



**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**COURSE CODE : ENT 216**

**COURSE TITLE:  
PROJECT APPRAISAL AND EVALUATION**

**COURSE  
GUIDE**

**ENT 216  
PROJECT APPRAISAL AND EVALUATION**

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## **Introduction**

**ENT 216:** Project Appraisal and Evaluation is a semester theoretical course consisting of 15 units covering the entire basic facets of Project Appraisal and Evaluation. The course is available for students offering Entrepreneurial Development and Small Business Management in the School of Business and Human Resources Management.

The course guide tells you what the course ENT 216 is all about and the materials that you will need to make your reading successful. Other information contained in this course guide includes information on the Tutor-Marked Assignments.

## **Course Contents**

The course contents consist of topics on Project Appraisal and Evaluation. The topics range from the basic ideas of project idea to project selection.

## **Course Aims**

The aims of this course are to expose you to the knowledge of how to appraise and evaluate projects either as a project initiator or evaluator. It aims to sharpen your skills in the evaluation of start-ups (new or virgin projects) or existing projects and with the view of attaching values to the projects under consideration.

## **Course Objectives**

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

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

## **Course Materials**

- Course Guide
- Study Units
- Text books and References
- Assignment Guide

## Study Units

There are 15 units in this course which should be carefully studied and understood.

### Module 1

Unit 1	The Project Cycle
Unit 2	Project Definition
Unit 3	Project Evaluations – An Introductory Format
Unit 4	Introduction to Technical Analysis of Projects
Unit 5	Evaluating Capacity and Production Plans

### Module 2

Unit 1	Manpower Planning and Evaluation
Unit 2	Demand and Market Analysis
Unit 3	Evaluating Market Supply
Unit 4	Evaluating Competition and Marketing plans
Unit 5	Financial Analysis of project – Part One

### Module 3

Unit 1	Financial Analysis of Projects – Part Two
Unit 2	Cash Flow Analysis
Unit 3	Traditional Investment Appraisal Methods
Unit 4	Discounted Cash Flow Methods of Appraisal
Unit 5	Economic Appraisal & Evaluation of Projects

Units 1 to 3 provide you with the necessary background knowledge you require for your study. Units 4 to 15 deal with the real subject matter of Project Appraisal and Evaluation.

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

You are required to study the materials, reflect on them and do the exercises. You should also read the text books and other recommended materials.

## Assignments File

In each unit, you will find exercises which you are required to do. The exercises will enable you to understand better 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 40% of the total score.

## **Final Examination**

At the end of the course, you will write the final examination. It will attract the remaining 60%.

This makes the final score to be 100%.

## **Summary**

The course ENT-216 Project Appraisal and Evaluation exposes you to the knowledge and understanding of the Project Appraisal and Evaluation Process. When you complete this course, you would have been armed with the knowledge needed to conduct project appraisal.

**MAIN  
COURSE**

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Course Title

ENT 216  
Project Appraisal and Evaluation

Course Team

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## MODULE 1

Unit 1	The Project Cycle
Unit 2	Project Definition
Unit 3	Project Evaluations – An Introductory Format
Unit 4	Introduction to Technical Analysis of Projects
Unit 5	Evaluating Capacity and Production Plans

## UNIT 1 THE PROJECT CYCLE

### CONTENTS

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

### 1.0 INTRODUCTION

In this course (ENT 216), we will devote our attention to the Appraisal and Evaluation of projects. But we need to understand what a project is. Let us begin our discussion by trying to define what a project is so that we can understand one when we see same.

Let us define a project as an undertaking however named or described that requires a concentrated effort. What it means is that every project will require commitment and critical deployment of scarce resources. It is important to stress that resources are not unlimited in the real sense of it. They are scarce.

In a real life setting, we are likely to be confronted with various projects in both the public and private sectors of the economy. We may be confronted with manufacturing projects that churn out goods. On the other hand, the projects could be public sector civil engineering projects. Your key task as a Project Analyst or Evaluator is to be able to carefully analyse projects brought to you and attach values to the projects

especially in a situation of capital rationing i.e. limited funds availability.

Our first important task in this unit is to examine the concept of a project cycle. The concept is very crucial as its understanding will go a long way to ensure that we are carried along in our study. A good understanding of a project cycle will guide us throughout the duration of this course.

## 2.0 OBJECTIVES

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

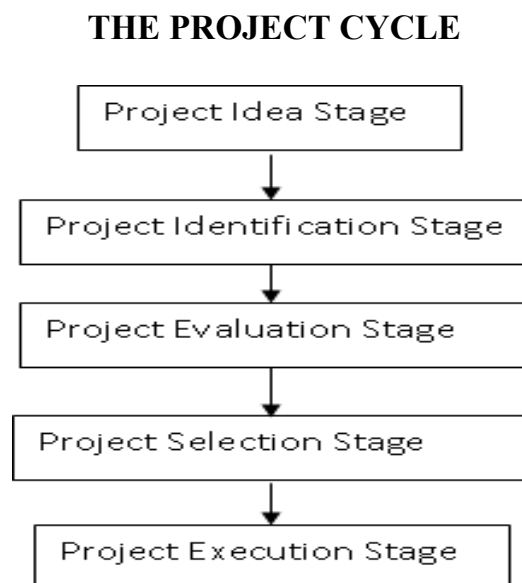
- define a project cycle
- discuss the various stages of a project cycle.

## 3.0 MAIN CONTENT

### 3.1 The Project Cycle

In the literature, a project cycle tries to describe the various stages that are involved from the primary conception of a project idea to when the project is executed or actually takes off. The project cycle is a very important aspect of our study as the understanding is very crucial to our study. The project cycle is a step by step examination of the various stages of a project when the idea is conceived.

Let us now go ahead to examine the various stages of a real life project cycle.



*Figure 1.1: The Project Cycle.*

### 3.1.1 The Project Idea Stage

We have tried to describe what a project cycle is. Our next primary task is to examine the various stages of a project cycle. The first stage of a project cycle is the project idea stage.

Generally, the idea about a project can arise from many sources. It could arise from within an organisation or from outside an organisation.

In arising from within an organisation, it could arise from the sales force as they interact with customers in the field. After discussions, the sales persons carry their observations back to the company. For example, customers using a radio set can ask for an audio-cassette. This request to a sales man, could lead a company producing radio sets to go ahead and produce audio-cassettes in response to customer's demands.

Generally, ideas about a new project may fall into any of the following categories:

- a company manufacturing radio sets may decide to add audio cassettes to its existing product line in response to customer demands.
- a company may decide to expand capacity in an existing product in response to market demand.

It is important to stress that new project ideas may arise from any level in an organisation. A factory cleaner in an organisation may come up with a new project idea. So also, an executive director in an organisation can also come up with a new project idea. No one has the monopoly of coming up with a new project idea.

### 3.1.2 Project Identification Stage

We have seen that the first stage of a project cycle is the project idea stage. The second stage of a project is the project identification stage. Project ideas are not usually very useful except they are clearly identified and put down in a manner that will make them amenable for further processing. When a project idea is introduced into a company, the board will be expected to clearly identify the project and present it for further discussions and analysis.

### 3.1.3 Project Evaluation Stage

After a project has been identified, the next stage is the project evaluation stage. The project evaluation stage is a very important stage of a project cycle. This stage is a very crucial aspect of this course. Project Evaluation in the real sense involves the examination of the benefits and costs attached to a project.

Generally, the benefits and costs of a project are measured in terms of what is known as cash flows.

In a standard project evaluation situation, the evaluation of cash flows is not an easy task. This is so because cash flows are very difficult to estimate because they are generally uncertain. It is this uncertainty about cash flows that makes its evaluation difficult. The future is very uncertain and unpredictable.

### 3.1.4 Project Selection Stage

We have briefly discussed the concept of the project evaluation stage in a project cycle. After the project evaluation stage, the next stage to be discussed is the project selection stage.

Generally, an organisation will be faced with so many projects that need to be executed. A university for example may be faced with the following projects:

- (1) construction of a Senate building
- (2) construction of a law faculty building
- (3) construction of a teaching hospital complex.

For the university authorities, there must be a way to select which of the projects to execute considering the fact that funds are more or less limited.

In a private sector setting like a firm, the project selection function is a top management function. For example, a firm that manufactures cars may decide whether to buy or manufacture the car engine. This is a top management function.

In selecting projects, every management must consider the financial outlays involved, their availability and also costs.

We shall return to how firms select their investment projects.

## **SELF ASSESSMENT EXERCISE**

List three sources of a new project idea.

### **3.1.5 Project Execution Stage**

The final stage in the project cycle is the project execution stage. After a project has been selected, the next stage is to execute the project. In an ideal situation, project execution is usually the responsibility of top management. Top management may appoint a project team to execute a project. The function of a project team is to execute a project and report periodically to management.

## **4.0 CONCLUSION**

In this unit, we have introduced the concept of a project cycle. We have described the project cycle as running from the project idea stage to the project execution stage.

## **5.0 SUMMARY**

This unit treats the concept of a project cycle. The project cycle is basically a stepping-stone into our study of Project Appraisal and Evaluation. It provides a solid background for us. Now that we have discussed the project cycle, we shall be discussing “Project Definition” in the next unit.

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. What do you understand by the term “Project Cycle”?
2. List the various stages of a project cycle.

## **7.0 REFERENCES/FURTHER READING**

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

## **UNIT 2 PROJECT DEFINITION**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Project Definition
    - 3.1.1 Tangible Projects
    - 3.1.2 Intangible Projects
    - 3.1.3 Characteristics of Projects
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In the last Unit (Unit 1), we spent some time discussing the concept of the project cycle. We discussed the various stages of a project cycle. We did that so that we could lay the background for further study of the subject matter— Project Appraisal and Evaluation.

In this unit, we shall discuss Project Definition. Project definition will help to further strengthen our understanding of the nature of projects. It amplifies the meaning of the project cycle.

### **2.0 OBJECTIVES**

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

- discuss project definition
- apply project definition to the project cycle.

### **3.0 MAIN CONTENT**

#### **3.1 Project Definition**

In Unit 1, we discussed the project cycle. In a way, it was a much generalised discussion.

Project definition is a sharper process which seeks to amplify the project from the idea stage to the time a project is completed. In the discussion of the project cycle, we did not go into greater depth into the nature of projects. This time around, we shall go a step further to bring more details about a project. The project definition brings out all the features



of a project so that all the parties involved in a project can understand their roles.

Theoretically, we consider it very sound to go ahead to divide projects into two groups namely:

- public sector projects
- private sector projects.

Let us start by taking a look at a standard public sector project. A standard public sector project that we may consider is the rehabilitation of the Onitsha—Owerri Road. We shall now use it as a discussion case.

### **Discussion Case**

#### **Rehabilitation of Onitsha—Owerri Road**

We want to use the rehabilitation of Onitsha—Owerri Road as a discussion case to bring out clearly the concept of project definition.

In the year 2004, following complaints from the South-Eastern states about the terribly bad state of the Onitsha—Owerri Road, the Federal Government then decided to rehabilitate the Onitsha—Owerri Road at a cost of two billion naira.

The engineering firm of C.C.C. Limited was chosen as the firm to carry out the rehabilitation work.

We can define the road project by a consideration of the various processes involved before the project is commissioned.

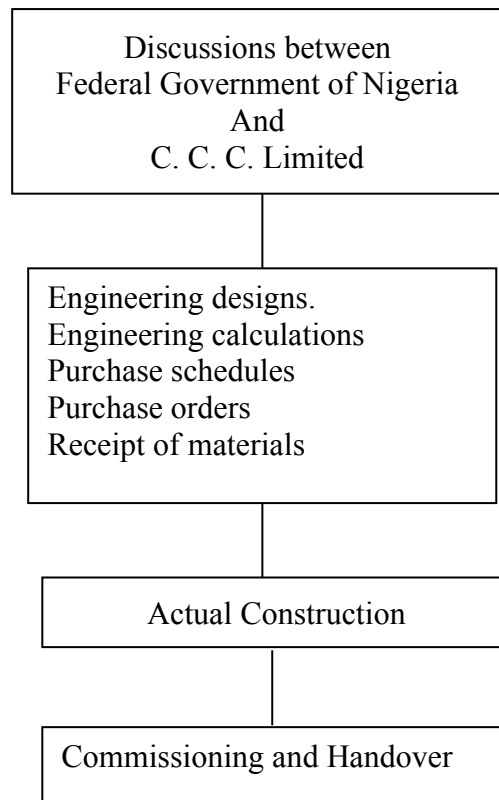


Figure 2.1: Project Definition for the rehabilitation of the Onitsha – Owerri Road by the Federal Government of Nigeria

### 3.1.1 Tangible Projects

In the example that we have just used, our project is defined in terms of Onitsha–Owerri Road rehabilitation project. In this situation, the project is something that can be seen with the naked eyes. In this case, we shall go further to describe the project as a tangible project. It is something you can see.

There are other examples that we can use to define a project. For example, a proposal to build a mega railway line that will link the western part of Nigeria with the Eastern part will be seen also as a tangible project.

Also the proposal to construct a primary health care centre in a remote part of Bauchi state will be seen as a tangible project in the real sense of it.

### SELF ASSESSMENT EXERCISE

List four public sector projects in your environment.

### 3.1.2 Intangible Projects

We have just discussed the concept of tangible projects. A key feature of tangible projects is the fact that they can be seen with the naked eyes. In most cases, the projects and their benefits last over a long period of time.

There are however projects which we may not be able to see with our naked eyes. They cannot be perceived by touch. Such projects are known or described as intangible projects.

An example of an intangible project is a population census.

When a country conducts a population census, the primary objective is to count the number of people existing in the country. Apart from knowing the number of people, the sex distribution of the population will be revealed during a census.

Also, the occupational structure of the population will be revealed during a census.

### 3.1.3 Characteristics of Projects

We have so far defined what a project is. We also went ahead to group projects into tangible and intangible projects. No matter their nature, projects have their unique characteristics and we need to understand these characteristics before we can be able to evaluate them. It is these characteristics that we shall now discuss:

- **Objectives**

Projects are not undertaken for the fun of it. They are undertaken to achieve certain key objectives. The objectives of a project are usually well stated so that they can be easily verified. For example, the objective of a road construction project is to construct a road or to rehabilitate it. In either case, at the end of the day, it will be very easy to determine whether the project's objectives have been met or not.

For a tangible project, it is usually easy to measure the achievement of the set objectives. Even at that, objectives may be set in quantitative terms.

It will also be important for us to note that even intangible projects have objectives which also can be verified.

For example, the success of a public government hospital can be measured through the examination of certain parameters as:

- (1) number of patients treated successfully.
- (2) number of successful surgical operations.
- (3) reduction in infant mortality rates.
- (4) reduction in maternal mortality rates.

In a nutshell, what we are saying is that every conceivable project must have an objective and the objective should be one that is measurable and verifiable.

- **Use of Financial Resources**

A major and important characteristic of a project is that every project uses up financial resources. Every project, whether undertaken by the public sector or the private sector, will involve :

1. expenditures on land and land acquisition.
2. expenditures on construction of buildings.
3. expenditures on purchase of machinery/equipment
4. expenditures on salary and wages.
5. manufacturing expenses.
6. taxes paid to the central authorities.

- **Receipt of Financial Resources/Benefits**

We have discussed the fact that projects use financial resources. The next discussion focuses on the fact that projects also receive financial resources/benefits.

