since they more or less dictate the price at which they will buy.

Finally substitute goods or the threat of substitute goods also influence competition in an industry. Substitute goods tend to limit the potentials of an industry. For example sugar tends to limit the honey industry's potentials for growth and expansion.

### SELF ASSESSMENT EXERCISE

In evaluating the outlook for an industry, list and discuss four items that you think are important.



**Figure 5: Forces governing competition in an industry**

### 3.3 The Marketing Plan

The marketing plan addresses issues concerning the marketing of the products. It tries to relate the firm to its external consumers and the market.

The marketing plan should answer the following questions:

- What is the product or service?
- What are the uses of the product or service?
- What is the offered price?
- Where will the product be found?
- How will the product or service be advertised?

**Table 21: The Marketing Pan Checklist**

	Have you covered this in the plan?
How big is the market? Who are your competitors? How are they faring? What is the structure of the competition? What are your competitors' prices? What are your prices? What are the trends in the market? What market share are you thinking of?	

**Table 22: The Marketing Plan Checklist**

	Have you covered this in the plan?
What are your competitors' strengths? What are your competitors' weaknesses? What is your strength? What is your weakness? What is your competitive advantage? How will you distribute your goods? How will you promote your goods? What is your customer service policy?	

### 4.0 CONCLUSION

In this unit, we have discussed competition and marketing plans. We have also discussed the analytical framework for discussing competition. Apart from these, we have provided a check list for the marketing plan.

## **5.0 SUMMARY**

We have discussed competition and marketing plans. We saw how competition and marketing plans relate to each other. The framework for analysis presented discussed industry outlook and a company's position in the industry.

## **60 TUTOR-MARKED ASSIGNMENT**

Discuss the five basic forces that govern competition in industry.

## **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

Michael E. Porter. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: Free Press.

## **UNIT 5 PROJECT COST ANALYSIS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Body
  - 3.1 Project Cost Analysis
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

In Unit 4, we discussed competition and marketing plans. We saw how competition takes place in the market place. We also discussed the components of marketing plans as prepared by project initiators. The marketing plan as we discussed is very important to both the project initiators and the evaluators.

In this unit, we shall discuss project cost analysis which is very important in this course.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain what project cost analysis is
- discuss how the analysis can be prepared.

### **3.0 MAIN CONTENT**

#### **3.1 Project Cost Analysis**

Project cost analysis provides total frameworks for calculating or estimating the total cost of a project. For example, a firm wants to set up a garri processing plant to enable it serve the food needs of a growing population. How does the firm know the cost of the envisaged garri processing plant?

To guide our discussions, let us define project cost as all those costs that are incurred in the process of setting up a project. The costs must be attached to the project. And the list of the items must be exhaustive. But we need to arrange the cost items in an orderly and consistent manner so

that like items stay together. To ease our discussions and to make them as easy as possible, we shall divide project cost items into the following sub-headings:

- Cost of land
- Cost of building
- Cost of machinery and equipment
- Cost of utilities
- Cost of furniture and other fittings
- Cost of vehicles
- Pre-operational expenses
- Working capital

Although we have listed the cost sub-headings, we shall go ahead and prepare a small checklist that will guide us. After the checklist, we will work through a practical demonstration using a vegetable oil refining plant as an example.

**Table 23: The Cost of Land -A Checklist**

	Have you included this in your cost?
Cost of purchase of the land	
Cost of Surveying of the land	
Cost of certificate of occupancy	
Cost of Legal documentation	
Cost of perimeter fence	

**Table 24: The Cost of Building –A Checklist**

	Have you included this in your cost?
Cost of architectural design	
Cost of structural designs	
Cost of electrical designs	
Cost of factory buildings	
Cost of offices	

**Table 25: The Cost of Machinery/Equipment- A Checklist**

	Have you included this in your cost?
Cost of locally purchased machinery	

Cost of imported machines	
Freight and insurance costs	
Custom duties and other costs.	
Installation and commissioning costs	
Test running costs	

**Table 26: The Cost of Utilities -A Checklist**

	<b>Have you included this in your cost?</b>
Cost of private transformer	
Cost of generator	
Cost of water bore hole with fittings	

**Table 27: The Cost of Vehicles -A Checklist**

	<b>Have you included this in your cost?</b>
Cost of vehicles for management	
Cost of vehicles for other staff	
Cost of distribution vans	
Cost of distribution Lorries	

**Table 28: Working Capital Checklist**

	<b>Have you included this in your cost?</b>
Purchase of raw materials	
Purchase of diesel/fuel	
Payment of salaries	
Administration costs	
Selling costs	

**SELF ASSESSMENT EXERCISE**

List and explain 10 items which you think should appear in a project cost analysis of a start-up sachet water manufacturing plant.

**A Worked Example****Analysis of Project Cost in a Vegetable Oil Refining Plant**

<b>Estimates of Project Cost</b>	<b>N</b>
Land for the project	4,000,000
Civil works and foundations	5,000,000

**Steel Structures**

Includes H Beams, U channels,  
Angles, checker plates, Railing pipes,  
Roofing materials

- 13,000,000

**Total Land, Buildings and Steel Structures**- **22,000,000****Storage Tanks**

2 units' crude oil tank – 200 tons - 3,000,000

1 unit refined oil tank- 300 tons - 2,000,000

1 unit fatty acid tank – 50 tons - 850,000

1 unit water storage tank – 20 tons - 750,000

1 unit diesel storages tank – 20 tons - 750,000

1 unit furnace oil tank – 20 tons - 750,000**Sub-Total** = **8,100,000**

■ ■ ■ ■ ■ ■ ■ ■ ■ ■

**Utilities**

1 unit 500 KVA transformer - 3,500,000

1 unit 500 KVA generator - 10,000,000

1 unit water bore hole - 500,000**Sub-Total** = **14,000,000****Machinery and Equipment (Imported)**

Full line vegetable oil refining plant consisting of the following:

- Continuous oil pre-treatment section
- Continuous bleaching section
- Continuous physical refining and deodorising section
- Thermal oil heating units
- Water cooling system
- Steam generation and distribution system

N

Total C & F Lagos U \$ 695,000*N132	=	91,740,000
Bank charges (L/C etc)	=	500,000
Port clearing and other Misc. charge	=	<u>6,500,000</u>
<b>Total: machinery and equipment</b>	=	<b><u>98,740,000</u></b>

**Pre-Operational Expenses**

Feasibility studies	=	300,000
Project management consulting services	=	500,000
NAFDAC for registration/documentation	=	150,000
Travels and tours (local and overseas)	=	<u>500,000</u>
<b>Total: pre-operational expenses</b>	=	<b><u>1,450,000</u></b>

**Summary of Project Cost**

Land, building and steel structures	=	22,000,000
Machinery and equipment	=	98,740,000
Storage tanks	=	8,100,000
Utilities	=	14,000,000
Pre-operational expenses	=	1,450,000
<b>Sub-Total</b>	=	<b>144,290,000</b>
<b>Working capital</b>	=	<b><u>30,617,994</u></b>
<b>Project Grand Total</b>	=	<b><u>174,907,994</u></b>

**Analysis of Working Capital Requirements**

		N
One week purchase of raw materials	=	29,697,261
One month factory salary/wages	=	482,820
One month diesel, oil and lubrication expenses	=	<u>437,913</u>
<b>Total</b>	=	<b><u>30,617,994</u></b>

**Table 29: A Proposed Financing Plan (N)**

	<b>Project Sponsor</b>	<b>Bank</b>	<b>Total</b>
Land, building and steel structures	9,000,000	13,000,000	22,000,000
Machinery and equipment	20,800,000	77,940,000	98,740,000
Storage tanks	-	8,100,000	8,100,000
Utilities	14,000,000	-	14,000,000
Pre-operational expenses	1,450,000	-	1,450,000
Sub-Total	45,250,000	99,040,000	144,290,000
Working capital	30,617,994	-	30,617,994
<b>Total</b>	<b>75,867,994</b>	<b>99,040,000</b>	<b>174,907,994</b>

### Contribution Ratio

Project sponsor	=	43.3 %
Bank	=	56.7 %
<b>Total</b>	=	<b>100%</b>

## 4.0 CONCLUSION

Project cost analysis is an important aspect of our study of project evaluation. Project cost analysis is important to both the project initiator and the financial analyst who may want to evaluate a project.