A private sector project will receive revenues following the sale of goods to third parties or the provision of services to various clients. In an ideal project appraisal setting, the estimation of revenues forms a very important part of the task for the project analyst. Apart from estimation of the revenues of a project, there will be the need to estimate the revenue risks facing a project. We shall discuss the risks at a later part of our study.

We have discussed the fact that every project uses up resources. But at the same time, every project receives financial resources/benefits. In a private sector setting, the difference between revenues and expenditures is known as profit. In the basic theory of the firm, economists are of the opinion that all firms will act rationally and devote all their time to profit maximisation.

Profit maximisation therefore is a basic objective of the firm.

In a public sector setting, we may not be entirely discussing revenues, costs and profits. In the analysis of public sector projects, revenues are better described as benefits. Most costs are defined in terms of true costs, social costs and also opportunity costs. At a later part of our study, we will discuss these concepts.

- **Time Frame**

One of the most important characteristics of projects is the concept of time frame. Every project must have a time frame attached to it. A project cannot go on indefinitely. Even a project analyst, when appraising a project, will appraise it over a period e.g. over a period of five years.

Even when we are comparing two projects, we must attach a time frame. Without a time frame, our analysis will be misleading and likely to lead us to take wrong decisions. When we attach a time frame to a project, we shall be able to properly measure the costs and benefits that accrue to the project within the chosen time frame.

#### **4.0 CONCLUSION**

In this unit, we discussed the concept of project definition. We tried to discuss ways of defining a project whether public or private sector driven.

#### **5.0 SUMMARY**

This unit treats the discussion of project definition. Project definition, as we discussed is a process which amplifies a project and brings out the key features of a project.

With the discussion of the project definition, in the next unit, we shall discuss project evaluation – an introductory format.

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

What are the key characteristics of projects?

#### **7.0 REFERENCES/FURTHER READING**

Morris, P.W.G. (1997). *The Management of Projects*. London: Thomas Telford (New Paperback Edition).

## **UNIT 3 PROJECT EVALUATION – AN INTRODUCTORY FORMAT**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Project Evaluation – An Introductory Format
    - 3.1.1 The Technical Segment
      - 3.1.1.1 Management Segment
      - 3.1.1.2 Demand and Market Segment
      - 3.1.1.3 The Financial Segment
      - 3.1.1.4 Economic Segment
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In the last unit (Unit 2), we discussed project definition. We discussed tangible and intangible projects. We also discussed the characteristics of projects. This consolidated our primary understanding of projects.

In this unit, we shall discuss Project Evaluation – An Introductory Format.

### **2.0 OBJECTIVE**

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

- explain the format of project evaluation.

### **3.0 MAIN CONTENT**

#### **3.1 Project Evaluation – An Introductory Format**

We started our study by discussing the project cycle. We then went ahead to discuss the concept of project definition. These two topics have provided us with a good foundation with which to start our real study which is Project Appraisal and Evaluation.

Our primary focus now is to introduce a format for carrying out our work. Ordinarily, the project evaluation format describes the way and manner in which our work will be arranged. To streamline our study,

we need to arrange our work in carefully defined segments. We shall now discuss the various segments.

In the literature, there are five angles from which a standard project can be viewed and also appraised thus:

- technical point of view.
- management point of view.
- marketing point of view.
- financial point of view.
- economic point of view.

In a nutshell, our work in Project Appraisal and Evaluation is to examine a project from the points of view of these five points and come up with a valuation. If two projects are being compared, the project analyst should be able to choose one, based on acceptable criteria.

At the back of your mind, you should note that you are being trained to:

- (1) prepare an appraisal of a project – business plan.
- (2) appraise a business plan prepared by another person.

### **3.1.1 The Technical Segment**

The technical segment of project appraisal tries to evaluate the total technical and engineering soundness of a project. It tries to see whether the project is achievable in technical terms.

For example, in all projects, there should be a location. In the location, there will be buildings. In the buildings, there could be plant and machinery used for various purposes.

Ideally, when analysing the technical segment of a project, it will be very necessary to list out all the items that the project ought to have. This type of list is called a checklist. For a start, let us draw up a simple checklist for technical analysis.

**Simple Checklist for Technical Segment of a Project**

ITEM	Have you covered this in your evaluation?
Land for the project Land clearing and stumping Civil works and foundations. Drainage Steel structures Factory building Offices Wind force and direction Availability of public electricity supply Availability of generator Potable water Sewerage Existing roads Access difficulties List of machinery/equipment Capacities of machinery/equipment Availability of raw materials Availability of skilled labour Availability of unskilled labour	

***Table 3.1: Checklist for Technical segment of a project.***

Your attention is drawn to the checklist as contained in table 3.1. The checklist, as simple as it seems is a short but not exhaustive list of items that should occupy the analyst’s attention. It means that any write-up on technical analysis should address issues and the items in the checklist.

**3.1.2 Management Segment**

We have briefly discussed the technical segment of project appraisal. The next segment we will discuss briefly is the management segment. The management segment focuses attention on the management aspects of a project. Our interest in the management segment lies in the fact that projects generally can only be successful if they are well managed.

Another important aspect of the management segment is the description of the legal form of an organisation. There are many forms of business organisations like the sole proprietor, the partnership and the limited liability company. Understanding of the legal form of an organisation helps us to determine the type of organisation that can manage a project. For example, a sole proprietor cannot be expected to manage the construction of a petroleum refinery.



To further guide us, we will again draw up a checklist which will be called the management checklist.

Item	Have you covered this in your evaluation?
The legal form of the business The operating structure The number of divisions The number of departments The number of units Who are the key officers? Qualifications of key staff Total number of employees Total staff salaries Conditions of employment	

*Table 3.2: Checklist for management segment*

### 3.1.3 Demand and Market Segment

The next segment that we shall discuss is the demand and market segment of a project appraisal. It is a very important aspect of our study. Understanding of demand for goods and services of a project is very critical because demand translates to revenues. The success of every project depends on its ability to earn income. A project will only earn income if there is a demand for its goods or services. Apart from demand situations in the market, we need to understand the supply situation equally. This is so because in the market, prices are determined by interplay of market forces. In the market, the key forces are demand and supply.

Although we shall treat demand in more details later, we will provide a checklist for the demand and market segment.

#### SELF ASSESSMENT EXERCISE

List two factors that affect price in the market.

Checklist for Demand and Market segment.

ITEM	Have you covered this in your evaluation?
What is the location of the project? What is the population of the project location? What is the nature of demand for the product? What is the size of the market? What is the supply situation? What is the price of the product? Market share of the project. Marketing strategy.	

*Table 3.3: Checklist for Demand and Market Segment.*

### 3.1.4 The Financial Segment

Let us now look at the financial segment. In this segment, we will focus attention on the key financial aspects of a project. We will be thinking of things like start-up costs. Start-up costs will include cost of land acquisition and development. It will include cost of erecting buildings and offices. Financing plans will also be thought of. What of revenues and costs? What of the income statement and the cash flows?

ITEM	Have you covered this in your evaluation?
Cost of land acquisition Cost of land clearing. Cost of stumping Cost of factory buildings Cost of administrative buildings. Cost of plumbing works Revenues Expenditures Projected income statement Projected cash flow statement Projected balance sheet.	

*Table 3.4: Checklist for the Financial Segment.*

### 3.1.5 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 values to the society at large.

Checklist for Economic segment

ITEM	Have you covered this in your evaluation?
Employment generating capacity No. of new jobs created Contribution to government revenues Forward linkages of the project Backward linkages of the project Externalities.	

**Table 3.5: Checklist for Economic Segment.**

## 4.0 CONCLUSION

In this unit, we have discussed the format for project evaluation. In our chosen format, the following segments have been identified as useful:

- Technical segment
- Management segment
- Demand and Market segment
- Financial segment
- Economic segment

## 5.0 SUMMARY

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

## 6.0 TUTOR-MARKED ASSIGNMENT

Discuss the key segments of project evaluation.

## 7.0 REFERENCES/FURTHER READING

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

## **UNIT 4 INTRODUCTION TO TECHNICAL ANALYSIS OF PROJECTS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Introduction to Technical Analysis of Projects
    - 3.1.1 Land and Buildings
    - 3.1.2 Machinery and Equipment
    - 3.1.3 Raw Materials and their Sourcing
    - 3.1.4 Utilities
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In the last unit (Unit 3), we discussed Project Evaluation – An Introductory Format. We saw that a project can be viewed from five angles – the technical angle, the management angle, the market angle, the financial angle and the economic angle.

In this unit, we shall discuss an Introduction to Technical Analysis of Projects.

### **2.0 OBJECTIVES**

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

- explain what technical analysis means
- discuss its application in real life.

### **3.0 MAIN CONTENT**

#### **3.1 Introduction to Technical Analysis of Projects**

Technical analysis of a project involves the exhaustive consideration of the technical soundness and practicability of a project.

It tries to relate the engineering aspects to the project environment. Technical analysis will involve exhaustive considerations of:

- (1) Land and buildings
- (2) Machinery and equipment

- (3) Plant capacity and production plans
- (4) Plant layout
- (5) Raw materials and their sourcing
- (6) Utilities

The critical components of technical analysis are displayed in Figure 4.1

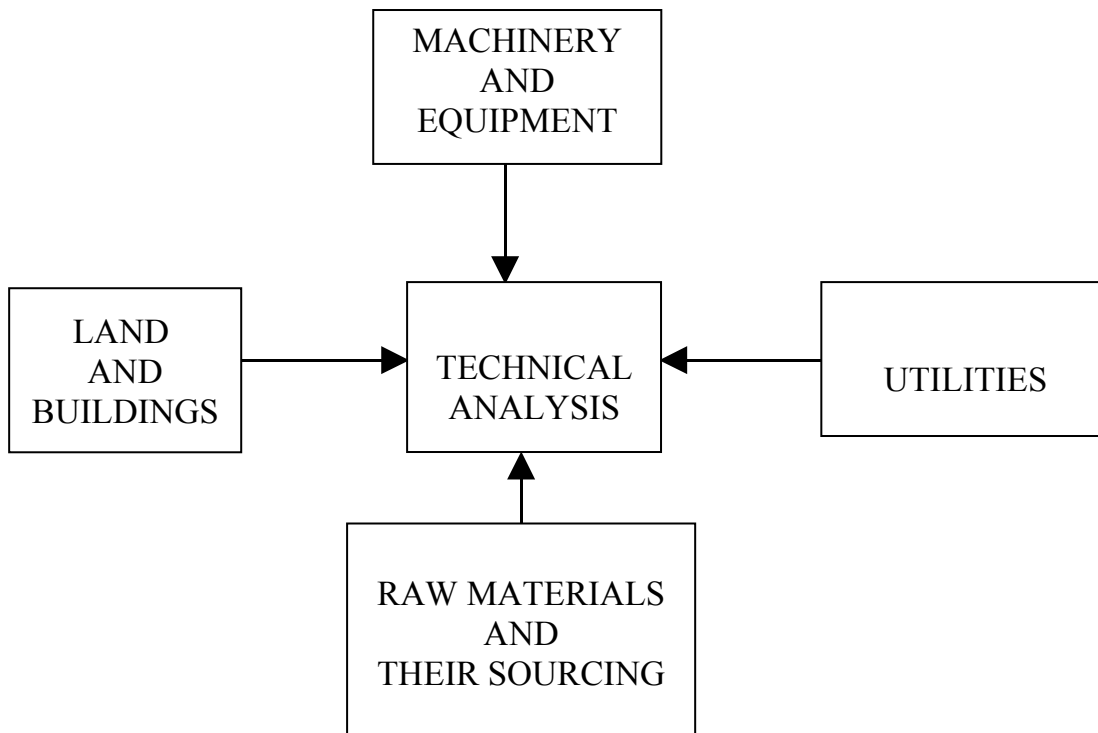


Figure 4.1: Key components of a technical plan.

### 3.1.1 Land and Buildings

In figure 4.1, we saw the key components of a technical plan. We start by discussing land and buildings. As project analysts, when we come to the issue of land, we shall ask critical questions and some of them will be:

Checklist for land and buildings

ITEM	Have you covered this in your appraisal?
Is land available for the project? What is the cost of the land? Perimeter fence? Construction of factory buildings Construction of offices Parking space for customers.	

Table 4.1: Check list for land and buildings

In the appraisal of a project, the availability of land is very crucial. Even if the project sponsor cannot afford to buy land at the inception of the project, enough attention should be paid to the renting of a suitable site for the project.

### 3.1.2 Machinery and Equipment

We have just briefly discussed land and its availability in connection with project appraisal. The next item that we shall consider is machinery and equipment. Most projects, especially those that are technical in nature, will involve the deployment of machinery and equipment. The person appraising the project must know that the machinery and equipment should be properly itemized and identified.

Machinery and equipment are usually supplied by the manufacturers.

Practically, when a manufacturer (vendor) is supplying a machine, the vendor should give sufficient details of the machine/equipment.

ITEM	Have you covered this in your appraisal?
Functions of the machinery/ equipment Components of the machinery/ equipment Electricity consumption Heating power Structure of the machinery Screw speed Compressed air requirement Quality of water required Quantity of water required Water temperature Clamping method Production process Service interval	

*Table 4.2: Machinery and Equipment check list.*

## A PRACTICAL BUSINESS IDEA FOR CLASS DISCUSSION

### 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/sterilizer, rotary stripper; digester and clarifier.

### **Production Process of Palm Oil**

Quartered fruit bunches are introduced into the boiler/sterilizer and left for about 30 minutes under hot steam for boiling and sterilization 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>0</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.

#### **3.1.3 Raw Materials and Their Sourcing**

We have discussed machinery and equipment as part of project appraisal. We will now discuss raw materials and their sourcing.

In a manufacturing concern, this is very important and cannot be overlooked. Every manufacturing activity involves the use of raw materials. For example, a garri processing project will require cassava tubers as raw materials.

The person appraising the project should address his/her attention to this issue of raw material and their sourcing.

A project which raw materials are sourced locally will have chances of survival as against a project which raw materials are imported.

In terms of risk, projects which raw materials are imported are considered high risk. We shall properly address the issue of project risk at a later section of our study.

In a standard setting, the raw material requirements of a project must be properly identified and the sources properly identified.

### **3.1.4 Utilities**

Utilities that concern us in project appraisal are:

- (1) Water
- (2) Electricity.

Water is very important in most manufacturing concerns. For example, in garri processing, a lot of water is required for the washing of the cassava tubers. In cosmetics manufacturing – especially shampoos, a lot of water is required.

Electricity is also important for every project. There are two sources of electricity – the public power source and the private power source usually obtained through the deployment of generators.

### **SELF ASSESSMENT EXERCISE**

List four items that can be found in technical analysis.

## **4.0 CONCLUSION**

In this unit, we discussed the introduction to technical analysis of projects. We discussed the critical components of technical analysis.

## **5.0 SUMMARY**

Technical analysis tries to consider the technical soundness of a project. It tries to isolate and itemize those things critical to the technical success of a project. The person appraising the project, must ensure that important questions concerning technical analysis are asked and answered.

## **6.0 TUTOR-MARKED ASSIGNMENT**

Discuss the four key items in technical analysis of projects.

## **7.0 REFERENCES/FURTHER READING**

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



## **UNIT 5     EVALUATING CAPACITY AND PRODUCTION PLANS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Evaluating Capacity and Production Plans
    - 3.1.1 Meaning of Capacity
    - 3.1.2 The Nature of a Production Plan
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In the last Unit (Unit 4), we discussed introduction to technical analysis of projects. We discussed the key components of a technical plan. We discussed land and buildings. We discussed machinery and equipment. We discussed raw materials and their sourcing. We discussed utilities.