## 5.0 SUMMARY

In this unit, we discussed project cost analysis. In doing this we agreed that cost of land, buildings, machinery and equipment, utilities, furniture and fittings, etc., all form part of the total project cost. We also used a check list to guide the preparation of the cost analysis. Finally we used a worked example of a vegetable oil refining plant to throw more light on the project cost analysis.

## 6.0 TUTOR-MARKED ASSIGNMENT

Why do you think that it is important to know the total cost of a project?

## 7.0 REFERENCES/FURTHER READINGS

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

Wearne, S.H. (1989). *Control of Engineering Projects*. London: Thomas Telford.

## MODULE 3

Unit 1	The Projected Income Statement
Unit 2	Projected Cash Flow Statements
Unit 3	The Projected Balance Sheet
Unit 4	Project Evaluation Criteria
Unit 5	Introduction to Economic Analysis

## UNIT 1 PROJECTED INCOME STATEMENT

### CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Projected Income State
  - 3.2 The Structure in the Projected Income Statement
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

## **1.0 INTRODUCTION**

In Unit 5 of Module 2, we discussed project cost analysis. We discussed how to cost a project, especially a start-up project. We saw that fixed costs and working capital all add up to constitute the project cost. In this unit, we shall discuss the projected income statement which is a very vital statement required for project analysis and evaluation.

The key basis for financial planning and project evaluation is the financial information. The financial information is required to record, compare and evaluate a firm's earning power and ability. In an already existing project, the financial information is already provided since it is a historical data. The income statement or the profit and loss account is a summary of revenues, expenses and net profit of an enterprise for a period of time. This serves as a measure of the firm's profitability over the period. For an on-going project or firm, when prepared, the income statement becomes a historical statement. The projected income statement is a forecast of the revenues, expenses and the net profit of an enterprise or project.

## **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the meaning of projected income statement
- discuss its application in project evaluation
- prepare a projected income statement.

## **3.0 MAIN CONTENT**

### **3.1 The Projected Income Statement**

The projected income statement is usually needed by a variety of people. Some of the users of the projected income statement might have direct interest in the firm while others have indirect interest.

The owners or sponsors of a project have a direct interest in the projected income statement. It is so because they are entrusting their investment to the firm. They wish to know before hand what the revenues, expenses and net profit of the firm will be, and most importantly, their own expected dividends.

Another important group that is expected to have a direct interest in the projected income statement of a project is the management. Usually when a project is conceived and a project plan is written, the plan will contain the projected income statement as conceived by the project sponsors or consultants. Usually, the projected income statement is handed down to the project managers as a guide.

Also financial institutions are interested in a projected income statement. Practically, when any firm approaches a financial institution for financial assistance, the firm is expected to prepare a business plan or a project feasibility study which contains, amongst other things, the projected income statement. Financial institutions need to study the projected income statement to evaluate the revenues, expenses and profitability of the investment project. When they do this, they will also test the cash flows of the project to see whether the proposed project can repay any loan granted together with the interest.

Other people that might be interested in the projected income statement are potential investors. Potential investors need to examine the projected income statement to decide whether or not they will invest in a firm.

### **3.2 The Structure of the Projected Income Statement**

We have just explained what the projected income statement is. It is a statement that shows projected revenues, projected expenses, and of course, net profit of a proposed investment, an expansion project or an existing project.

In the standard practice, there is an acceptable arrangement that should group like items together and this leads to building a projected income statement that is broken into revenues, expenses and the net profit.

- **Revenues**

Ordinarily, revenues are the value of output of goods or services that an enterprise supplies to its customers. Revenues, therefore, arise when a firm produces or manufactures goods which it sells to third parties for a fee. Secondly, revenues can arise when a firm is engaged in the buying and selling of goods. It purchases goods which it later resells at a profit or a loss as the case may be. Thirdly, revenues can also arise through provision of services by a firm. A hospital may specialise in surgery and provide surgical services to its customers for whom it collects relevant payments, which when added up, make up the revenues.

Finally, a firm can earn revenue by loaning its economic resources. For example, a bank lends money to customers and earns interest income. The interest earned is revenue.

In projecting for revenues in a project situation, care must be taken so that proper estimates or forecasts are made. And this is made by qualitative judgment plus quantitative judgment on the part of the project evaluator. For example, if the project is a manufacturing facility that will produce goods for the market, the best option is to start with the known market price of the good to be produced. For example, if the good in question is the type of bread that sells for N100 a loaf, then the project evaluator or initiator has to start from the known price of a loaf of bread and that is N100 a loaf. If the number of loaves of bread to be produced per annum amount to 1,000,000 then the projected revenue of the project is N100,000,000.

Likewise, if a firm is engaged in the provision of services, the revenues likely to be earned can be easily estimated. If for example a hospital is projecting revenues, it has to first estimate the likely number of patients that will use its facility and also the average fee it charges a patient. The number of patients multiplied by the average fee per patient will give us the projected revenue of the health facility.

The projection for revenues can cover various periods. In most organisations, revenue projections for project evaluation purposes stretch over a period of three years. Some banks ask for five year revenue forecasts. In the revenue projections care must be taken so as not to overstate the revenues or understate them.

- **Expenses**

The cost of earning revenue is known as the expense. Expenses are different from costs. Cost is the outlay incurred to acquire some asset. For example, when a car is purchased by a company for its business, the

sum used to purchase the vehicle is the cost of the vehicle. If the vehicle uses fuel for the firm's operations, that constitutes an expense.

In projecting the expenses of a firm's investment, a lot of factors are usually taken into consideration.

Firstly, we have to get proper estimates of the current cost profile of the various items. For example, when projecting gas and oil expenses of a project, the proper starting point is to collect data on the current prices of gas and oil.

### Revenue Projections

From the proposed production plan, the following is the revenue profile for the project in year one (year 2007).