In this unit, we will discuss evaluating capacity and production plans.

### **2.0 OBJECTIVES**

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

- explain the meaning of capacity and production plans
- describe their practical applications in industry.

### **3.0 MAIN CONTENT**

#### **3.1 Evaluating Capacity and Production Plans**

Most projects will involve the production of goods or services. But in all cases they must have capacity. We are interested in capacity for two main reasons. Firstly, as project initiators or entrepreneurs, an entrepreneur wishing to set up a plant for the production of goods must know well in advance the capacity of his plant and machinery. Knowledge of the capacity will assist the entrepreneur to project for the revenues and associated costs.

Alternatively, the person appraising the project could be an analyst who is appraising a project. In this situation, a business plan may have been presented to the person appraising the project, for evaluation. So,

whether you are an entrepreneur or an analyst, you should understand capacity and production plans.

No firm worth its salt can ignore the importance of capacity and production plans.

### 3.1.1 Meaning of Capacity

Our key task in this unit is to discuss evaluating capacity and production plans. So we have to first discuss the meaning of capacity. Ordinarily, capacity means **“ability to do something”**. At least that is the understanding in the simplest form.

From a project point of view, we shall define capacity as the output of a plant or machine. Service based organisations like general hospitals also have capacities. In this case, capacity is a reference to the ability of the hospital to provide service to patients. For example, if a hospital is able to treat 300 patients per day, that becomes the capacity of the hospital. Again you will realize that a hospital may have only 30 beds for the patients. The beds available in a hospital also constitute the capacity of the hospital. In the literature and in practical terms, there exist three types of capacity namely: installed capacity, attainable capacity and actual capacity.

- **Installed Capacity**

The installed capacity of a plant or machine is the maximum output achievable in terms of tangible goods which the plant or machine is capable of producing over a given time.

In most cases, the capacity of a plant is always disclosed by the plant or machine manufacturers.

We can define installed capacity in terms of the following:

- (1) number of goods produced per second.
- (2) number of goods produced per minute
- (3) number of goods produced per hour
- (4) number of goods produced per day
- (5) number of goods produced per year.

The best way to conceptualise capacity is to consider a Peugeot 504 car that has a speedometer limit of 200 kilometres per hour. Technically, 200 kilometres per hour is the maximum speed that the car can attain. And so, we can safely say that 200 km/hour is the installed capacity of the car.

## SELF ASSESSMENT EXERCISE

An exercise book plant can produce 5,000 exercise books per hour, all things being equal. What is the installed capacity of the plant per annum?

- **Attainable Capacity**

We have just discussed installed capacity of a plant or machine and described same as the maximum output that the plant or machine can achieve, all things being equal. However, in real life, no machine can work for 60 minutes in the hour, 24 hours in the day and 365 days in the year without breaking down. There must be production loss arising from the servicing of machines, repairs and changes in shift.

Because of these reasons, we have a more realistic capacity which in the literature, is known as attainable capacity of a plant or machine. Attainable capacity is a safe capacity. Attainable capacity captures the effects of plant servicing or repairs on the production output.

Now, let us go back to the Peugeot 504 car which we said has an installed capacity or maximum speed limit of 200 kilometers per hour.

Practically and of course in real life, no sane person will like to drive a car at a speed of 200 kilometres per hour, especially in an urban area. Anyone who drives a car at a speed of 200 kilometres per hour in a town will definitely have an accident and also cause harm to other road users.

Because of the need to ensure safety in driving, it will be more realistic to impose a safe limit to driving. And so for some people, 120 kilometres per hour is the maximum speed they can attain because of safety considerations. So in this case, 120 kilometres per hour constitutes attainable capacity. In production, attainable capacity is usually described as a percentage of installed capacity.

- **Actual Capacity**

We have discussed installed capacity and attainable capacity. We also said that attainable capacity is a percentage of installed capacity. The next capacity we shall discuss is actual capacity.

Actual capacity is the real output that a plant can achieve given the market situation and other situations.

Goods are not usually produced for the sake of production alone. Production is undertaken for the market. Ideally, a producer will manufacture the quality of goods that he/she will be able to sell in the market at a given point in time.

Another important aspect of actual capacity is that it is usually limited by the availability of financial resources.

The firm or entrepreneur may have the market for goods but does not have the financial resources to purchase raw materials. So in this case, you will see that actual output will be dictated by the availability of financial resources.

### **3.1.2 The Nature of a Production Plan**

So far, so good. We have discussed capacity. The next item for discussion is the production plan. The production plan of a project shows us exactly the proposed output of a plant or project. This output is usually described in units.

A production plan shows the output of goods achievable following the input of raw materials. The production plan will be based on the following:

- (1) input – output arrangements.
- (2) the number of work shifts.

It is important to note that a work shift is usually 8 hours. And so, there are 3 shifts of 8 hours each in a day.

Therefore, based on availability of raw materials and the dictates of the market, a plant can be run on the following:

- (1) a single shift of 8 hours in a day.
- (2) 2 shifts of 8 hours each a day.
- (3) 3 shifts of 8 hours each in a day.

**NOTE:** Ideally in a year, it is safe to assume that there are 300 working days. This seeks to accommodate production losses arising from weekends, public holidays, plant breakdown and routine maintenance of machinery and equipment.

Below is a production plan of a sachet water and bottled water production plant. You are requested to study the plan and make sure you understand it. You are expected to be able to write a similar production plan.

### **EXAMPLE OF A PRODUCTION PLAN**

#### **The Project**

The project is a comprehensive project that will produce the following:

- (1) Sachet water

- (2) Bottled water
- (3) Plastic bottles and caps for packing bottled water
- (4) Nylon for packing the sachet water.

### **Sachet Water Plant**

The plant under consideration is a sachet water production line capable of producing 4000 sachets per hour. Working on a single shift of 8 hours, the plant can produce 32,000 sachets of water. Working on 2 shifts of 8 hours each, an output of 64,000 sachets is possible while 3 shifts of 8 hours each will produce 96,000 sachets per day.

### **Annual Capacity/Production Plan (Units of Sachet Water)**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4-5</b>
Installed capacity	35,040,000	35,040,000	35,040,000	35,040,000
Attainable capacity	31,536,000	31,536,000	31,536,000	31,536,000
Actual capacity	19,200,000	28,800,000	28,800,000	28,800,000

Proposed actual capacity is based on the following:

Year 1: 2 shifts of 8 hours each per day and 300 working days/year.

Year 2-5: 3 shifts of 8 hours each per day and 300 working days/year.

Attainable capacity is 90% of installed capacity.

### **Summary of Proposed Production Plan (Units of Sachet Water)**

Year 1	-	19,200,000
Year 2	-	28,800,000
Year 3	-	28,800,000
Year 4	-	28,800,000
Year 5	-	28,800,000

### **BOTTLED WATER PLANT**

The plant under consideration is a bottled water production line capable of producing 2,000 bottles of water per hour. Working on a single shift of 8 hours, the plant can produce 16,000 bottles. 2 shifts of 8 hours each

per day will produce 32,000 bottles while working on 3 shifts of 8 hours each per day, a total output of 48,000 bottles is possible.

**Annual Capacity/Production Plan (Units of Bottled Water)**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4-5</b>
Installed capacity	17,520,000	17,520,000	17,520,000	17,520,000
Attainable capacity	15,768,000	15,768,000	15,768,000	15,768,000
Actual capacity	4,800,000	9,600,000	9,600,000	9,600,000

Proposed actual capacity is based on the following:

Year 1: 1 shift of 8 hours each per day and 300 working days/year.

Year 2-5: 2 shifts of 8 hours each per day and 300 working days/year.

Attainable capacity is 90% of installed capacity.

**Summary of Proposed Production Plan (Units of Sachet Water)**

Year 1	-	4,800,000
Year 2	-	9,600,000
Year 3	-	9,600,000
Year 4	-	9,600,000
Year 5	-	9,600,000

**BLOW MOULDING AND INJECTION MOULDING UNIT**

The plant under consideration is a pet blow moulding line capable of producing 2,000 bottles per hour. Working on a single shift of 8 hours, the plant can produce 16,000 bottles. Working on 2 shifts of 8 hours each, an output of 32,000 bottles is possible while 3 shifts of 8 hours each day will yield 48,000 bottles.

**Annual Capacity/Production Plan (Units of Bottles)**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4-5</b>
Installed capacity	17,520,000	17,520,000	17,520,000	17,520,000
Attainable capacity	15,768,000	15,768,000	15,768,000	15,768,000
Actual capacity	9,600,000	14,400,000	14,400,000	14,400,000

Proposed actual capacity is based on the following:

Year 1: 2 shifts of 8 hours each per day and 300 working days/year.

Year 2-5: 3 shifts of 8 hours each per day and 300 working days/year.

Attainable capacity is 90% of installed capacity.

#### **Summary of Proposed Production Plan (Units of Sachet Water)**

Year 1	-	9,600,000
Year 2	-	14,400,000
Year 3	-	14,400,000
Year 4	-	14,400,000
Year 5	-	14,400,000

#### **NYLON EXTRUSION AND PRINTING UNIT**

The plant under consideration is capable of extruding 70kg of nylon per hour. Working on a single shift of 8 hours, the plant can extrude 560 kg of nylon. Working on 2 shifts of 8 hours each, an output of 1120 kg of nylon is possible. 3 shifts of 8 hours each per day yields an output of 1680kg of nylon.

#### **Annual Capacity/Production Plan (Kg of extruded nylon)**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4-5</b>
Installed capacity	613,200	613,200	613,200	613,200
Attainable capacity	551,880	551,880	551,880	551,880
Actual capacity	336,000	504,000	504,000	504,000

Proposed actual capacity is based on the following:

Year 1: 2 shifts of 8 hours each per day and 300 working days/year.

Year 2-5: 3 shifts of 8 hours each per day and 300 working days/year.

Attainable capacity is 90% of installed capacity.

### Summary of Proposed Actual Production Plan

	Year 1	Year 2	Year 3	Year 4	Year 5
Sachet water (units)	19,200,000	28,800,000	28,800,000	28,800,000	28,800,000
Bottled water (Units)	4,800,000	9,600,000	9,600,000	9,600,000	9,600,000
Pet Bottles (Units)	9,600,000	14,400,000	14,400,000	14,400,000	14,400,000
Extruded nylon (kg)	336,000	504,000	504,000	504,000	504,000

### Machinery and Equipment Required

The following machinery and equipment are required for the project:

1. 1 Unit comprehensive water treatment plant consisting of sand filters, activated carbon filter, iron filter, micro filters, UV sterilizers with lamps and electric control panels.

The function of the treatment plant is to treat the water and make it safe for drinking.

2. 2 units automatic sachet water packaging machine with full coding system built to NAFDAC specification.

Each packaging machine shall have a packaging capacity of about 2,000 sachets of water per hour (total say 4,000 sachets per hour).

3. 1 unit automatic water bottling line with in feed and out feed table. The installed capacity is between 2,000 to 3,000 bottles per hour (rinse, fill and cap) depending on bottle size to be filled. The type of caps will be pilfer proof screw cap with tear-off ring.
4. 1 unit semi-automatic shrink sleeve label applicator with a capacity of about 3000 bottles per hour. The function of the shrink sleeve label applicator is to insert the shrink labels on the bottles.



5. 1 unit semi-automatic shrink wrapping machine. The function of the shrink wrapping machine is shrink wrapping of the pet bottled water with cardboard trays in their various combinations:

0.5 x 0.75 litre x 24 bottles

1.5 litre x 12 bottles

the acceptable film is polythene of good quality and strength.

6. 1 unit ink jet coding machine for insertion of packing information on the bottle.
7. Semi automatic pet stretch blow moulding machines with capacity of blowing different sizes of pet bottles. The moulding machine has pre-heaters, compressors and moulds for the various bottles.
8. Comprehensive injection moulding machine comprising:
  - Pet preform injection moulders,
  - Auto loaders;
  - Dry loader;
  - Chiller;
  - Injection moulds for pet preform;
  - Injection moulds for caps.

The function of the injection moulding machine is to produce the preform and also the bottle caps.

9. 1 unit nylon extruder with installed capacity of 60kg – 70kg output per hour. The extruder shall be suitable to extrude both low density and high-density polyethylene. The function of the extruder is to extrude and blow the nylon into films.
10. 1 unit flexographic printing machine. The printing machine is used for printing on nylon on a roll conveyor format.
11. In-house laboratory complete with furniture, laboratory equipment, water test kits and re-agents.

#### **4.0 CONCLUSION**

In this unit, we discussed evaluating capacity and production plans. We discussed the concept of capacity as well as production plans. We then went ahead to provide an example of a sachet water and bottled water plant.

## **5.0 SUMMARY**

In this unit, evaluating capacity and production plans were discussed. The person appraising the project should understand how to conceptualize and prepare proper production plans. In the next unit, we will discuss Manpower Planning and Evaluation.

## **6.0 TUTOR-MARKED ASSIGNMENT**

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

## **7.0 REFERENCES/FURTHER READING**

Association of Cost Engineers (1991). *Estimating Checklist for Capital Projects*.

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

## MODULE 2

Unit 1	Manpower Planning and Evaluation
Unit 2	Demand and Market Analysis
Unit 3	Evaluating Market Supply
Unit 4	Evaluating Competition and Marketing plans
Unit 5	Financial Analysis of Project – Part One

### UNIT 1 MANPOWER PLANNING AND EVALUATION

#### CONTENTS

1.0	Introduction
2.0	Objectives
3.0	Main Content
3.1	Manpower Planning and Evaluation
3.1.1	Importance of a Manpower Plan
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

#### 1.0 INTRODUCTION

In the last unit, (Unit 5 of Module 1), we discussed evaluating capacity and production plans. We discussed the meaning of capacity. We discussed installed capacity, attainable capacity and actual capacity. Then we went ahead to use the example of a production plan to drive home our discussion.

In this unit, we will discuss Manpower Planning and Evaluation.

#### 2.0 OBJECTIVES

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

- explain what manpower planning and evaluation is all about
- prepare a simple manpower plan.

### **3.0 MAIN CONTENT**

#### **3.1 Manpower Planning and Evaluation**

In elementary economic theory, we are told that there are four factors of production namely: land, labour, capital and the entrepreneur. Labour and the entrepreneur are the human components of production factors. Every business requires labour. It is labour that has life among other factors of production like land and capital. So, for the purpose of our study, we want to examine the human resources aspects of a project. Again, it is important in two ways. Firstly, it could be that you are preparing a business plan for a project and you need to know and document information on the human resources aspect of a project under consideration. You need to ask the following questions:

- (1) What is the organogram for the enterprise?
- (2) What are the key functional units?
- (3) Who will be the key employees?
- (4) What are their qualifications?
- (5) What will be their remuneration?

Generally, organizing enterprise manpower in an organization is the process of assigning duties amongst personnel and coordinating efforts towards the achievement of the objectives of the organization. But the organization should be based on a plan. It is the plan that of course leads to the shaping of an organization structure. The ideal thing in structuring an organization is to lay emphasis on two main areas, namely:

- (1) job definitions in the project.
- (2) the creation of departments following job definitions.

For example, when looking at a manufacturing facility, it is most appropriate to divide same into functional areas like:

- production
- marketing
- finance

#### **SELF ASSESSMENT EXERCISE**

List four departments that could be found in a big manufacturing enterprise.