**Table 30: Revenue Projection for a Vegetable Oil Refining Plant**

<b>Projected Year One Revenues</b>			
<b>Product</b>	<b>Quantity Sold (Tons)</b>	<b>Price Per Ton N</b>	<b>Total Revenue N</b>
Refined Vegetable Oil	12,498	145,000	1,812,210,000
Palm Kernel Cake (PKC)	18,418	5000	92,090,000
Palm Kernel Sludge (PKS)	1,315	4000	5,260,000
Fatty acid	657.84	100,000	65,784,000
<b>Total</b>			<b>1,975,344,000</b>

### Summary of Projected Revenues

	<b>Revenues (N)</b>
Year 1 – (2007)	1,975,344,000
Year 2 – (2008)	1,975,344,000

### Production Materials and Their Expenses

Cracked palm kernel	N45, 000 per ton
Bleaching earth	N88, 000 per ton
Citric acid	N200 per kg
Phosphoric acid	N300 per kg

### **Consumption of Utilities and Chemicals per Ton of Bleached and Refined Vegetable Oil**

Steam at 50 psig	=	70kg
Barometric water	=	6 m <sup>3</sup>
Clean water in circulation	=	7 m <sup>3</sup>
Fuel oil	=	4 kg
Bleaching earth	=	15 kg
Citric acid	=	200 gms
Phosphoric acid (for dosing)	=	300 gm

### **Vegetable Oil Packaging Expenses**

The refined vegetable oil will be sold in two ways:

1. Direct to vegetable oil distributors who will purchase the vegetable oil in tanker loads. In this case, the vegetable oil tankers will come and load vegetable oil at the factory.
2. The refined vegetable oil will be filled into plastic jerry cans of 9 litre and 18 litre capacity and also sold to the market. The purpose of this is to ensure that the brand of vegetable oil will be in affordable units and prices to the market.

**Table 31: Projected Manufacturing Account for a Vegetable Oil Refining Plat**

### **Projected Manufacturing Account for Year Ending 31<sup>st</sup> December**

	2007	2008
--	------	------

Opening raw materials	10,000,000	15,000,000
Raw materials purchased	1,544,257,610	1,544,257,610
	<b>1,554,257,610</b>	<b>1,559,257,610</b>
Raw materials at close	15,000,000	9,000,000
Raw materials consumed	1,539,257,610	1,550,257,610
<b>Add Factory Overheads</b>		
Diesel, oil and lubricant	5,254,959	5,517,707
Factory uniform	110,000	-
Electricity and light	3,721,819	3,907,910
Plant/Machinery repairs	3,002,287	3,152,401
Laboratory consumables	438,820	500,000
Laboratory equipment repair	50,000	80,000
Generator Repairs and maintenance	8,46,556	888,883
Weighbridge fare	290,122	300,000
Salaries and wages	5,793,840	6,083,532
Welding gas	218,499	240,000
Cleaning and sanitation	87,595	90,000
Depreciation	17,248,071	17,248,071
<b>Total factory overheads</b>	<b>37,062,568</b>	<b>38,008,504</b>
<b>Cost of manufactured goods</b>	<b>1,576,320,178</b>	<b>1,588,266,114</b>

**Table 32: Projected Expenses for a Vegetable Oil Refining Plant**

**Projected: Selling and Distribution Expenses**

	<b>2007</b>	<b>2008</b>
<b>Selling and Distribution Expenses</b>		
Advertising	5,000,000	5,000,000
Car and bus running expenses	1,782,230	1,871,341
Transports and travelling	2,185,317	2,185,317
Loading and off loading	586,050	586,050
Gifts, entertainment, donations	293,306	293,306
Public relations	418,813	400,000
<b>Total</b>	<b>10,265,716</b>	<b>10,336,014</b>

<b>Administrative Expenses</b>		
Printing and stationery	310,324	325,840
Truck repairs & maintenance	585,862	615,155
Telephone, courier & postages	900,000	900,000
Consultancy fee	120,000	130,000
Security expenses	102,072	107,175
Medical expenses	1,038,632	1,090,563
Audit fee	120,000	120,000
Building maintenance	389,942	409,439
Directors remuneration	7,200,000	7,200,000
Interest and bank charges	16,000,000	12,000,000

Insurance premium	350,000	350,000
Salaries & wages (office)	3,257,100	3,419,955
Depreciation provisions	1,889,544	1,889,544
<b>Total</b>	<b>32,263,476</b>	<b>28,557,671</b>

**Table 33: Projected Trading, Profit and Loss Account for a Vegetable Oil Refining Plant**

**Projected Trading, Profit and Loss Account for the Year Ending 31<sup>st</sup> December**

	<b>2007</b>	<b>2008</b>
Sales	1,975,344,000	1,975,344,000
<b>Opening Stock</b>	30,000,000	40,000,000
+ Cost of Manufactured goods	1,576,320,178	1,588,266,114
Less Stock at Close	40,000,000	50,000,000
=Cost of Sales	1,566,320,178	1,578,266,114
Gross Profit	409,023,822	397,077,886
<b>Deduct</b>		
Selling and distribution expenses	10,265,716	10,336,014
Administrative expenses	32,263,476	28,557,671
Total expenses	42,529,192	38,893,685
Profit before tax	366,494,630	358,184,201
Tax provision	117,278,281	114,618,944
Profit after tax	249,216,349	243,565,257

- **Net Profit**

If you deduct expenses from revenues, you will arrive at the profit before tax (PBT).

If you deduct taxation from the profit before tax, you will arrive at the net profit.

### **SELF ASSESSMENT EXERCISE**

List and explain four expense items that can be found in a projected income statement.

## **4.0 CONCLUSION**

We have discussed the projected income statement. We discussed the structure of the projected income statement, revenues, expenses and net profit concepts.

Finally we used as an example to demonstrate a projected income statement.

## **5.0 SUMMARY**

We have treated the projected income statement in this unit. The projected income statement is one of the most important items in project evaluation from the project sponsor's position or from the bank or analyst's position.

## **6.0 TUTOR-MARKED ASSIGNMENT**

Discuss the likely users of a projected income statement.

## **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

## **UNIT 2 PROJECTED CASH FLOW STATEMENTS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Projected Cash Flow Statements – Meaning and uses
  - 3.2 The Structure of the Projected Cash Flow Statement
    - 3.2.1 Cash Inflows
    - 3.2.2 Cash Outflows
  - 3.3 Sensitivity Analysis
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### **1.0 INTRODUCTION**

In Unit 1 we discussed the projected income statement. There we discussed the concept of revenues and expenses and also net profit. We also discussed the fact that the projected income statement is used by a variety of users like the project initiators, bankers and financial analysts.

In this unit, we shall discuss the projected cash flow statements.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain what a projected cash flow statement is
- explain how it can be prepared
- explain the usefulness.

### **3.0 MAIN CONTENT**

#### **3.1 Projected Cash Flow Statement – Meaning and Uses**

It is important to understand and analyse the projected cash flows of the firm. We shall begin our discussion by defining a cash flow statement.

A cash flow statement is a statement that shows the actual receipt of cash (inflows) and the disbursement of cash (out flows) of a firm or project. Having said that, we can now go ahead to define a projected cash flow statement.

A projected cash flow statement is a statement which shows the forecasts of actual receipts of cash (inflows) and the disbursement of cash (outflows) of a firm or project. There are many users of information contained in projected cash flow statements. The first user of the projected cash flow statement is the project sponsor or initiator.

The project sponsor or initiator is interested in knowing well in advance the future cash flows of the firm. This is important because the future financing needs of the firm have to be known well in advance. The project initiator needs to distinguish between credit sales and cash sales. If the project initiator does not distinguish between credit sales and cash sales, then his/her project may suffer cash flow problems. The initiator may not be able to estimate the amount of cash needs of the project as well as timing of the cash needs.

Similarly, providers of finance especially the lending banks are usually very interested in the projected cash flow statement. They need to determine the firm's ability to service debt. The debt in question may be existing debts or future debts. Ability to service debts is a function of future cash flows.

Projected cash flow statements assist us to evaluate a firm's future performance and of course financial condition that enables the project evaluator answer the following questions.

- What is the nature of the firm's projected cash flow statement?
- Will the projected cash flow be able to service the project's debts (loan, overdraft + interest)?
- When will the project need financing and to what extent?
- How should the loan or overdraft or finance be structured?
- How stable are the cash flows?

### **3.2 The Structure of the Projected Cash Flow Statement**

The basic format of the projected cash flow statement is displayed in Table 33 is a projected cash flow statement of a company. But it covers a period of only 3 months. You can project a cash flow as long as you require but the basic principles should be followed. If you examine Table 33 properly, you will realise that the projected cash flow statement is divided into two main sections, namely:

1. The cash inflows
2. The cash outflows (outgoings)

We will now go ahead to break down the projected cash flow statement.

**Table 34: A Three Month Projected Flow Statement  
Niger Limited**

<b>Cash Inflows</b>	<b>January</b>	<b>February</b>	<b>March</b>
Capital introduced	10,000,000	-	-
Loan introduced	20,000,000	-	-
Cash sales	40,000,000	50,000,000	60,000,000
<b>Total Cash Inflows</b>	<b>70,000,000</b>	<b>50,000,000</b>	<b>60,000,000</b>
<b>Cash Outflows</b>			
Raw material	30,000,000	30,000,000	35,000,000
Salary and wages	2,000,000	2,200,000	2,500,000
Office admin expenses	500,000	550,000	600,000
Electricity and gas expenses	500,000	550,000	600,000
Loan repayment	2,000,000	2,000,000	2,000,000
Interest charges	400,000	400,000	400,000
Selling expenses	1,000,000	1,200,000	1,300,000
<b>Total Cash Outflows</b>	<b>36,400,000</b>	<b>36,900,000</b>	<b>42,400,000</b>
<b>Cash Surplus/ (Deficit)</b>	<b>33,600,000</b>	<b>13,100,000</b>	<b>17,600,000</b>
<b>Opening Cash Balance</b>	-	33,600,000	46,700,000
<b>Closing Cash Balance</b>	<b>33,600,000</b>	<b>46,700,000</b>	<b>64,300,000</b>

### 3.2.1 Cash Inflows

We have seen that a projected cash flow statement is broken down into the inflows and the outflows (outgoings). Let us now proceed to examine some of the key items contained in the projected cash flow statement. The items will vary from capital to loan introduced and also cash sales. We shall treat them individually.

- **Capital Introduced**

Every firm or project should have a capital. At the time a project is conceived or is being expanded, the owners of the firm usually bring in what is known as capital.

In a limited liability company, the share holders usually contribute the capital of the firm. In cash flow construction, capital is usually entered as an inflow. The reason is clear. When you introduce capital, you bring in cash.

- **Loan**

Another item appearing in a projected cash flow statement is loan. In some cases, a project is funded through loan from banks.

The loan will usually have the following features:

1. The loan amount will be specific
2. The loan has an interest rate attached to it.
3. The loan will be repaid in agreed installments.

- **Cash Sales**

The sales figure is the most important in a projected cash flow statement. Projections for sales pose one of the most difficult challenges in cash flow projections. We must quickly distinguish between total sales, credit sales and cash sales. Total sales are the total value of goods or service sold to third parties. Credit sales refer to sales for which payment is not made immediately. The figure for credit sales is usually transferred to the debtors list. Cash sales are the difference between total sales revenue and credit sales.

As far as we are concerned, the cash sale is the most important component of sales and it is the one that appears in the projected cash flow statement. Credit sales are only reflected in the cash flow when they are converted to cash. For example, if in January 2007, a company sells four cars at a credit of N10,000,000. In the cash flow for January 2007, there will be no entry for cash sales. But if in February 2007, the company receives a cash payment of N5,000,000, then that figure will appear in the inflows column for February 2007.

The basic rule is that only actual cash received is usually entered in the inflow column.

In actual practice, projecting for cash sales will involve exhaustive consideration of the following:

- General economic outlook in the country
- The industry outlook. What is the demand situation like? What is the supply situation?
- What is the structure of competition and how fierce is it?
- What will be the effect of competition on prices in the firm's area of operation?

### 3.2.2 Cash Outflows

Cash outflows or outgoings will include all expenses that use cash. They will include items like:

- Raw material expenses
- Salary and wages
- Stationery
- Loan repayment
- Interest charges
- Selling expenses
- Office admin expenses
- Oil and gas expenses
- Taxation
- Rates and permits

### 3.3 Sensitivity Analysis

Usually, when constructing a projected cash flow statement, the first set of projections is what we call normal estimates of cash flows. Normal estimates of cash flows especially cash revenues are based on all things being equal; but all things cannot be equal. A lot of things may happen.

In a market, supply can come from unexpected source and cause prices to fall. Prices of raw materials may rise suddenly and all these tend to reduce our earlier revenue projections and jack up expenses.

Sensitivity analysis provides the tool for subjecting a project's cash flows to adverse market situations. Sensitivity analysis seeks to adjust revenues for risk and also costs. In conducting sensitivity analysis, we say that we are adjusting a project's cash flows for risk. If we conduct sensitivity analysis on a cash flow, we may do that by making one, two or three of the following assumptions:

- Due to intense competition the project will not be able to make the earlier normal sales volume. Cash revenues will drop.
- Due to excess supply, prices in the market will fall, that will reduce cash revenues.
- The prices of raw materials and other items will rise. A close examination will reveal that the impact of any of the above will have the effect of reducing the cash revenues of a project.

We now state that if a normal projected cash flow statement is reconstructed to accommodate the fact that the market could be worse, we say that the reconstructed cash flow is now called a risk “adjusted cash flow statement.” The risk- adjusted cash flow is a pessimistic cash flow and should be admired by analysts.

Table 34 is a risk-adjusted income statement reconstructed from Table 33. The critical assumption is that Table 34 assumes that only 75% of cash sales of Niger limited will be realised.

Sensitivity analysis is a tool for subjecting cash flows to risk analysis. The key objective of the sensitivity analysis is to forecast a worst-case scenario for a project.

Other ways of conducting a sensitivity analysis is to assume that expenses attached to a project will increase.

**Table 35: A Three Month Risk-Adjusted Projected Cash Flow Statement Niger Limited**

<b>Cash inflows</b>	<b>January</b>	<b>February</b>	<b>March</b>
Capital introduced	10,000,000	-	-
Loan introduced	20,000,000	-	-
Cash sales	30,000,000	37,500,000	45,000,000
<b>Total Cash Inflows</b>	<b>60,000,000</b>	<b>37,500,000</b>	<b>45,000,000</b>
<b>Cash Outflows</b>			
Raw material	30,000,000	30,000,000	35,000,000
Salary and wages	2,000,000	2,200,000	2,500,000
Office admin expenses	500,000	550,000	600,000
Electricity and gas expenses	500,000	550,000	600,000
Loan repayment	2,000,000	2,000,000	2,000,000
Interest charges	400,000	400,000	400,000
Selling expenses	1,000,000	1,200,000	1,300,000
<b>Total Cash Outflows</b>	<b>36,400,000</b>	<b>36,900,000</b>	<b>42,400,000</b>
<b>Cash Surplus/ (Deficit)</b>	<b>23,600,000</b>	<b>600,000</b>	<b>2,600,000</b>
<b>Opening Cash Balance</b>	-	23,600,000	24,200,000
<b>Closing Cash Balance</b>	<b>23,600,000</b>	<b>24,200,000</b>	<b>26,800,000</b>

#### 4.0 CONCLUSION

We have discussed projected cash flow statements. We discussed the nature of cash flow statements and their users. We also examined the structure of cash flow statements. We used an example to show what a projected cash flow statement looks like. We also constructed a risk-adjusted cash flow statement.