### 3.1.1 Importance of a Manpower Plan

There are two main uses of a manpower plan. The first use is by the project initiator. When a project initiator is structuring a project, the manpower plan definitely constitutes a very critical component. The project initiator must know in advance the type of employees that the project requires. For example, a soap manufacturing facility should have industrial chemists as core staff. A civil engineering firm must as a matter of necessity have civil engineers as core staff.

A hospital also must have doctors and nurses as core staff.

The second use of the manpower plan is that financial institutions, like the banks, before granting loans and advances for a project, usually insist on being convinced of the management skills that a borrowing company has.

The manpower of a project can be divided into two groups namely:

- direct labour
- indirect labour

When we are talking of direct labour in a manufacturing project e.g. cosmetics plant, we are talking about staff directly involved in the actual production of the cosmetics.

The factory manager, production supervisor, factory attendants are all direct labour.

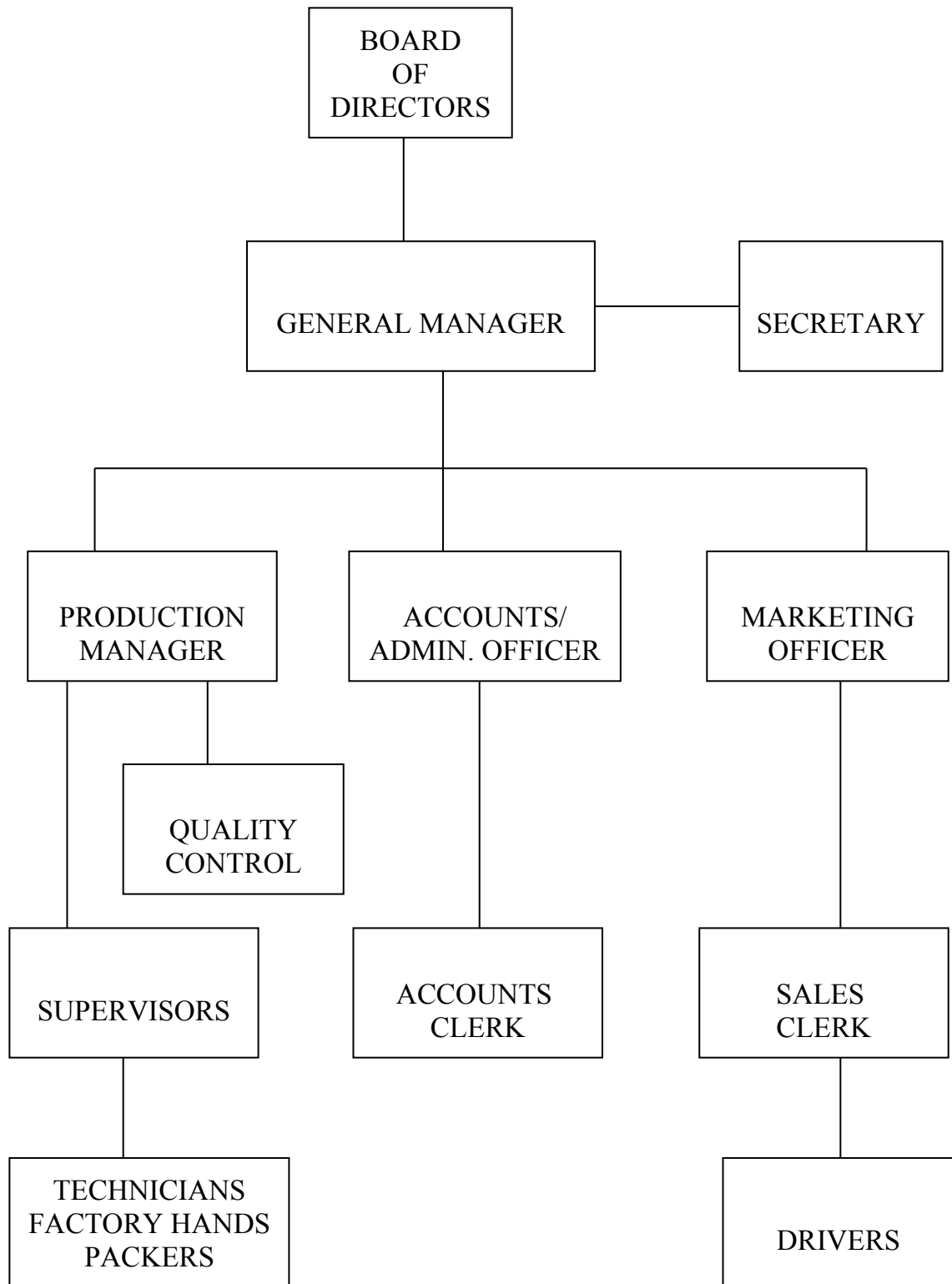
On the other hand, indirect labor are those workers who do not work directly on the manufactured goods but rather indirectly.

They include accounting and administrative staff, marketing staff etc.

#### **Example of a Manpower Plan**

Figure 6.1 is the organogram of a sachet water plant.

**ABC Properties and Investment Company Limited Organogram**



*Figure 6.1: Organogram of a sachet water plant*

## Manpower Requirements of the Project

**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 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 the 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.

Direct Labour

Post	Specifications	Job Functions
Production Manager	HND water technology with at least 4 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 & Guilds/Trade test	Maintenance of the mechanical and electrical components.
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.

**Summary of Manpower Requirements Including Outlays**

	Number Required	Annual Outlays (N)
<b>Indirect Labour</b>		
General Manager	1	420,000.00
Accounts/Admin. Officer	1	240,000.00
Marketing Officer	1	240,000.00
Sales Clerk	3	360,000.00
Accounts Clerk	2	240,000.00
Secretary	1	180,000.00
Driver	3	288,000.00
Security Staff	4	336,000.00
Sub-total	16	2,304,000.00
<b>Direct Labour</b>		
Production Manager	1	360,000.00
Technicians	2	288,000.00
Shift Supervisors	4	720,000.00
Laboratory Technician	1	180,000.00
Factory attendants/machine operators	12	1,296,000.00
<b>Sub-total</b>	<b>20</b>	<b>2,844,000.00</b>
<b>Grand total</b>	<b>36</b>	<b>5,148,000.00</b>
<b>Staff welfare</b>		<b>514,800.00</b>
<b>Total salary, wages/welfare</b>		<b>5,662,800.00</b>



## **4.0 CONCLUSION**

In this unit, we discussed manpower planning and evaluation. We saw that manpower plans are important to both the project initiator and the banks.

## **5.0 SUMMARY**

The success of any project depends upon the management. That is why the project evaluator should try to evaluate an enterprise's management so see whether such management can manage a project.

In the next unit, we will discuss Demand and Market Analysis.

## **6.0 TUTOR-MARKED ASSIGNMENT**

Why is a manpower plan important?

## **7.0 REFERENCES/FURTHER READING**

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

Morris, P.W.G. (1997). *The Management of Projects*. London: Thomas Telford (New Paper Back Edition).

## **UNIT 2 DEMAND AND MARKET ANALYSIS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Demand and Market Analysis
    - 3.1.1 Demand Analysis – Analytical Framework
    - 3.1.2 Analysis of Population Data
    - 3.1.3 Definition of Demand
    - 3.1.4 Building Market Demand
    - 3.1.5 Forecasting Future Demand
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In the last unit (Unit 1), we discussed manpower planning and evaluation which helped to provide a good framework for manpower planning and of course evaluation. We then went ahead to provide an example of a manpower plan, which we said must be properly studied and understood, by all of us.

In this unit, we will discuss demand and market analysis. Demand and market analysis is the first step in taking a critical look at the market. As a project analyst, you should know the demand for the product or service that you are analyzing. Or, on the other hand, you may be appraising a business plan presented to you for analysis.

### **2.0 OBJECTIVES**

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

- explain the nature of demand analysis
- relate it to the market.

### **3.0 MAIN CONTENT**

#### **3.1 Demand and Market Analysis**

In the previous units, we laid a foundation for our study of project appraisal. We will now proceed to relate the project to the external environment which is the market. A project survives through sale of

goods and services to the market. Therefore, it is very clear that the study of demand and the market is a very vital aspect of our study as project appraisers and evaluators.

Demand analysis is the measurement and forecasting of demand for various goods and services. It is a tool used by analysts to measure and forecast demand and also get a total picture of the market.

Providers of funds like the banks also conduct demand analysis to ensure that the projects they wish to finance will find a market for their goods and services.

### **3.1.1 Demand Analysis – Analytical Framework**

To arrange our discussion in an orderly manner, we will present a framework to guide us in our analysis of demand. The framework to be adopted will follow the sequence below:

- (1) Get total population data for Nigeria and make projections for the growth in population. A growth rate of between 3% and 3.2% is considered acceptable.
- (2) Study the details of the population for example the demographic characteristics.
- (3) Define the good or service for which demand analysis is being conducted.
- (4) Look at factors affecting demand for the good or services.
- (5) Using both qualitative and quantitative techniques, generate conditional demand.
- (6) Generate projections for the future using both qualitative and quantitative methods.

Let us start by taking a look at population data.

NIGERIAN POPULATION DATA

<b>State</b>	<b>Total</b>	<b>Males</b>	<b>Females</b>
Abia	2,833,999	1,434,193	1,399,806
Adamawa	3,168,101	1,608,123	1,561,987
Akwa Ibom	3,920,208	2,044,510	1,875,698
Anambra	4,182,032	2,174,641	2,007,391
Bauchi	4,676,465	2,426,215	2,250,250
Bayelsa	1,703,358	902,648	800,710
Benue	4,219,244	2,164,058	2,055,186
Borno	4,151,193	2,161,157	1,990,036
Cross River	2,888,966	1,492,465	1,396,501
Delta	4,098,391	2,074,306	2,024,085
Ebonyi	2,173,501	1,040,984	1,132,517
Edo	3,218,332	1,640,461	1,577,871
Ekiti	2,384,212	1,212,609	1,171,603
Enugu	3,257,298	1,624,202	1,633,096
FCT	1,405,201	740,489	664,712
Gombe	2,353,879	1,230,722	1,123,157
Imo	3,934,899	2,032,286	1,902,613
Jigawa	4,348,649	2,215,907	2,132,742
Kaduna	6,066,562	3,112,028	2,954,534
Kano	9,383,682	4,844,128	4,539,554
Katsina	5,792,578	2,978,682	2,813,896
Kebbi	3,238,628	1,617,498	1,621,130
Kogi	3,278,487	1,691,737	1,586,750
Kwara	2,371,089	1,220,581	1,150,508
Lagos	9,013,534	4,678,020	4,335,514
Nasarawa	1,863,275	945,566	917,719
Niger	3,950,249	2,032,725	1,917,524
Ogun	3,728,098	1,847,243	1,880,855
Ondo	3,441,024	1,761,263	1,679,761
Osun	3,423,535	1,740,619	1,682,916
Oyo	5,591,589	2,809,840	2,781,749
Plateau	3,178,712	1,593,033	1,585,679
Rivers	5,185,400	2,710,665	2,474,735
Sokoto	3,696,999	1,872,069	1,824,930
Taraba	2,300,736,	1,199,849	1,824,930
Yobe	2,321,591	1,206,003	1,115,588
Zamfara	3,259,846	1,630,344	1,629,502
<b>Total</b>	<b>140,003,542</b>	<b>71,709,859</b>	<b>68,293,683</b>

*Table 7.1: Nigerian population based on Census 2006.*

### 3.1.2 Analysis of Population Data

Table 7.1 is the population data for Nigeria based on the year 2006 census count. According to the census, in year 2006, total population stood at 140,003,542. In our analysis, it is not only total population that is important. The structure and characteristics of the population is also important.

The age distribution of population is also very important. For example, a manufacturer of children's toys will want to know the number of children in a population.

We now go further to provide a checklist to guide us when we are analyzing population data.

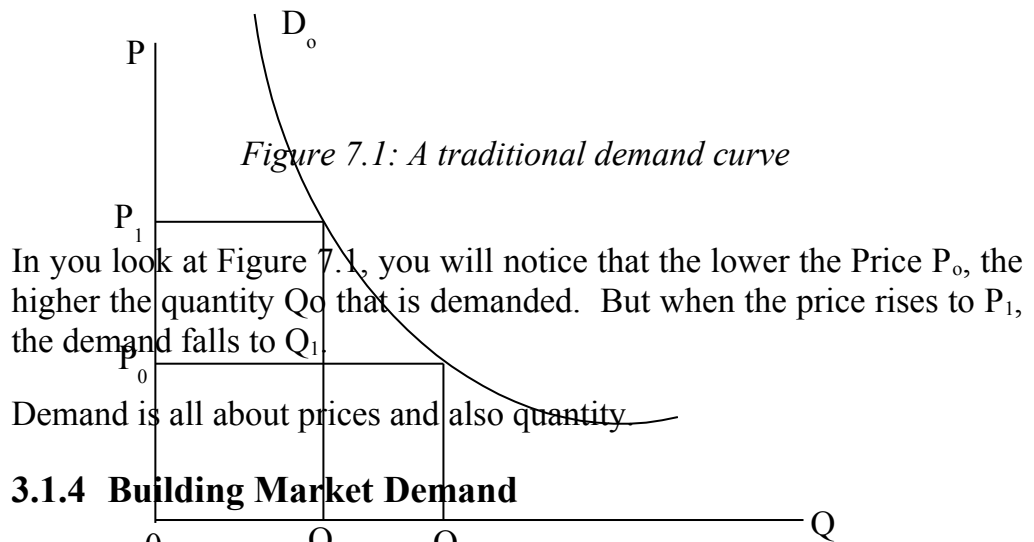
Item	Have you built this into your demand analysis?
Population of Nigeria by states. Population of states by local government areas. Population of Nigeria by sex Population by age Population distribution by income Population distribution by marital status Population distribution by type of disability Persons arriving Nigeria by nationality Persons arriving Nigeria by age group Persons departing Nigeria by nationality Persons departing Nigeria by age group.	

*Table 7.2: Analysis of Population data – A checklist.*

### 3.1.3 Definition of Demand

So far, so good. We have already discussed the importance of demand analysis. We took a look at population data. We will now discuss the definition of demand.

The demand for a product or service is the total quantity of goods or services that able customers in a defined area, are willing to buy at set prices. In effect, demand refers to a set of quantities of goods that customers are willing to buy at different prices. In the traditional setting in economics, the demand curve is downward sloping from the left to the right (with a price and quantity axis).



In you look at Figure 7.1, you will notice that the lower the Price P<sub>0</sub>, the higher the quantity Q<sub>0</sub> that is demanded. But when the price rises to P<sub>1</sub>, the demand falls to Q<sub>1</sub>.

Demand is all about prices and also quantity

### 3.1.4 Building Market Demand

We have already defined demand for a product or service. We have also taken a look at the population of Nigeria. We will now go ahead and build market demand.

Let X = Number 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 for the product in question.

### SELF ASSESSMENT EXERCISE

There are 6,000,000 persons in Lagos. Each person in Lagos drinks a sachet of water daily. What is the annual demand for sachet water in Lagos?

### 3.1.5 Forecasting Future Demand

We have discussed demand. But we have not finished our work. We need to be able to forecast what future demand will be. The analyst should be able to forecast future demand. Future demand will reveal future cash flows. But forecasting future demand is not an easy task

because future demand may be stable, erratic or unpredictable. Social change, change of taste and fashion and technology all add up to make forecasting difficult.