## **5.0 SUMMARY**

In this unit we treated projected cash flow statements which we said constitutes a very vital document used in the evaluation of projects. The cash flow gives us a picture of cash inflows and outflows together with timing.

## **6.0 TUTOR-MARKED ASSIGNMENT**

Why do you think that banks are interested in projected cash flow statement of projects?

## **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

## **UNIT 3 THE PROJECTED BALANCE SHEET**

## CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Meaning of a Balance Sheet
  - 3.2 Components of a Balance Sheet
    - 3.2.1 Assets
    - 3.2.2 Liabilities
  - 3.3 Construction of the Projected Balance Sheet
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### 1.0 INTRODUCTION

In Unit 2, we discussed the projected cash flow statement. There, we discussed inflows and outflows (outgoings) of a firm or project. We also discussed the structure of the projected cash flow statement and went a step further to provide an example of a projected cash flow statement.

In this unit, we shall discuss the projected balance sheet.

### 2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the meaning of a projected balance sheet
- explain the preparation of the projected balance sheet
- prepare a projected balance sheet.

### 3.0 MAIN CONTENT

#### 3.1 Meaning of a Balance Sheet

Before we delve into the projected balance sheet proper, it is very important for us to first understand what a balance sheet is.

The balance sheet or the statement of financial position is one of the most important financial statements. It shows the financial condition or better still, the statement of affairs of a firm or business. We will therefore, define a projected balance sheet as a forecast of a future balance sheet as at a future date.

## 3.2 Components of the Balance Sheet

The balance sheet has two main sides namely:

- Assets
- Liabilities

### 3.2.1 Assets

When we are talking of assets generally, we are talking about the valuable possessions owned by the firm, valued in monetary terms. They will include land and buildings, stock of goods, raw materials, cash, vehicles and other valuables.

But generally we can classify assets under the following headings:

- Current assets
- Investments
- Fixed assets

Lets us now discuss each of them:

#### Current Assets

The current assets of a firm or business are those assets which are held in the form of cash or expected to be converted into cash in a short period or within the accounting period of the firm. In actual practice, the accounting period is usually of a one-year duration.

The current assets of the firm will include the following:

- Cash
- Book debts (debtors).
- Prepaid expenses
- Marketable securities.
- Stock

Let us start with cash which is one of the most liquid current assets. Cash will mean cash on hand or cash in the bank.

Another current asset which is important is book debts (debtors). Book debts are sometimes called account receivables. These are amounts due from debtors to whom goods have been sold or service rendered. Some

of the book debts may be realised by the firm. If they are not realised they turn into what is called bad debts and may be written off later.

Prepaid expenses are also current assets. They are expenses of future periods that are paid in advance. An example of prepaid expenses is rent which may be payable in advance by a firm. For example in January 2007, a firm may pay rent for its office for January 2007 to December, 2007. If in April, 2007, the financial year of the firm ends, it will regard the portion of rent paid from May 2007 to December, 2007 as a prepaid expense which invariably is a current asset.

Stock (inventory) is another current asset and includes raw material, work in process and finished goods. The raw materials and work in process are required for maintenance of the production function of the firm.

Finished goods usually will be already packed and kept ready for purchase by customers of the business.

Marketable securities are the firm's short term investment in shares, bonds and other securities. The securities are usually marketable and can be converted into cash in a very short time.

### **Investments**

Investments represent the firm's investments in shares, debentures and bonds of either firms or the government. By their nature, the investments are long term.

It is important to note that the investments yield income to the firm.

### **Fixed Assets**

Fixed assets are long-term assets held for periods longer than one year. They are usually held for use in the firm's business. Fixed assets include land, buildings, machinery and equipment, vehicles, etc.

We have briefly seen what the assets are. We shall now move over and discuss liabilities.

## **3.2.2 Liabilities**

When we talk of liabilities, we mean the debts that are payable by the firm or business to creditors. They may represent various obligations due to various third parties arising from various business transactions. Examples of liabilities include creditors, accounts payable, taxes payable, bonds, debentures, etc.

But generally, liabilities are divided into two broad groups namely:

- Current liabilities and
- Long-term liabilities

We shall discuss each of the groups

### **Current Liabilities**

Current Liabilities are those debts that are payable in a short period usually within a year.

One of the major current liabilities is the bank overdraft. Most banks grant their customers overdraft which are repayable within a period of one year. The other type of current liability includes provisions for taxes and dividends. These are liabilities that will mature within one year. Another type of liability is expenses payable. The firm may owe expenses to public power supply organisation or have rents to be paid.

### **Long Term Liabilities**

Long-term liabilities are the obligations which are payable in a period of time greater than a year.

One of the long term liabilities of a firm is term loan. The firm may borrow money from a bank that will be repayable over a period exceeding one year. Such a borrowing or loan is regarded as long-term liability.

Also, when a firm needs to raise a large sum of money, it issues debentures. A debenture is an obligation on the part of a firm to pay interest and principal under the terms of the debenture.

However one of the most stable types of long term liability is owners' equity. Owner's equity represents the owners' interest in the firm. In practical terms, the total assets of a firm less the liabilities are the owners' interest. The owners interest in the firm consist of

- Paid up share capital and
- Retained earnings (undistributed profits).

## SELF ASSESSMENT EXERCISE

Discuss the components of a balance sheet.

### 3.3 Construction of the Projected Balance Sheet

In the earlier sections of this unit, we have discussed the balance sheet generally. That was from a historical perspective. We shall now discuss the construction of a projected balance sheet.

The following steps are recommended:

- Start from the determination of sales revenue.
- Compute cost of goods sold (COGS)
- Compute admin expenses, general and selling expenses.
- Bring forward sundry income and expenses and generate the projected income statement.
- Determine taxation, dividends and retained earnings.
- Project for assets.
- Project for liabilities.

**Table 36: A Projected Balance Sheet**

#### Projected Balance Sheet (N)

As at	Year 1
<b>Assets Employed</b>	
Fixed assets	66,629,024
Preliminary expenses	33,140
<b>Total</b>	<b>66,662,164</b>
<b>Current Assets</b>	
Stock-in-trade	12,000,000
Raw materials	12,000,000
Debtors and prepayment	1,000,000
Cash and bank balance	2,623,497
<b>Total Current Assets</b>	<b>27,623,497</b>
<b>Current Liabilities</b>	
Creditors and accruals	2,000,000
Tax provisions	10,247,185
Total current liabilities	12,247,185
NET CURRENT ASSETS	15,376,312
<b>Total Assets</b>	<b>82,038,476</b>

<b>Financed by</b>	
Share capital	4,050

Loan	22,449
Profit and loss account	55,539
Directors current account	
<b>Total Liabilities</b>	<b>82,038</b>

**Table 37: Projecting for Assets in a Balance Sheet Checklist**

<b>Item</b>	<b>Have you covered this in your projection?</b>
<p>List existing plants and depreciation</p> <p>Determine additions to Plants and machinery.</p> <p>Determine new depreciation Determine capital allowances Determine changes in the Investment account</p> <p>Bring forward all sundry assets according to previous years data</p> <p>Estimate cash Estimate marketable securities</p> <p>Total the Asset side of The balance sheet.</p>	

**Table 38: Projecting for Known Liabilities in a Balance Sheet Checklist**

<b>Item</b>	<b>Have you covered this in your projection?</b>
<p>Record account payable and determine the trend.</p> <p>Record accruals and project for increases or decreases according to historical patterns</p> <p>Record long term debt and project for the future balances bearing in mind the repayments.</p> <p>Record leases if any and project for the future amortisations.</p>	

<p>Bring forward other sundry liabilities,</p> <p>Estimate taxation based on the projected income statement and forecast the future trend.</p> <p>From the net profit estimate amount going to dividends and retained earnings.</p> <p>Record retained earnings. Record paid up capital. Fine tune grey areas.</p> <p>Total the liabilities to agree with total assets.</p>	
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#### **4.0 CONCLUSION**

We have discussed the projected balance sheet. We first discussed assets generally and then went ahead to discuss liabilities. We discussed the construction of the projected balance sheet and provided a checklist for the projection for both assets and liabilities.