When forecasting demand, there are two basic approaches:

- (1) qualitative techniques
- (2) quantitative techniques

### • **Qualitative Techniques**

Qualitative techniques are mainly desk methods which are mainly based on reports obtained from various sources namely:

- experts in industry.
- sales force composite method.

Under this method, salesmen in a particular industry can provide expert data on demand. The belief is that salesmen operate at the grassroots.

### • **Quantitative Techniques**

Many of the data generated by the qualitative method are unreliable and biased. Quantitative techniques in forecasting are less subjective and usually based on past data.

## **A Practical Example of Demand Analysis**

Below is an example of demand analysis. The project in question is a tyre retreading plant. You should study the example properly and make sure you understand same.

### **Demand Analysis for a Tyre Retreading Plant**

#### **Demand and Market Analysis**

##### **Introduction**

When Nigeria gained independence in 1960, it had a viable railway system which catered for nearly 70% of long distance haulage of goods and human passengers. Internal air transport, though existing then, was exclusively for the rich elites. Road transportation accounted for about 20% - 26% of the haulage of goods and movements of human passengers.

The Nigerian civil war in the late 1960's grounded the use and development of the Nigerian Railway Corporation which to date has been unable to attain its pre-war capacity. With water transport limited

to the riverine areas, the generality of Nigerians now depend on road transportation for their movement of both human beings and haulage of goods. This situation has led to an increasing trend of more vehicles on Nigerian roads.

The availability of relatively cheap “Tokunbo” vehicles has led to flooding of Nigerian roads by cars, buses and lorries.

### **Demand for Tyres**

Tyres as commodity only exist in association with vehicles. Most vehicles at least are generally four wheeled. This means that for every vehicle, there are at least four tyres required.

To estimate the demand of tyres, the following information is required.

1. Information on the number of vehicles in Nigeria
2. Information on newly registered motor vehicles.
3. Vehicles usage structure.

### **Types of Vehicles in Nigeria**

1. Salon/station wagons
2. Vans, pick-up and kit car
3. Lorries, trucks and tippers
4. Buses
5. Tankers
6. Trailers
7. Tractors
8. Special purpose vehicles.

### **Why Demand for Retreaded Tyres Exist**

All over the world, retreaded tyres are being used. As far back as 1999, 27.7 million retreaded tyres were sold in North America with sales of more than \$2 billion. Retreaded tyres are safe if properly done and also retreading of tyres is a good way of saving money.

Given the Nigerian situation where the economy is biting hard on the population, purchase of new tyres is not an easy task. The average passenger car tyre (175 x 14). Costs about N7,000 to N8,000 depending on the brand.

The cost of new tyres for buses, lorries and haulage trucks is very prohibitive and so most corporate bodies are looking inwards towards ways of savings their costs of tyres. Resort to retreaded tyres is the solution.



According to reliable engineering information, retreaded tyres are safer than second-hand tyres. And that is why large multinational companies in Nigeria like Nigerian Bottling Co. Ltd are now using retreaded tyres. The bottom line is to control costs.

### **Motor Vehicle Population in Nigeria**

<b><u>Year</u></b>	<b><u>Vehicle Population</u></b>
2002	1,734,000
2003	2,074,000
2004	2,176,000
2005	2,284,000 +
2006	2,399,040 +
2007	2,518,992 +
2008	2,644,941 +
2009	2,777,188 +

**Source:** National Bureau of Statistics (The Nigerian Statistical fact sheets on economic and social development 2005).

+ = Projections.

### **Newly Registered Motor Vehicles in Nigeria**

<b><u>Year</u></b>	<b><u>Newly Registered Vehicles</u></b>
2002	290,000
2003	340,000
2004	402,000
2005	480,000 +
2006	500,000 +
2007	600,000 +
2008	660,000 +
2009	700,000 +

**Source:** National Bureau of Statistics (The Nigerian Statistical fact sheets on economic and social development 2005).

+ = (Projections)

### **Projected Motor Tyre Requirement in Nigeria**

Based on the projected motor vehicle population in Nigeria and the fact that every moving vehicle requires 5 tyres (including spare tyre), we can generate a conditional tyre requirement for vehicles in Nigeria.

<b>Year</b>	<b>Vehicle Population</b>	<b>Tyres Required</b>
2007	2,518,992	12,594,960
2008	2,644,941	13,224,705
2009	2,777,188	13,885,940

Note: This projection excludes tyres for caterpillars, earth moving equipment, tractors and special utility vehicles.

### **Supply of Tyres in Nigeria**

Time it was that rubber was a major export of Nigeria. Rubber was produced in abundance in Nigeria and that attracted Michelin and Dunlop to establish tyre-manufacturing plants in Nigeria. But with the discovery of oil in Nigeria, economic focus changed to the oil sector leaving the agricultural sector grossly unmanned in terms of labour and productivity.

Gradually, the rubber plantations have been abandoned. Attempts by Dunlop and Michelin to set up rubber plantations in the South South have not been very successful.

Consequently, Dunlop and Michelin started to import motor tyres from their sister subsidiaries abroad. Industrial experts estimate that Michelin and Dunlop are only able to meet 40% of Nigeria's motor tyre requirements. The situation has been worsened with Michelin closing its manufacturing operations in Nigeria due to raw material problems and also the activities of militants in the Niger Delta.

### **Projected Domestic Supply of Motor Vehicles Tyres**

<b>Year</b>	<b>Projected Domestic Supply (Tyres)</b>
2007	5,037,984
2008	5,289,882
2009	5,554,374

### **Projected Demand/Supply Gap for Motor Tyres**

<b>Year</b>	<b>Projected Demand</b>	<b>Projected Supply</b>	<b>Supply/Demand Gap</b>
2007	12,594,960	5,037,984	7,556,976
2008	13,224,705	5,289,882	7,934,823
2009	13,885,940	5,554,376	8,331,564

### **Market Equilibrium**

Local domestic supply from both Michelin and Dunlop cannot meet the domestic demand for motor tyres. The shortfall is met through importation of motor tyres from overseas.

**Imported Motor Tyres Brands Include:**

1. Hancock
2. Pirelli
3. Klebber
4. Sanyung
5. Michelin
6. Dunlop
7. Good year.

**4.0 CONCLUSION**

In this unit, we have discussed demand and market analysis. We discussed the analytical framework for preparing the demand analysis. We took a look at population. We defined demand and went ahead to provide a practical demand analysis using a tyre retreading plant.

**5.0 SUMMARY**

We discussed demand and market analysis in this unit. Understanding demand is our first practical step towards understanding the market.

In the next unit, we shall discuss evaluating market supply

**6.0 TUTOR-MARKED ASSIGNMENT**

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

**7.0 REFERENCES/FURTHER READING**

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

## **UNIT 3     EVALUATING MARKET SUPPLY**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Evaluating Market Supply
    - 3.1.1 The Supply Equation
    - 3.1.2 Analysis of Supply Data
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In the last unit (Unit 2), we discussed demand and market analysis. We tried to understand how to estimate market demand and also how to forecast demand. However, this is only one part of the story. After discussing demand, we will now go ahead to discuss evaluating market supply. This will enable us to see the other side of the market.

### **2.0 OBJECTIVES**

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

- explain what market supply is
- discuss market supply in relation to project appraisal and evaluation.

### **3.0 MAIN CONTENT**

#### **3.1 Evaluating Market Supply**

In Unit 2, we discussed Demand and Market Analysis which we said constitutes only one part of the story. Our focus in this unit is to examine supply as a core component of the market structure.

The study of supply is very important for the entrepreneur and the person appraising the project. Before you can understand any market structure, you will need to understand supply to that market.

##### **3.1.1 The Supply Equation**

Consider a firm called Leotraco Industries Nigeria Limited that wishes to set up a motor cycle manufacturing plant in Nigeria. The firm now wants to analyze the supply of motor cycles in the Nigerian market. As expected, there are three key items to consider.

These key items to consider are:

- The domestic supply of motor cycles
- The foreign supply of motor cycles.
- The export of motor cycles from Nigeria.

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

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

This is called the supply equation and it is of general application.

If you note properly, C is the export quantity which will not be available for local consumption.

Let us take a broad approach in our analysis of supply and consider the Nigerian supply situation. Here, we will display the output of selected items and also the export of selected items. We will also display imports of selected items for Nigeria. All these are shown in table 8.1, 8.2, and 8.3.

### **SELF ASSESSMENT EXERCISE**

List two major sources of supply for goods in Nigeria.

Products	N'000
----------	-------

<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	124,688
Wine, spirits	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 & Iron rods	718,785
Wire-nails and wire products	207,520
PVC pipes and fittings	84,149
<b>PETROLEUM AND CHEMICAL</b>	
Soap detergents	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 8.1 Value of output of selected items.

## Exports by Products Section

<b>DESCRIPTION</b>	<b>(N MILLION)</b>
Live animals and animal products	137.1
Of which live animals	0.0
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	398.6
Plastic, ethers, esters of cellulose, rubber etc,	3,245.2
Hides, leather and fur	6,806.1
Wood, charcoal and wood products	39.6
Paper-making material and articles thereof	621.7
Textile and textile article	1,000.1
Footwear, headgear, umbrellas, feathers, hair	228.8
Stone, plastic, cement, asbestos, mica products	42.6
Base metals and articles of base metal	5,645.0
Machinery and appliances (other than electrical)	4,508.8
Transport equipment	190,409.0
Instruments and apparatus (photos, clocks, etc)	536.4
Miscellaneous manufactured articles	9.1
Arms and ammunitions	0.0
Works and arts, collector pieces and antiques	0.1
Other goods and product	40.9

*Table 8.2 Export by Products.*

## Imports by Product Section

<b>DESCRIPTION</b>	<b>(N Million)</b>
Live animals and animal products	108,636.4
Of which live animals.	97.7
Vegetable products	103,549.2
Food industry product	84,374.6
Of which tobacco products	14,018.3
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	4,048.3

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, asbestos, mica product	15,568.6
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
Special items, n.e.s.	48.4
	1,575,563.9

*Table 8.3: Imports by products.*

### 3.1.2 Analysis of Supply Data

It is very important especially in a competitive private sector setting for an investor to evaluate the market in terms of determining the level of supply of goods or services in a particular market. Therefore in practical terms, there will be the urgent need to identify every supplier and the suppliers' locations. Some analysts are of the opinion that the only important data required is the actual supply data of a product or service. But that is not true.

The proper way to appraise the supply situation of a given product or service is to find out the following facts:

- the number of players or suppliers in the industry.
- their current installed capacities
- their current actual operating capacities.
- their anticipated expansion plans.
- critical labour costs in the industry.
- raw material costs in the industry and the likely direction.
- categorising the suppliers into their various categories – big, medium or small players.

#### Example

A firm Abado Nigeria Limited is interested in setting up a palm kernel oil (PKO) production facility at Onitsha. It wants to understand the supply situation for Palm Kernel Oil (PKO) in its proposed area of operations which is the Eastern States of Nigeria.



Below is supply information on the state of production of Palm Kernel Oil (PKO).

### Supply of Palm Kernel Oil (PKO)

In the project region, the following key crushers of palm kernel have been identified namely:

1.	Envoy Oil	-	Onitsha
2.	Role Agro Ltd	-	Umuahia
3.	Lever Brothers Nig. Plc.	-	Aba
4.	Hic Oil Ltd.	-	Aba
5.	Life Vegetable Oil	-	Nnewi
6.	R. O. Iloro & Sons Ltd	-	Owerri
7.	Ogbunke & Sons Ltd	-	Umuahia
8.	New Era Foods Ltd	-	Aba
9.	Polema Nigeria Ltd	-	Aba
10.	Avop Limited	-	Enugu
11.	Palmil Ltd	-	Abak
12.	Atlanta Gulf Limited	-	Aba
13.	Universal Oil	-	Aba
14.	Rivoc Nig. Ltd.	-	Port Harcourt
*15.	Leotraco Industries Ltd	-	Onitsha.

- Production has been suspended for some time.

Industry sources indicate that at an average installed capacity of producing 50,000 tons of Palm Kernel Oil (PKO) per producer, total supply of Palm Kernel Oil to the market is estimated to be about 700,000 tons per annum (50,000 tons x 14 producers).

### Demand/Supply Gap for Palm Kernel Oil (PKO)

Projected Annual Demand	=	1,327,757 tons
Projected Annual Supply	=	700,000 tons
Demand/Supply Gap	=	627,757 tons

The demand/supply gap is the difference between projected annual demand and projected annual supply.

## 4.0 CONCLUSION

In this unit, we have discussed evaluating market supply. We discussed the supply equation. We also provided some data to enable us understand national supply.

## **5.0 SUMMARY**

In any given market situation, the understanding of the market will depend on understanding of the demand situation and the supply situation. Evaluating market supply of a product or service enables the investor to see whether or not a new product still has a space in the market. Understanding supply is a must if we are to understand competition in the market. In this unit, we discussed evaluating market supply.

In the next unit, we shall discuss Competition and Marketing plans.

## **6.0 TUTOR-MARKED ASSIGNMENT**

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

## **7.0 REFERENCES/FURTHER READING**

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

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

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Evaluating Competition and Marketing Plans
    - 3.1.1 Analytical Framework
    - 3.1.2 The Nature of Competition
    - 3.1.3 The Marketing Plan
    - 3.1.4 Nature and Structure of Competition in the Sachet and Bottled Water Industry
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In Module 2, Unit 2, we discussed demand and market analysis. Then in Unit 3, we discussed Evaluating Market Supply. We discussed the supply equation which as we saw was very useful in our understanding of supply.

In this unit, we will discuss Evaluating Competition and Marketing plans.

### **2.0 OBJECTIVES**

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

- explain the meaning of competition
- describe marketing plans and their components.

### **3.0 MAIN CONTENT**

#### **3.1 Evaluating Competition and Marketing Plans**

You will recollect that in Unit 2, we discussed demand and market analysis. Here we saw that population is a very important determinant of demand. Demand being discussed is basically the demand for goods and services. Apart from discussing demand, we went ahead to discuss

supply in Unit 3. Our next task is to merge demand and supply and see how both of them interplay in an arena called a market.

To fully prepare you for the understanding of this unit, you should put yourself in the shoes of a potential investor or even an investment analyst who wants to understand the nature of competition in a market.

A market is a mechanism through which buyers and sellers are brought into contact and goods and services exchanged.

Every firm takes market demand as given and no firm can singly change demand which depends on population and a lot of factors. Also, every firm takes supply to the market as given because no single firm is able to control it. And that is the essence of competition. It is very crucial that we really need to understand the nature of competition in the market place.

Every dynamic environment creates new opportunities and problems for every firm. A company must be able to respond to the market setting, analyze the competition and threats and then formulate marketing plans to remain in the competition.

### 3.1.1 Analytical Framework

Our critical task here is to discuss the competition and also the marketing plan. To properly 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 marketing plans.

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

Let us now proceed by taking a look at Industry and the competition.