#### **5.0 SUMMARY**

We have treated the projected balance sheet. The projected balance sheet as we discussed is a forecast of a future balance sheet as at a future date. It will show what the assets will be and also what the liabilities will be. It is a very important document in project evaluation.

#### **6.0 TUTOR-MARKED ASSIGNMENT**

1. Who do you think are the users of the information in a projected balance sheet?
2. Why do they need the information contained in it?

#### **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

### **UNIT 4 PROJECT EVALUATION CRITERIA**

## CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Traditional Criteria of Project Evaluation
  - 3.2 The Discounted Cash Flow (DCF) Method
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Readings

### 1.0 INTRODUCTION

Let us recall that the focus of this course is project evaluation. From unit 1, we discussed the project cycle. From there we moved on to discuss factors affecting location of projects. We also discussed capacity and production planning, demand analysis, supply analysis, project cost analysis, projected income statements, cash flows and the balance sheet.

All these have set the stage for us to tie the discussions. We now want to discuss a very crucial aspect of this course, which is the project evaluation criterion. Project evaluation criteria seek to present the methods to be adopted to measure the value of an investment project. The evaluation enables us to choose between two or more projects once the values are known.

Any project evaluation criterion to be adopted should possess the following characteristics:

- It should provide a means to distinguish between acceptable and unacceptable projects.
- It should also be able to rank projects in order of their desirability.
- It should be a criterion that is applicable to any conceivable project.
- It should recognise that bigger cash flows are preferable to smaller ones.
- It should recognise that early cash flows or benefits are preferable to later cash flows or benefits.

Although there are a lot of project evaluation criteria in the literature, we shall discuss the most widely accepted criteria which are the traditional criteria and the discounted cash flow (DCF) criteria.

## 2.0 OBJECTIVES

At the end of this unit, you should be able to:

- discuss project evaluation criteria
- distinguish between the traditional criteria and the discounted cash flow relative to project evaluation.

## 3.0 MAIN CONTENT

### 3.1 Traditional Criteria of Project Evaluation

In the traditional criteria, we shall discuss two methods, namely: the payback period and the accounting rate of return method.

#### The Payback Period

The payback period is one of the most popular methods of project evaluation. The payback period is defined as the number of years required to recover the original cash outlay invested in a project. If the project yields constant annual cash inflows, the payback period can be computed by dividing cash outlay by the annual cash inflow.

So we say thus:

$$\text{Payback period} = \frac{\text{Cash outlay (investment)}}{\text{Annual Cash inflow}}$$

#### Example

A project requires a cash outlay of N200,000 and yields an annual cash inflow of N50,000 for a period of 10 years; calculate the payback period.

$$\text{The payback period is } \frac{\text{N200,000}}{\text{N50,000}} = 4 \text{ years.}$$

However, it is to be noted that in the case of unequal cash inflows, the payback period can be computed by adding up the cash inflows until the total is equal to the initial cash outlay.

The payback period is greatly admired by project evaluators because it is very simple to understand. Another good virtue of the payback period is that it costs less than most of the other sophisticated methods.

However, despite its simplicity, the payback period may not be a desirable investment criterion. In the first place, it fails to recognise the cash flows that come in after the payback period. Again it fails to consider the pattern of cash inflows and that early cash inflows are better than later cash inflows.

Despite its weakness, the payback period is very popular amongst analysts. It tries to emphasise early recovery of an investment. This means that it gives an insight into the cash inflows of the project.

### **The Accounting Rate of Return (ARR) Method**

The accounting rate of return (ARR) is a method that uses accounting information to measure the profitability of an investment.

The accounting rate of return (ARR) is computed by dividing the average income after taxes by the average investment.

$$\text{ARR} = \frac{\text{Average Income}}{\text{Average Investment}}$$

### **Example**

A project costs N100,000 and has a scrap value of N40,000. The stream of income before depreciation and taxes are N40,000, N50,000 and N60,000 for the first three years. The tax rate is 50% and depreciation is on straight line basis.

Calculate the accounting rate of return for the project.

### **Solution**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
	<b>N</b>	<b>N</b>	<b>N</b>
Earnings before depreciation and taxes	40,000	50,000	60,000
Depreciation	20,000	20,000	20,000
Net earnings before taxes	20,000	30,000	40,000
Taxes at 50%	10,000	15,000	20,000
Net earnings after taxes	10,000	15,000	20,000

### **Book value of investment**

Beginning	100,000	80,000	60,000
Ending	80,000	60,000	40,000

Average	90,000	70,000	50,000
---------	--------	--------	--------

$$\text{Average earnings} = \frac{10,000+15,000+20,000}{3}$$

$$= \mathbf{15000}$$

$$\text{Average investment} = \frac{90,000 + 70,000 + 50,000}{3}$$

$$= \mathbf{70000}$$

$$\begin{aligned} \text{Accounting rate of return} &= \frac{15000}{70000} \\ &= \mathbf{21.42\%} \end{aligned}$$

As an accept or reject criterion, the ARR method will accept all those projects whose ARR is greater than the minimum rate established by management. If the ARR is lower than the minimum rate established by management, then the project should be rejected.

The ARR method is very simple to understand and use. It can also be easily calculated using accounting information.

However, the ARR suffers from three main weaknesses. First it uses accounting profits not cash flows in appraising projects.

Secondly ARR ignores the time value of money. The profits occurring in different periods are valued equally.

Thirdly, it does not allow the fact that profit can be reinvested to earn more profits.

### **3.2 Discounted Cash Flow (DCF) Methods**

We have discussed two of the traditional methods used in the evaluation of projects. One is the payback period while the other is the accounting rate of return (**ARR**). Although two of them are simple to use and understand, they are not theoretically sound. Both of them fail to consider the timing of cash flows. Both fail to consider the time value of money.

Because of these limitations, we shall consider two superior investment criteria which fully recognise the timing of cash flows.

The two methods are the net present value (**NPV**) method and the internal rate of return (**IRR**) method. These two methods are referred to as discounted cash flow (**DCF**) methods or the time-adjusted methods.

### **The Net Present Value (NPV) Method**

This method correctly recognises the fact that cash flows arising at different time periods differ in value and are comparable only when their equivalent- present values are found out.

The following steps are followed when computing the net present value (NPV).

1. A discount rate is selected to discount the cash flows. The correct discount rate should be the firm's cost of capital which is the minimum rate of return expected by the investors to be earned by the firm.
2. The present value of cash inflows and outflows are computed using cost of capital as the discounting rate.
3. The net present value (NPV) is the present value of cash inflows less present value of cash outflows.

The acceptance rule using the NPV method is to accept a project if the NPV is positive, and to reject it if the NPV is negative.

If NPV is greater than zero, then the value of the firm is expected to increase. It is also important for us to understand the interpretation of NPV. The net present value may be interpreted to mean the immediate increase in the wealth of a firm if the investment proposal is accepted. It is equal to an unrealised capital gain. The net present value can also be interpreted to represent the amount the firm could raise at a required rate of return in addition to the initial cash outlay to distribute immediately to its shareholders and by the end of the project life to have paid off all the capital raised plus interest on it.

### **Example**

Calculate the net present value of a project which cost N500,000. but generates cash inflows of N150,000, N300,000 and N400,000 over a three year period. The required rate of return is 10%.

### **Solution**

Year	Cash inflows	Discount factor	Present Value
------	--------------	-----------------	---------------

		at 10%	of Cash Inflows
	N		N
1	150,000	.909	136,350
2	300,000	.826	247,800
3	400,000	.751	300,400
<b>Total</b>			<b>684,550</b>
<b>Less investment outlay</b>			<b>500,000</b>
<b>Net present value</b>			<b>184,550</b>

In terms of merit, the NPV method is very significant since it recognises the time value of money. It also is consistent with the objective of maximising the wealth of shareholders. However, the NPV suffers from the following limitations.

Firstly, it is fairly difficult to use.

Secondly, in computing the NPV, it is assumed that the discount rate which usually is a firm's cost of capital is known. But as we know, the cost of capital is a fairly difficult concept to measure in real life.

Thirdly, NPV may not yield a consistent answer when the projects being compared involve different amounts of investment.

### The Internal Rate of Return (IRR) Method

The internal rate of return (IRR) can be defined as that rate which equates the present value of cash inflows with the present value of cash outflows of an investment. Put in another way, the internal rate of return is the rate at which the NPV of an investment is zero. It is called the internal rate because it depends solely on the outlay and the resulting cash inflows of the project and not any rate determined outside the investment.

Let  $C$  = Cash outlays of an investment

$\frac{A_1}{(I+R)}$  = Cash in flows received in year I discounted at the cost of capital R.

$\frac{A_2}{(I+R)^2}$  = cash inflows received in year 2 discounted at the cost of Capital R.

$\frac{A_3}{(I+R)^3}$  = cash inflows received in year 3 discounted at the cost of Capital R.

Write the basic equation

$$C = \frac{A_1}{(1+R)} + \frac{A_2}{(1+R)^2} + \frac{A_3}{(1+R)^3}$$

$$O = C - \frac{A_1}{(1+R)} + \frac{A_2}{(1+R)^2} + \frac{A_3}{(1+R)^3}$$

The value of R in the equation at which total cash outlays equal total cash inflows is called the internal rate of return (IRR).

Usually the value of R can be found out by trial and error. Generally, if the calculated present value of the expected cash inflows is lower than the present value of cash outflows, a lower rate should be tried. On the other hand, if the calculated present value of the expected cash inflows is higher than the present value of cash outflows, a higher rate should be tried.

### Example

A barbers' shop costs N32,400 to establish and is expected to generate cash inflows of N16,000, N14,000 and N12,000 over its life of three years. Calculate the internal rate of return.

### Solution

Let us start by trying 16%

Year	Cash Inflow	Discount Factor at 16%	Present Value
	N		N
1	16,000	.862	13,792
2	14,000	.743	10,402
3	12,000	.641	7,692
<b>Total</b>			<b>31,886</b>
<b>Less cash outlay</b>		=	<b>32,400</b>
<b>Net present value (NPV)</b>		=	<b>-514</b>

The net present value is -N514 at 16% discount factor. Let us try a lower rate like 14%

Year	Cash Inflow	Discount	Present Value
------	-------------	----------	---------------

		<b>Factor at 14%</b>	
	<b>N</b>		<b>N</b>
1	16,000	.877	14,032
2	14,000	.769	10,766
3	12,000	.675	8,100
<b>Total</b>			<b>32,898</b>
<b>Less cash outlay</b>		=	<b>32,400</b>
<b>Net present value (NPV)</b>		=	<b>498</b>

You will observe from the above calculations that when we tried 16% discount rate, the NPV was negative at –N514, when we tried 14% discount rate, the NPV became positive at N498. Therefore, the internal rate of return we are looking for lies between 14% and 16%.

The basic accept-or-reject rule, using the IRR method, is to accept the project if its internal rate of return is higher than the firm's required rate of return. However, the project should be rejected if its internal rate of return is lower than the firm's cost of capital.

It is important that we understand the interpretation of the internal rate of return (IRR).

The internal rate of return (IRR) represents the highest rate of interest a firm would be ready to pay on funds borrowed to finance the project without being financially worse-off, by repaying the loan principal plus accrued interest out of the cash inflows generated by the project.

We should also see the internal rate of return method as a very sound method. As we said, it is a discounted cash flow method and also it considers the time value of money. It is also compatible with the firm's desire to maximise the owners' wealth. However the IRR method is fairly difficult to understand and it involves complex computations.

### **SELF ASSESSMENT EXERCISE**

Distinguish between the traditional project evaluation methods and the discounted cash. Show criteria.

## **4.0 CONCLUSION**

We have discussed project evaluation criteria which we said constitute a very crucial topic in this course. We discussed traditional criteria of

project evaluation. Here we mentioned the payback period and the accounting rate of return (ARR). We also discussed discounted cash flow criteria. Here we mentioned the net present value (NPV) method and the Internal Rate of Return (IRR).

## **5.0 SUMMARY**

Project evaluation criteria provide us with the tools with which we can choose from various investment proposals using acceptable techniques. The evaluation criteria guide the project initiator and assist him/her to choose among alternative projects. Also banks use project evaluation criteria to decide whether or not to lend money for a project.

## **6.0 TUTOR-MARKED ASSIGNMENT**

Why are the discounted cash flow (DCF) techniques better and more acceptable than the traditional methods of project evaluation?

## **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.

# **UNIT 5 INTRODUCTION TO ECONOMIC ANALYSIS**

## **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
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  - 3.2 The Nature of Economic Analysis
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  - 3.4 Linkage Effects of a Project
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- 5.0 Summary
- 6.0 Tutor-Marked Assignment
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## **1.0 INTRODUCTION**

Generally, in a project analysis situation, most analyses focus on the cash inflows and outflows of a project. Critical expenses and incomes are usually compared to determine whether a project should be undertaken or not. But expenses and revenues in most financial analyses are mainly the consideration of a private investor.

The implication of financial analysis is that it provides a micro view of a project and concentrates attention on things like accounting profits.

Economic analysis on the other hand considers projects from a macro point of view. The type of questions asked in an economic analysis are:

1. Will the project under consideration lead to the general well being of the community, the state and the nation?
2. Will the project generate employment at various levels in the macro environment?
3. Will the project lead to economic growth?
4. What are the linkages that the project has, i.e., forward or backward linkages?
5. Will the project generate more technical knowledge?

The questions that we have asked are not exhaustive but only go to demonstrate the type of questions that economic analyses seek to answer.

## **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the meaning of an economic analysis
- distinguish between an economic analysis and a financial analysis.

### **3.0 MAIN CONTENT**

#### **3.1 Financial Analysis and Economic Analysis – a Comparison**

In general theory, a financial analysis tries to solve resource allocation problems. It tries to use information from projects to determine whether projects should come on stream or not.

Economic analysis also tries to solve resource allocation problems in an economy. In economic theory, resources are very scarce and it is part of any good analysis to allocate resources between competing projects. For example, resource allocation problems can arise if a community is trying to decide whether to build a school or a hospital with limited scarce resources.