INDUSTRY OUTLOOK	Demand for the product or service. Usefulness of the product or service. Stability of demand. Supply capacity of the industry. Labour costs. Raw material costs. Taxation. Business permits. Regulation
------------------	---

COMPANY'S POSITION IN THE INDUSTRY	Market position of the firm in the industry. Products or services offered. Location of the firm. Comparative location. Relative efficiency of the firm's equipment. Cost advantages. Relative financial strength. Ability of the firm's management.
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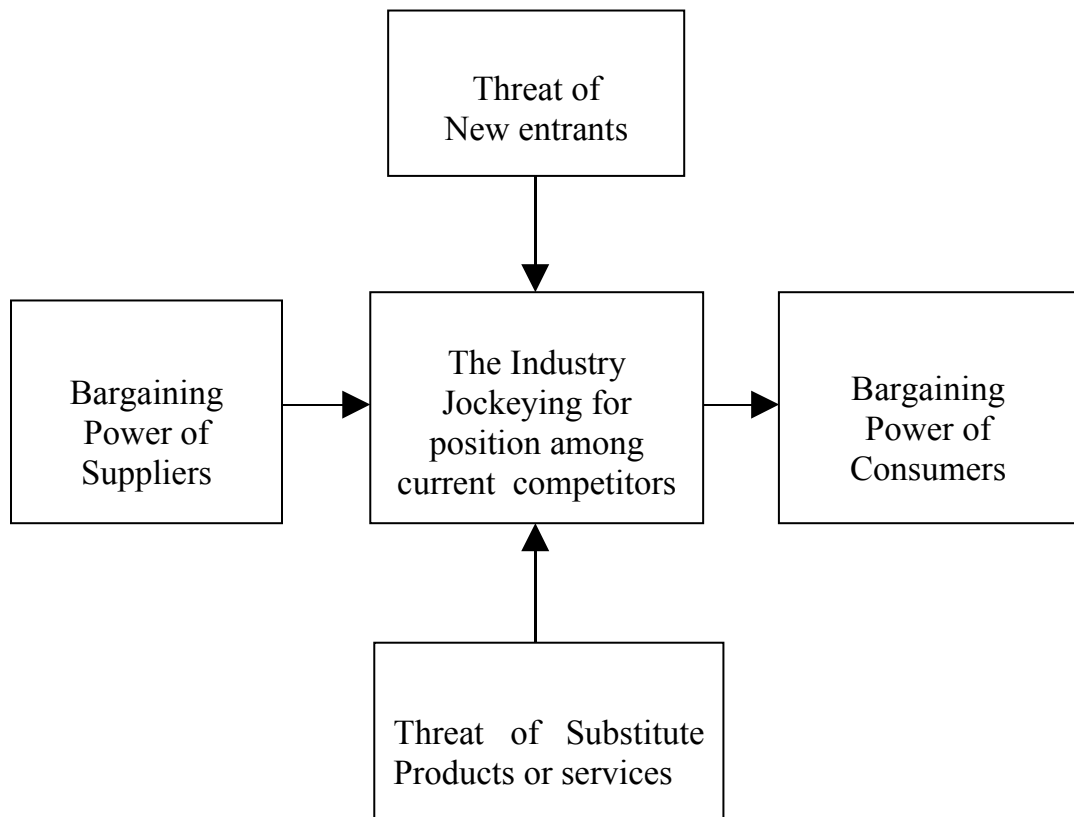
*Table 9.1: Competition – A framework for Analysis*

Generally, a framework that we are adopting is to take a look at the industry. In taking a look at the industry, there are key facts we need to know. Things like demand and supply. After the industry outlook, the next thing that is important to discuss is the firm or project's position in the industry. Now, if the firm is already existing and active in a market, our analysis can be fairly easy. But if we are evaluating a firm coming to the market for the first time or considering a new project, then our task is not that easy because the firm is going to face competition in the market.

### **3.1.2 The Nature of Competition**

Competition is a way of life. Human beings compete against each other. Firms also compete against themselves in the market place. Competition 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 the other market players.

In the market, the state of competition depends on five basic forces as shown in figure 9.1



*Fig. 9.1: Forces governing competition in an industry*

Any discussion of competition must take into consideration the five basic forces namely:

- Threat of new entrants.
- Bargaining power of suppliers.
- Bargaining power of consumers.
- Threat of substitute products or services.
- Jockeying for position among current competitors.

In the market, the first basic force affecting competition is the jockeying for position among current competitors. For example in the soft drinks market, the competition is keen between Pepsicola and Coca Cola. In the mobile phone market, we have keen competition between MTN versus Glo and versus Zain etc.

In the brewing industry, Harp competes with Gulder in the beer category. Competition is not a singular event. It is a continuous event, a series of races between firms.

The second force that affects competition is the threat of new entrants. New entrants into an industry bring in new capacity. For example, a new project will bring in new capacity.

Another major factor affecting competition is the bargaining power of suppliers. Strong suppliers can exert a lot of influence on the market by either increasing or decreasing supply.

Bargaining power of customers also affects competition. Powerful buyer groups, when they exist in an industry, tend to influence prices. 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 growth of honey industry.

### **SELF ASSESSMENT EXERCISE**

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

#### **3.1.3 The Marketing Plan**

If a firm is coming to the market with new products or services, there is the need to have a proper marketing plan. The marketing plan addresses issues that relate to the marketing of the firm's products or services.

A good marketing plan must address the following issues:

1. What is the product or service?
2. What are the uses of the product or service?
3. What is the offered price?
4. Where will the product be found?
5. How will the product be advertised.

Let us now go ahead and produce a marketing plan checklist.

	<b>Have you covered this in your plan?</b>
How big is the market? Who are your competitors? How are they faring? What is the structure of the competition? What are your prices? What are the trends in the market? What market share are you thinking of? 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 consumer service policy?	
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*Table 9.2: Marketing plan checklist.*

### **Example: A Water Production Project by ABC Ltd**

In the year 2007, ABC Limited, a firm located at Ogidi in Anambra State decided to commence the manufacturing of sachet and bottled water. To enable it understand the competition, it decided to have an overview of the water market.

The overview is reproduced in 3.1.4.

You are requested to study this example and make sure you understand it properly.

#### **3.1.4 Nature and Structure of Competition in the Sachet and Bottled Water Industry**

Because of the very low development of potable water in Nigeria, coupled with the increasing prevalence of water borne diseases like diarrhoea, guinea worm infestations, typhoid fever, gastro enteritis, cholera etc, the general public has come to pay particular attention to the quality of water they drink and use for domestic consumption.

Generally, drinking water for purposes of this study can be grouped into three namely:

**1. Untreated Water**

This is obtained from streams or bore holes and used for domestic cooking and also for drinking. Some households, if income levels permit, boil their water before drinking.

**2. Sachet Water**

This is a regulated product but produced by regulation compliant and non-compliant companies or individuals. Patronage is mainly by the lower class in view of the existing retail price of N5.

**3. Bottled Water**

Also a regulated product but patronised by the middle to upper class of society in view of the obviously higher retail prices.



### Structure of Competition (Sachet Water)

Product	Market Discipline	Competition
Sachet water	In view of the existing market price of N5 per sachet, there is absolute market discipline. All producers take the market price as given.	No clear visible leader exists in the market.

### Sachet Water Segment of the Market

#### Key Players

Market Zones	Visible Sachet Water Brands
Ogbunike – Ogidi – Nkpor Axis	<ul style="list-style-type: none"> <li>- KP table water</li> <li>- Orient table water</li> <li>- Canic table water</li> <li>- Obisco table water</li> <li>- O’polar table water</li> <li>- Tempest table water</li> <li>- Tolls table water</li> <li>- Chricken table water</li> <li>- Osaks table water</li> <li>- Mountain table water</li> <li>- Kings table water</li> <li>- I.G. table water</li> <li>- Offor table water</li> <li>- Monik table water</li> <li>- Vivia table water</li> </ul>
Onitsha	<ul style="list-style-type: none"> <li>- Aqua Rapha</li> <li>- Ogo table water</li> <li>- Mary Queen table water</li> <li>- Valcons table water</li> <li>- Madonna table water</li> <li>- Nation table water</li> <li>- Guest table water</li> <li>- Linas table water</li> <li>- Zandas table water</li> <li>- Bastina table water</li> <li>- Classic table water</li> </ul>
Awka	<ul style="list-style-type: none"> <li>- Marvel drinking water</li> <li>- Beajin water</li> <li>- Ranco water</li> <li>- Lekmor water</li> <li>- Hazeal table water</li> </ul>

	- Aqua Rapha
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**Structure of Competition (Bottled Water)**

Product	Market Discipline	Competition
Bottled water	No market discipline exists. Each producer fixes own price. No ruling market price makes it an unstructured market.	Eva water closely followed by Ragolis dominate the top end of the market. Their products command premium prices. Eva's market strength is based on the coca cola brand to which it belongs.

**Bottled Water Segment of the Market  
Key Players**

Market Zones	Visible Brands
Anambra State	- Eva water – clear market leader
Enugu State	- Ragolis water – close rival
Delta State	- Aqua Rapha – very strong brand and driven by religious sentiments.
Imo State	- KP bottled water
	- O'polar bottled water
	- Osaks bottle water
	- Ivy bottled water
	- Aqua Pana
	- Ogo table water
	- Kanu Nwankwo
	- Mary Queen water
	- Vivia table water
	- Classic table water

Sources of Demand for Sachet and Bottled Water

**1. Demand for Household Drinking**

This demand is related to the drinking water needs of households. The population is aware of the dangers posed by drinking unsafe and untreated water.

**2. Demand for Use in Hospitals and Clinics**

In most cases, drinking water used in hospitals is either sachet or bottled water because of the need to maintain high hygiene standards for patients.

### **3. Demand for Use in Hotels and Restaurants**

This constitutes a very high proportion of the demand for drinking water. Most, if not all hotels, offer either sachet or bottled water to their guests.

## **4.0 CONCLUSION**

In this unit, we discussed evaluating competition and marketing plans. We also discussed an analytical framework for our analysis. We generally discussed the nature of competition and isolated the five forces affecting market competition.

## **5.0 SUMMARY**

We have discussed evaluating competition and marketing plans. The evaluation of competition enables the project analyst to conduct meaningful inquiries about the state of any particular market in terms of competition. It enables the analyst to isolate supply and demand forces. Understanding competition well in advance assists in preparation of a good marketing plan.

In the next unit, we will discuss financial analysis of projects.

## **6.0 TUTOR-MARKED ASSIGNMENT**

Discuss the five basic forces that govern competition in industry.

## **7.0 REFERENCES/FURTHER READING**

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 FINANCIAL ANALYSIS OF PROJECTS – PART ONE**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Financial Analysis of Projects – Part One
    - 3.1.1 Project Cost Analysis
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

You will recall that in Unit 4 of Module 1, we discussed the concept of technical analysis of projects which gave us an insight into technical matters concerning a project and its environment.

Then in Unit 2 of this module, we discussed demand and market analysis which introduced us into the market. In Unit 4, we discussed evaluating competition and marketing plans.

In this unit, we will discuss Financial Analysis of Projects. Without doubt, you know that this unit is one of the most important in our study. You are requested to study this unit properly and make sure you understand same.

### **2.0 OBJECTIVES**

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

- describe the concept of financial analysis of projects
- explain the core items in financial analysis of projects.

### **3.0 MAIN CONTENT**

#### **3.1 Financial Analysis of Projects – Part One**

The study of financial analysis of projects is a vast area. So, we will take the topic in an orderly manner so as to enhance learning. Every project will involve costs both fixed and variable. The construction of an expressway linking Lagos to Ibadan will involve a lot of financial implications involving huge sums of money. The construction and

operation of a modern teaching hospital will involve the construction of medical wards, theatres, pharmacy shops, etc.

A firm building a new oil refinery will undertake a lot of capital expenditures and recurrent expenditures alike. So in all these cases, finance is involved.

Financial analysis of projects focuses proper attention on the financial aspects of a project. It tries to answer questions such as these.

1. What is the total cost of this project?
2. What are the various components of the cost?
3. Which costs are fixed?
4. Which costs are variable?
5. How will the project be financed?
6. What incomes will the project yield?
7. What expenditures will the project consume?
8. What is the residual profit of the project?
9. What are the financial risks attached to the project?

In a nutshell therefore, these are the type of questions that financial analysis seeks to answer.

### **3.1.1 Project Cost Analysis**

Project cost analysis provides the basic framework for calculating the total cost of any given project. For example, a firm wishing to establish a sachet water plant in Epe to serve the population must first estimate the cost of the sachet water plant well in advance. The purpose will be to determine whether or not it can afford the total costs involved and if need be, seek financial assistance from a bank.

To guide our thinking, we will define project costs as all those costs that are incurred in the process of setting up a project. The project costs will contain a total list of items that will be required in a project and the attached costs.

It will be important to arrange the cost items in a consistent and orderly manner so that like items will stay together.

To make our work easy, we shall divide project costs items into the following sub-headings.

- (1) Cost of land
- (2) Cost of buildings
- (3) Cost of machinery and equipment
- (4) Cost of utilities
- (5) Cost of furniture and other fittings.
- (6) Cost of vehicles.

- (7) Pre-operational expenses
- (8) Working capital

Although we have listed some of the sub-headings, the project analyst should go ahead and prepare a check list that will ensure that no crucial cost is missing in the analysis.

**Example 1**

Odutola Industries Limited wants to set up a tyre retreading plant at Ijebu-Ode. Below is a sample of the project analyst’s checklist for the project. The checklists are itemized as tables 10.1, 10.2, 10.3, 10.4, 10.5 & 10.6.

You are requested as a student project analyst to study the checklists properly and make sure you will be able to prepare such a checklist for a similar or different project.

	Have you included this in your costs?
Cost of land purchase Cost of surveying the land Cost of stumping Cost of certificate of occupancy Cost of legal documentation Cost of perimeter fence.	

*Table 10.1 : Cost of land checklist.*

	Have you included this in your costs?
Cost of architectural designs Cost of structural designs Cost of electrical designs Cost of factory buildings Cost of offices Cost of building plan	

*Table 10.2: Cost of buildings check list.*

	Have you included this in your costs?
Cost of locally fabricated machines Cost of imported machines Freight and insurance costs Custom duties and VAT Installation costs Commissioning and test run	

*Table 10:3 Cost of machinery checklist.*

	Have you included this in your
--	--------------------------------

	costs?
Cost of private generator Installation cost of generator Cost of water bore-hole.	

*Table 10.4 : Cost of utilities check list.*

	Have you included this in your costs?
Cost of vehicles for management Cost of vehicles for other staff Cost of distribution vans Cost of distribution lorries	

*Total 10.5: Cost of vehicles checklist*

	Have you included this in your costs?
Purchase of raw materials Purchase of diesel/fuel Payment of salary and wages Administrative costs Selling costs Cash at hand.	

*Table 10.6: Working capital checklist*

If you go through the checklists that we have prepared, you will realize that the checklists contain to a large extent, the key cost items that one is likely to encounter in a private sector project.

### **SELF ASSESSMENT EXERCISE**

List 10 items that you think should appear in project cost analysis of a public hospital.

#### **Example 2**

In year 2008, Babayo Nigeria Limited, decided to set up a Palm Kernel Oil (PKO) manufacturing plant at Onitsha. Please find below sample of a project cost prepared by a project analyst. You are again requested to study the example properly and make sure that you understand same. It is going to be very useful to you as a project analyst. You should also be able to prepare a similar project costing.

## Financial Analysis

In the financial analysis, the key objective is to determine the financial outlays of the project and the inflows with a view to establishing the following:

1. Total start up costs for the project.
2. Revenues of the project
3. Operating expenditures attached to the project.
4. Profit and loss profile of the project.

### Estimates of Project Cost

	N
Land for the project	10,000,000
Factory with perimeter fence and containing Factory, administrative block, security house and generator house	<u>30,000,000</u>
Total land and building cost.	<u>40,000,000</u>

### Machinery and Equipment

#### Existing Machinery/Equipment

	N
8 units Palm Kernel Oil expellers and ancillary equipment	- 40,000,000
1 unit Palm Kernel Cake silo	- 3,500,000
1 unit weigh bridge avery	- 1,000,000
Dehusking equipment with separator	- 4,000,000
1 steel surface tank with pump	- 3,000,000
Engineering support equipment consisting of pumping machines, welding machine; pre-treatment plant, pressing equipment and Surge tank.	<u>15,000,000</u>
Sub-total	<u>66,500,000</u>



**Machines/Equipment to be Purchased**

6 units Palm Kernel Oil expeller at \$17,000	-	
each x N132 exchange rate @ ₦102,000 x N132-		13,464,000
bank charges (L/C etc)	-	140,000
Port clearing and other misc. charges	-	900,000
Transportation to factory site etc		600,000
Contingencies/cost over run		<u>400,000</u>
Sub total		<b><u>15,504,000</u></b>
Total machinery and equipment		<b><u>82,004,000</u></b>

**Power and Utilities**

1 unit 300 KVA generator	-	6,000,000
1 unit 300KVA transformer	-	3,000,000
Electrical fittings, change over panels, etc	-	1,000,000
Water bore hole		<u>500,000</u>
<b>Total</b>		<b><u>10,500,000</u></b>

**Motor – vehicles** **750,000**

**Pre-Operational Expenses**

Feasibility studies and other management		
Consulting services	-	250,000
Travels and Tours	-	<u>100,000</u>
Total	-	<b><u>350,000</u></b>

**Furniture/Fittings** **300,000**

**Summary of Project Cost**

		<b>₦</b>
Lands and buildings	-	40,000,000
Machinery and equipment	-	82,004,000
Power and utilities	-	10,500,000
Furniture and fittings	-	300,000
Pre-operational expenses	-	350,000
Motor vehicles	-	750,000
Sub-total	-	133,904,000
Working Capital Requirement	-	<u>17,291,155</u>
Project grand total		<b><u>151,195,155</u></b>

### Proposed Financing Plan (₦)

	<b>Project Promoter</b>	<b>Bank/Investor</b>	<b>Total</b>
Land and Buildings	40,000,000	-	40,000,000
Machinery/Equipment	66,500,000	15,504,000	82,004,000
Power and utilities	10,500,000	-	10,500,000
Pre-operational expenses	350,000	-	350,000
Motor vehicles	750,000	-	750,000
Furniture/fittings	300,000	-	300,000
Working capital	2,795,155	14,496,000	17,291,155
<b>Total</b>	<b>121,195,155</b>	<b>30,000,000</b>	<b>151,195,155</b>

#### 4.0 CONCLUSION

In this unit, we discussed Financial Analysis of Projects – Part One. As we said, financial analysis is a very vast area of study. But for a start, we have understood the nature of the financial analysis and the type of items that should be captured in the financial analysis.

Finally, we used some worked examples to throw more light on the topic.

#### 5.0 SUMMARY

We have discussed Financial Analysis of Projects – Part One in this unit. It is an introduction to a key aspect of our study. Financial analysis is at the core of project appraisal. It is very important to the person appraising the project and also a project financier.

In the next unit, we shall discuss Financial Analysis of Projects – Part Two.

#### 6.0 TUTOR-MARKED ASSIGNMENT

Discuss the major groups of costs to be encountered in the establishment of an exercise book making factory.

#### 7.0 REFERENCES/FURTHER READING

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	Financial Analysis of Projects – Part Two
Unit 2	Cash Flow Analysis
Unit 3	Traditional Investment Appraisal Methods
Unit 4	Discounted Cash Flow Methods of Appraisal
Unit 5	Economic Appraisal and Evaluation of Projects

### UNIT 1 FINANCIAL ANALYSIS OF PROJECTS – PART TWO

#### CONTENTS

1.0	Introduction
2.0	Objectives
3.0	Main Content
3.1	Financial Analysis of Projects – Part Two
3.1.1	The Projected Income Statement
3.1.2	The Structure of the Projected Income Statement
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

#### 1.0 INTRODUCTION

In Unit 5 of Module 2, we discussed Financial Analysis of Projects – Part One. There we discussed the concept of financial analysis and went ahead to prepare checklists for project cost analysis. We even produced an example to assist you in your study.

In this unit, we shall discuss Financial Analysis of Projects – Part Two. This section will focus attention on the income aspects of a project.

#### 2.0 OBJECTIVES

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

- derive the meaning of the income statement as an aspect of financial analysis
- describe the preparation of the projected income statement of a project.

### **3.0 MAIN CONTENT**

#### **3.1 Financial Analysis of Projects – Part Two**

You will recall that in Unit 10, we spent a lot of time to discuss the concept of project cost which you seem to have now understood.

Specifically, we isolated two types of costs – fixed costs and working capital. These two costs constitute total project cost. Our focus in this unit is to go a step further to discuss the concept of the projected income statement. This is a very vital aspect of our study as it is very essential in the study of Project Appraisal and Evaluation.

##### **3.1.1 The Projected Income Statement**

No matter which side you belong to – project initiator or evaluator, the projected income statement must attract your attention. Bankers and financiers all pay attention to the projected income statement.

The projected income statement is a summary of revenues, expenses and net profit of an enterprise for a period of time. This serves as a measure of a firm's profitability over a time. It is a forecast of the revenues, expenses and net profit of an enterprise or project. A lot of groups are interested in the projected income statement.

Firstly, the owners or sponsors of a project have a direct interest in the projected income statement. They wish to know before hand what the revenues, expenditures and net profit will be.

Financial institutions are another group that is interested in the projected income statement. When a firm approaches a financial institution for assistance, the financial institution will appraise the business plan of the borrower and usually the key area of critical interest is the projected income statement. The banks will want to know if the project they are being asked to sponsor will be profitable.

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

Having explained the meaning of the projected income statement, our next task is to discuss the structure of the projected income statement.,

In the structure that we propose, there are three major components of the projected income statement namely:

- (a) revenues
- (b) expenses
- (c) profit

- **Revenues**

Revenues represent the value of the output of goods and services that an enterprise supplies to third parties at a price. When a project is contemplated or is existing, one of the most important tasks of the project analyst is to project for revenues. To project for revenues, one must first determine the quantity of goods or services that will be sold and at what price.

For example, if a new bakery to be located in Kano wants to project for revenues, it must first project for the quantity of loaves of bread that will be sold and at what price.

Also in projecting for revenues, the project analyst must make some critical assumptions underlying the forecasts.

- **Expenses**

The cost of earning a revenue is known as the expense. Expenses are quite different from costs. Cost is the outlay incurred to acquire some asset. For example, when a firm buys a car, the sum used to purchase the car is the cost of the vehicle. But the purchase of fuel to run the vehicle will constitute an expense.

In a project, a lot of expenses are involved and that again depends on the nature of the project.

- **Profit**

Generally, profit represents the difference between the revenues and expenses of a project. If revenues exceed expenses, the difference is a profit. However, if expenses exceed revenues, the difference is a loss.

### **SELF ASSESSMENT EXERCISE**

List five expense items that can be found in a car manufacturing plant.

### **Practical Example**

In the year 2007, Bestway Limited – a Port Harcourt based firm decided to go into the business of manufacture of Palm Kernel Oil (PKO). Palm Kernel oil is produced from Palm Kernel through a process known as crushing.

You will find below, the basis for an Analyst's forecast of the financial projections of Bestway Limited. A projected profit and loss statement is shown.

You are please requested to study the worked example properly and ensure that you understand the workings. You are expected to be able to prepare something similar.

#### Assumptions Underlying the Financial Projections

1. There will be no changes in government regulation concerning vegetable oil which importation is currently banned by the Federal Government.
2. There will be no new substitutes for soap and so demand for palm kernel oil for soap making will continue to be firm.
3. There will be no drastic change in the political and economic climate of the country that will adversely affect the operations of the company.

#### Revenue Projections

##### Revenues (Year 1)

Item	Output in Tons	Selling Price per Ton (N)	Total Revenue (N)
Palm Kernel Oil	7,200	130,000	936,000,000
Palm Kernel Cake	9,900	5,000	49,500,000
Palm Kernel Sludge	900	4,000	3,600,000
<b>Total</b>			<b>989,100,000</b>

##### Revenues (Year 2 and 3)

Item	Output in Tons	Selling Price per Ton (N)	Total Revenue (N)
Palm Kernel Oil	14,400	130,000	1,872,000,000
Palm Kernel Cake	19,800	5,000	99,000,000
Palm Kernel Sludge	1,800	4,000	7,200,000
<b>Total</b>			<b>1,978,200,000</b>

### Summary of Revenue Projections

Year		Revenue (N)
1	-	989,100,000
2.	-	1,978,200,000
3.	-	1,978,200,000

### Projected Raw Material Costs

Year	Quantity Purchased (Tons)	Buying Price per Ton (N)	Total Cost (N)
1	18,000	45,000	810,000,000
2	36,000	45,000	1,620,000,000
3	36,000	45,000	1,620,000,000

### Electricity and Gas Expenses

Electricity and gas expenses relate to the public electricity consumed, purchase of diesel and repairs/maintenance of the power generating set.

Going by recent surveys, Power Holding Company's average annual electricity bills to similar companies with heavy duty machines is about N200,000 per month i.e. (N2,400,000 per annum). However, the project will use its generator to cover power failure. Assuming an average daily consumption of 200 litres of diesel per day at N80 per litre for 300 days, fuel expenses per annum amount to N4,800,000.

### 1<sup>st</sup> Year Summary of Electricity and Gas Expenses

	N
Public Power supply electricity bill	2,400,000
Fuel for generator costs	4,800,000
Generator repairs and maintenance	500,000
Total	7,700,000

Year 2 electricity and gas expenses are expected to be twice that of year 1 because year 2 will operate 2 shifts. Therefore year 2 expenses will be N15,400,000.

### Maintenance Factory Premises

Obviously, in year 1, it is projected that a sum of N600,000 be allocated to this expenses head given the large size of the factory premises. This includes cleaning and general sanitation.

Annual increase of 5% over the years will be permissible.

### Repairs and Maintenance of Machinery and Equipment

Expenses under this heading include all expenses to be incurred on normal routine maintenance of machinery and equipment. Also, repairs following breakdowns are included. It is envisaged that maintenance will be carried out every two weeks on the machines to ensure peak performance with low breakdowns.

A sum of N3,000,000 is budgeted in year 1 under this heading and the figure is expected to double as from year 2 since the production shifts will double in year 2.

#### Summary of Other Direct Production Costs

	<b>Year 1 N</b>	<b>Year 2 &amp; 3 N</b>
Electricity and gas	7,700,000	15,400,000
Maintenance factory	600,000	630,000
Repairs/maintenance machines	3,000,000	6,000,000
<b>Total</b>	<b>11,300,000</b>	<b>22,030,000</b>

### Depreciation

The rate used in depreciation of factory fixed assets:

Machinery and equipment	10%
Building	5%
Vehicles	25%
Furniture/fittings	10%

#### Depreciation Schedule

<b>Item</b>	<b>Value (N)</b>	<b>Depreciation Rate (%)</b>	<b>Annual Depreciation(N)</b>
Land & Buildings	40,000,000	5%	2,000,000
Machinery and equipment	82,004,000	10%	8,200,400
Power and utilities	10,500,000	10%	1,050,000
Motor vehicles	750,000	20%	187,500
Furniture/fittings	300,000	10%	30,000
		<b>Total</b>	<b>11,467,900</b>



## Allocation of Depreciation

Factory	=	N11,250,400
Office/Admin.	=	<u>217,500</u>
Total	=	<b><u>11,467,900</u></b>

**Office/Administration Expenses**

Obviously, this covers expenses relating to general administration. Below are the components of the office/administration expenses in year 1.

	N
Printing and stationery	80,000
Telephone and postages	120,000
Local government rates and taxes	20,000
Audit fee	120,000
Insurance premium	150,000
Vehicle and transport expenses	<u>400,000</u>
Total	890,000

5% cost increases are permissible as from year 2 onwards.

## Selling Expenses

Under this expenses head, we have all expenses relating to the sales of the crude palm kernel oil. It is important to note that the project has to receive adequate publicity to enable the customers and the general public to be aware of the company's existence and capabilities.

For the first year, we budget selling expenses to be broken into sub heads as followings:

1. Transport logistics	3,000,000
2. Advertisement bill boards etc	2,000,000
3. Public relations/social responsibility	500,000
<b>Total</b>	<b><u>5,500,000</u></b>

In subsequent years, we anticipate 5% cost growth.

**Analysis of Working Capital Requirement**

1 week stock raw materials (year 2007)	15,576,923
1 month total salary and wages (year 2007)	772,566
1 month other direct production costs (year 2007)	941,666

**Total** **17,291,155**

**Bestway Limited**

**Projected Profit And Loss Statement (N)**

	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Revenue</b>			
Palm Kernel Oil	936,000,000	1,872,000,000	1,872,000,000
Palm Kernel Cake	49,500,000	99,000,000	99,000,000
Palm Kernel Sludge	3,600,000	7,200,000	7,200,000
Total Revenue	989,100,000	1,978,200,000	1,978,200,000
<b>Direct Cost of Production</b>			
Raw Materials	810,000,000	1,620,000,000	1,620,000,000
Direct Management and Labour	3,608,000	3,788,400	3,977,820
Other direct production costs like, electricity and gas, factory maintenance and repairs/ maintenance of machine	11,300,000	22,030,000	22,030,000
Depreciation	11,250,400	11,250,400	11,250,400
<b>Total direct costs</b>	836,158,400	1,657,068,800	1,657,258,220
<b>Indirect Costs of Production</b>	5,662,800		
Management and labour	00	5,945,940	6,243,237
Office/administration expenses	890,000	934,500	981,225
Bank charges/commission	2,000,000	4,000,000	4,000,000
Selling expenses	5,500,000	5,775,000	6,063,750
Insurance of assets	200,000	200,000	220,000
Depreciation	217,500	217,500	217,500
Total indirect costs	14,470,300	17,072,940	17,725,712
Total direct + indirect costs	850,628,700	1,674,141,740	1,674,983,932
Profit/(Loss) Before Tax	138,471,300	304,058,260	303,216,068
Taxation	44,310,816	97,298,643	97,029,141
Profit After Tax	94,160,484	206,759,617	206,186,927
<b>Dividends Proposed</b>	75,328,387	165,407,693	164,949,541

**4.0 CONCLUSION**

In this unit, we discussed Financial Analysis of projects – Part Two. We discussed the Projected Income Statement and its structure. Projecting

for revenues and expenses is a very important aspect of Project Appraisal and Evaluation.

## **5.0 SUMMARY**

Understanding the projected income statement of a project is a very important aspect of project appraisal. It enables an analyst see well in advance the pictures of revenues and expenses attached to a new or existing project.

In this unit, we provided a practical example on how to prepare a projected income statement.

In the next unit, we shall discuss Cash Flow Analysis.

## **6.0 TUTOR-MARKED ASSIGNMENT**

Who do you think are the likely users of a projected income statement?

## **7.0 REFERENCES/FURTHER READING**

Smith, N. J. (1995). *Project Cost Estimating*. London: Thomas Telford.

## **UNIT 2 CASH FLOW ANALYSIS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Cash Flow Analysis
    - 3.1.1 Users of the Projected Cash Flow Statement
    - 3.1.2 The Structure of the Projected Cash Flow Statement
    - 3.1.3 Cash Flows
    - 3.1.4 Cash Outflows
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In the last unit (Unit 2), we discussed Financial Analysis of Projects – Part Two. We discussed the projected income statement. We discussed the structure of the projected income statement and isolated revenues, expenses and profit as the core elements therein.