Financial analysis equally tries to allocate resources but from a micro view point. So, both financial and economic analyses solve resource allocation problems.

Financial analysis tries to concern itself with issues of both benefits and costs arising from a project. In the financial analysis, the concern of the analysis is to evaluate the stream of costs attached to a project and deduct same from the stream of benefits.

If the stream of benefits is greater than the stream of costs, then the project in question has a positive value and should be accepted, all things being equal. However, if the stream of costs is greater than the stream of benefits, then the project in question has a negative value and should not be accepted, all things being equal.

Economic analysis also concerns itself with costs and benefits arising from a project. If the stream of benefits is greater than the stream of costs, then the project in question has a positive value and should be accepted.

However, if the stream of costs is greater than the stream of benefits, then the project in question has a negative value and should not be accepted, all things being equal.

So we could say that financial analysis and economic analysis both concern themselves with costs and benefits arising from a project. In the end, they provide answers to the question of whether a project should be acceptable or not. In evaluating projects, both use discounting and compounding techniques to arrive at their answers.

However, there exist conceptual differences between financial analysis and economic analysis. While financial analysis has a primary objective of establishing the viability and acceptability of a project from a financial view point, paying no attention to society, economic analysis has the objective of establishing the fact that a project is acceptable or not to the society as a whole. So while financial analysis has a micro objective, economic analysis has a macro objective.

Finally, in reaching a decision as to whether or not to accept a project, financial analysis and economic analysis both try to establish a relationship between costs and benefits.

For example in financial analysis, costs and benefits arising from a project are usually defined in monetary variables such as profits. But economic analysis goes really beyond the vague definitions of profit. In Economic analysis, costs are defined in terms of opportunity costs or foregone costs to the society as a whole.

### **SELF ASSESSMENT EXERCISE 1**

Compare and contrast financial analysis and economic analysis.

### **3.2 The Nature of Economic Analysis**

In economic analysis, the costs and benefits attached to a project are usually compared before a decision can be reached on whether or not to accept a project.

In the literature, there exist three discounted measures of project worth which we will now discuss:

#### **The Net Present Worth**

The net present worth is the difference between the present worth of benefits and the present worth of costs. We can write thus:

$$\text{Net Present Worth} = \boxed{\text{Present Worth of benefits}} - \boxed{\text{Present Worth of costs}}$$

Generally, according to the net present worth theory, a project is acceptable if the net present worth is positive. If the net present worth is negative, the project will be rejected.

### **Benefit-Cost Ratio**

If you divide the present worth of benefits of a project by the present worth of its costs, then you have what is known as the benefit-cost ratio.

We can write thus:

$$\text{Benefit-Cost ratio} = \frac{\text{Present worth of benefits}}{\text{Present worth of costs}}$$

Generally, a project is acceptable if the benefit-cost ratio is greater than 1 (one).

If the benefit-cost ratio is exactly 1 (one), that project is a marginal project or break even project.

### **The Internal Rate of Return (IRR)**

The internal rate of return is a discount rate where the present worth of benefits is equal to the present worth of costs.

Under the internal rate of return evaluation method, a project will be acceptable if its internal rate of return is higher than the firm's required rate of return.

The starting point of economic analysis is the financial analysis of projects which should be properly concluded before embarking on an economic analysis. Some adjustments will be made to the financial calculations to arrive at economic data.

First, it may be necessary to include or exclude some costs and benefits which may have been included or excluded from the financial analysis. Secondly, some project inputs and outputs may have to be revalued if their shadow prices differ significantly from their market prices.

### **SELF ASSESSMENT EXERCISE 2**

Discuss the nature of economic analysis with emphasis on the methods of evaluating the worth of a project

### **3.3 Adjustments to Financial Analyses**

We have stated that the starting point of an economic analysis is a financial analysis, so if we have financial data on financial analysis, we need to make some adjustments to the financial analysis to arrive at economic analysis data. We shall now consider some of the adjustments:

#### **Transfer Payments**

Transfer payments represent transfer of resources from one section of society to another. They do not make any claim on the country's resources and as such, their impact should be clearly distinguished and analysed in the economic analysis.

One of the first transfer payments we shall consider is interest. Interest is a reward for capital. For example, if a project is funded through a bank loan, the interest component is included in the profit and loss statement.

The interest charges in the profit and loss statement represent transfer payments from a project to the provider of funds. What the project lost (interest) has become a gain to the provider of funds.

In effect, both figures are equal and cancel out without any net increase to society of funds. Therefore in economic analysis, interest charges are excluded since they only represent transfer payments.

The second transfer payment we shall consider is tax. When a project is profitable it is expected to pay taxes to the government at the ruling rate. In computing the profit of a project taxes are deducted to arrive at net profit. Taxes therefore appear as outgoing cash flows. Taxes represent transfer payments from a project to government.

In the economic analysis of a project, taxes are excluded because from the point of view of the society, they are only a transfer of resources from one section of the economy to another.

The third transfer payment is subsidies. In a traditional private sector setting, it would be unheard of to talk of subsidies. But in economic analysis, subsidies appear as important data. Most public sector projects enjoy government subsidies to enable the poor gain access to certain services which ordinarily they cannot afford without government assistance. Subsidies represent opportunity costs to a nation as a whole. Therefore in estimating the true cost of a project in an economic analysis, subsidies should be included.

### **3.4 Linkage Effects of a Project**

Consider a simple case where a university is newly located in an environment. Many investments will begin to spring up. New housing developments will begin to spring up; canteens will begin to spring up; hair dressing salons, etc. will begin to spring up to cater for the needs of the new university community. Such constitute the linkage effects of a project.

Generally, there are two types of linkage effects which we shall briefly discuss:

### **Forward Linkage Effects**

Forward linkage is the stimulus given to industries that use the products of a project. A case in point is a flour manufacturing project. Flour has so many uses. If a flour mill is located in an environment, it will lead to the establishment of such projects as bakeries which will use the flour.

### **Backward Linkage Effects**

Backward linkage demonstrates the stimulus to industries that supply the inputs to a project. For example, the establishment of a flour mill in an environment will lead to demand for wheat which is a major input for flour mill. The flour mill will lead to investment in wheat cultivation.

Also, the establishment of a car assembly plant will lead to the establishment of tyre manufacturing plants that need to supply tyres to the car assembly plant.

### **Example of an Economic Analysis**

In the year 2006, the World Bank was considering the desirability or otherwise of assisting Nigeria set up an ethanol plant covering thousands of hectares in the Niger Delta area.

Under the scheme, young farmers will be allocated hectares of land for subsidised cassava cultivation. Such inputs like fertilisers will be heavily subsidized while technical advice will be provided by the World Bank/ Nigerian agricultural experts.

## **4.0 CONCLUSION**

In this unit, we discussed the nature of economic analysis and compared it with the financial analysis of a project. We discussed net present worth, benefit cost ratio and the internal rate of return (IRR).

## **5.0 SUMMARY**

Introduction to economic analysis has provided us with the tools to conduct economic analyses, with financial analyses as a starting point. Financial analysis is the private sector's view of a project without considering a project's impact on the society. Economic analysis is a macro view of a project, taking into consideration the project's impact on society.

## **6.0 TUTOR-MARKED ASSIGNMENT**

What do you see as the basic differences between the financial analysis of a project and the economic analysis of a project?

## **7.0 REFERENCES/FURTHER READINGS**

Leon Ikpe (1999). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.