In this unit, we shall discuss Cash Flow Analysis.

### **2.0 OBJECTIVES**

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

- explain cash flow analysis
- describe the preparation of a cash flow statement.

### **3.0 MAIN CONTENT**

#### **3.1 Cash Flow Analysis**

Before we discuss Cash Flow Analysis, we must first define what a cash flow is. Perhaps let us start with the cash flow statement.

A cash flow statement is a statement that shows the receipt of cash (inflows) and the disbursement of cash (outflows). For an existing business, the cash flow statement can be prepared from the accounting records.

However, if a business is non-existent and about to start, what we have is usually called the Projected Cash Flow Statement. It is therefore important for us to understand the meaning of a projected cash flow statement.

A projected cash flow statement is a statement which shows the forecasts of cash receipts (inflows) and the disbursement of cash (outflows) of a firm or project.

It is important to note that the projected cash flow statement is not an income statement. It only captures the movement of cash in and out of a project.

The projected cash flow statement assists to evaluate the future performance of a firm or project. It enables the project evaluator to answer the following questions.

1. What are the products and services of the firm?
2. What are the revenues and cash expenses of the firm or project?
3. Will the projected cash flow be able to service the project's debts (loan, overdraft and interest)?
4. Will the project need financing and when?
5. How should the loan or overdraft be structured?

All answers to the above questions should be provided by the projected cash flow statement.

### **3.1.1 Users of the Projected Cash Flow Statement**

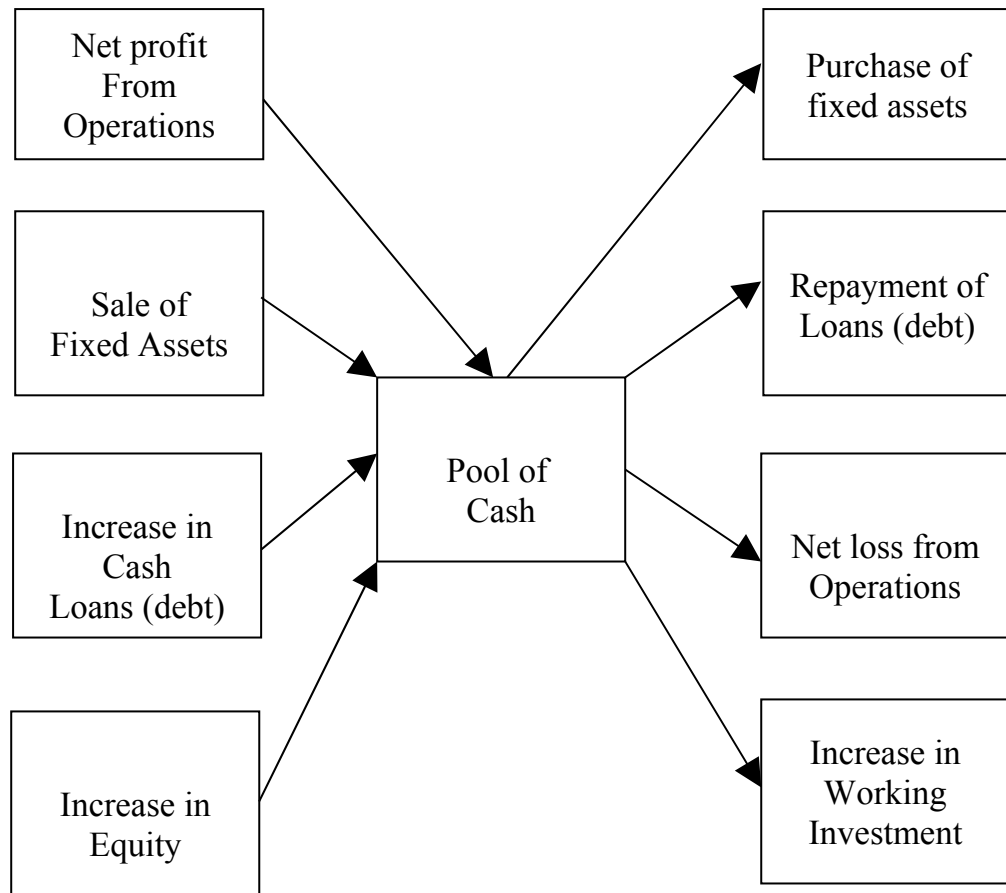
We have defined the projected cash flow statement at least in the sense that we now know what it is all about. The next thing for us to do is to discuss who the users of the projected cash flow statement are:

- **The Project Promoter or Sponsor**

The project promoter is the initiator of a project. He/she will be interested in knowing well in advance what the cash flows of the project will be.

SOURCES OF CASH

USES OF CASH



*Figure 12:1 Sources and Uses of Cash*

A properly prepared cash flow statement will reveal when a project will require financing because of the gaps between the earning of income and the actual receipt of cash. It will be very important for us to note that when a sale is made to a third party, an income has been earned and this should be recorded in the books of the firm. However, if the third party does not pay cash immediately for the goods or services received, then we will say that no cash inflow came in. So, a firm can be making sales but also lack money if it sells on credit.

Secondly, providers of finance (e.g. banks) are usually interested in the projected cash flow statement of the firms or projects that they are being called upon to finance. Their interest in reading the cash flow is to determine whether the borrower's project will be able to:

- (1) repay loan principal
- (2) repay interest and other bank charges

Thirdly, the managers of a project may be guided by a projected cash flow statement especially if the same has been prepared by a third party like a management consultant.

### 3.1.2 The Structure of the Projected Cash Flow Statement

At least, we now understand what the projected cash flow statement is. It is a forecast of cash inflows and outflows of a project or a firm.

The details of all the cash inflows and the cash outflows must be captured. We will now use an example to demonstrate a projected cash flow statement. You are requested to study the example and make sure you understand same.

#### Example: Chisco Nigeria Limited

In December 2007, Chisco Nigeria Limited obtained a loan of N10,000,000 from a bank to start a cassava flour manufacturing plant.

Table 12.1 is a three month projected cash flow statement as prepared by the Financial Controller of Chisco Nigeria Limited.

#### CHISCO NIGERIA LIMITED

	January 2008	February 2008	March 2008
<b>CASH INFLOWS</b>			
Capital introduced	30,000,000	-	-
Loan Introduced	10,000,000	-	-
Cash sales	40,000,000	42,000,000	43,000,000
Total cash inflows	80,000,000	42,000,000	43,000,000
<b>CASH OUTFLOWS</b>			
Purchase of machinery	40,000,000	-	-
Raw Materials	20,000,000	21,000,000	22,000,000
Salary and wages	2,000,000	2,000,000	2,200,000
Office expenses	200,000	200,000	200,000
Electricity and gas	2,000,000	2,000,000	2,100,000
Loan repayment	-	1,000,000	1,000,000
Selling expenses	500,000	500,000	800,000
Total Cash Outflows	64,700,000	26,700,000	28,300,000
Inflows Less Outflows	15,300,000	15,300,000	14,700,000
Opening cash balance	1,000,000	16,300,000	31,600,000
Closing cash balance	16,300,000	31,600,000	46,300,000

Table 12.1 Projected Cash Flow Statement

### 3.1.3 Cash Inflows

From the example that we used – Table 12.1, you can see that the cash flow is broken down into two main segments namely:

- (1) the cash inflows
- (2) the cash outflows.

Let us now proceed to examine some of the items that make up the cash inflows.

- **Capital Introduced**

Every firm or project ideally should have a capital. At the time that a project is conceived, or being expanded, the owners usually bring in what is known as capital. This capital brought in really is an inflow of cash.

In a limited liability company, this capital will be introduced by the shareholders. They contribute the capital of the company. In a small business, a proprietor, the owner of the business, usually introduces the capital.

- **Loan Introduced**

Another item appearing in our projected cash flow statement is loan introduced. In our example, the loan introduced is N10,000,000. This obviously is an inflow of cash. You will note that the loan comes in as a single entry in the month of January 2008.

- **Cash Sales**

The sales figure is the most important in a projected cash flow statement. However, projections for sales pose problems for the analyst. In projecting for sales in the cash flow, it is only cash sales that should be entered as cash inflows. Any sale made on credit should be excluded. But then you will quickly realize that:

$$\text{Total sales} = \text{Cash sales} + \text{Credit sales.}$$

Credit sales refer to sales for which payment is not made immediately.

In the projected cash flow statement, only estimates of actual cash will be entered in the cash flow.



### **3.1.4 Cash Outflows**

We have discussed the cash inflows. We also need to discuss the cash outflows. Cash outflows will include those items which use cash. And they will include the following:

1. purchase of machinery
2. raw materials
3. salary and wages
4. office expenses
5. electricity and gas
6. loan repayment
7. selling expenses

### **SELF ASSESSMENT EXERCISE**

List three uses of cash.

## **4.0 CONCLUSION**

In this unit, we discussed Cash Flow Analysis. We discussed the cash flow statement. We also discussed the users of the cash flow statement. We also used an example to show what a cash flow looks like.

## **5.0 SUMMARY**

Cash flow analysis was treated in this unit. We also said that cash flow analysis is one of the most important aspects of project appraisal. Cash flows give a picture of cash inflows and outflows of a project.

In the next unit, we shall treat Traditional Investment Appraisal Methods.

## **6.0 TUTOR-MARKED ASSIGNMENT**

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

## **7.0 REFERENCES/FURTHER READING**

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

## **UNIT 3 TRADITIONAL INVESTMENT APPRAISAL METHODS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Traditional Investment Appraisal Methods
    - 3.1.1 The Investment Criteria
    - 3.1.2 Pay back Period
    - 3.1.3 Evaluation of Payback Period.
  - 3.2 Accounting Rate of Return Method
    - 3.2.1 Evaluation of ARR Method
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In the last unit (Unit 2), we discussed Cash Flow Analysis. We discussed the structure of a cash flow statement. We also discussed the user of the projected cash flow statement. Then we went ahead to provide a worked example of a cash flow. In this unit, we shall discuss Traditional Investment Appraisal Methods.

### **2.0 OBJECTIVES**

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

- describe the traditional investment appraisal methods
- extrapolate how you can use them to rank projects.

### **3.0 MAIN CONTENT**

#### **3.1 Traditional Investment Appraisal Methods**

The firm has three decisions to make:

- the investment decisions
- the financing decisions
- the dividend decisions

Also, entrepreneurs have the investment decisions to make. So, faced with an array of investment opportunities in the market place, the central questions asked are:

- (1) Given projects A, B and C, what project should be undertaken?
- (2) What is the criterion for choosing project A instead of Project B?

There must be a way to appraise projects before we can be able to say that the project is acceptable or not.

Our primary task in this unit is to discuss the investment decisions and see how to arrive at accepting or rejecting the selection process. The investment decisions of the firm or the entrepreneur are various. It could involve the start up of a new cassava farm to produce ethanol. It could be the mechanization of a process or the replacement of machines. But whatever the investment is, a decision has to be made on whether or not to accept the investment.

The investment or capital budgeting decisions are very important because they involve huge capital outlays. Also, once an investment has been made, it is very difficult to reverse.

Because of all these, the firm must develop techniques for evaluating the investment proposals before it.

### **3.1.1 The Investment Criteria**

We have already said that the investment decisions of a firm or entrepreneur are important. So, investment decisions must be made carefully. We will therefore agree that there should be a model or method for selecting which projects to select and those to reject.

The investment selection criteria that will be used must be such that they should possess certain characteristics:

- It should provide the project evaluator the simple means of distinguishing between acceptable and unacceptable investment projects.
- It should be able to assist the project evaluator to choose between alternative projects especially where there is a financial constraint.
- It should also be able to rank projects in their order of desirability.

- It should also be able to recognize the fact that bigger cash flows are more preferable to smaller ones and also that early cash flows are better than later cash flows.
- It should be applicable to any type of project.

In the literature, there are many investment criteria in use. We have the traditional investment criteria and the discounted cash flow criteria.

In this section, we are only interested in the traditional investment criteria. The two main traditional criteria that we shall discuss are the payback period and the accounting rate of return methods.

### 3.1.2 Pay Back Period

The payback period is one of the traditional methods used in evaluating investment proposals. Apart from the fact that it is simple, it is also very popular amongst analysts.

The payback period is defined as the number of years required to recover the original cash outlay invested in a project.

For example, if a project generates constant annual cash inflows, the payback period can be computed thus:

$$\text{Payback period} = \frac{\text{Cash outlay (Investment)}}{\text{Annual Cash Inflow}}$$

#### Worked Example

ABC Ltd – a transport company purchases a luxury bus for N20,000,000. The luxury bus yields annual cash inflow of N5,000,000 for the next 10 years. Calculate the payback period.

Solution

The payback period for the bus is:

$$\begin{aligned} \text{Payback period} &= \frac{\text{N20,000,000}}{5,000,000} \\ &= 4 \text{ years} \end{aligned}$$

The example of the luxury bus that we have just used is a very simple and straight forward one. In real life, cash flows are never fixed or constant. They have no regular pattern.

In a situation of irregular, unpredictable and uneven cash flows, the payback period can be computed by adding up the cash inflows until the total cash inflows become equal to the initial cash outlay (Investment).

### **Example**

An urban hospital requires N20,000,000 to establish and generates annual cash inflows of N4,000,000, N6,000,000, N5,000,000, N10,000,000 for the next four years. Calculate the payback period.

### **Solution**

If we add up the cash inflows of the first three years, they amount to N15,000,000. This means that the remaining amount to be recovered is N5,000,000. In year 4, the cash inflow is N10,000,000. If the cash inflows for year 4 are even, it will take only 6 months to recover the remaining N5,000,000. So the payback period for the luxury bus is 3 ½ years.

The payback period can be used in two ways. First it can be used as an acceptance or rejection criterion. Secondly, it can be used to rank projects.

Ideally, every firm should have a maximum payback period set up by management to guide its investment decision making. For example, a firm may set 3 years as the maximum pay back period of any investment that it can undertake. What that means is that any project which has a payback period greater than 3 years will not be accepted.

Secondly, payback period can be used to rank projects. As a ranking method, pay back period gives highest ranking to a project with a shorter pay back period.

So, if a firm is constrained to choose between two mutually exclusive projects due to capital rationing, then the project with the shorter payback period will be selected.

### **SELF ASSESSMENT EXERCISE 1**

List the three main investment decisions that the firm makes.

#### **3.1.3 Evaluation of Payback Period**

Starting from the definition of payback period, we can see that it is a relatively easy concept to understand. The payback period is simple and

also very easy to compute. It does not involve complex mathematical calculations.

Secondly, payback period is not costly. It costs less than other evaluation methods because it does not use up a lot of costly analysts' time. It does not also require the assistance of computers to compute payback period.

However, despite the fact that it is simple to use and also cheap in terms of cost, payback period is not a good investment criterion because it suffers from various obvious limitations.

Firstly, it does not take into account, the cash inflows generated after the payback period. Once the payback period of a project has been reached, no further inquiry will be made on any other cash inflows that may arise.

Secondly, since it does not consider all the cash inflows generated by a project, it is a weak criterion.

Thirdly, it does not consider the pattern of cash inflows. The pattern of cash inflow consists of the magnitude and timing. In the financial analysis, the pattern of cash inflows is very important as we know fully well that money has a time value.

We have spent quite some time to discuss the shortcomings of payback period. Despite all the weaknesses that we have highlighted, payback period has a place in the minds of project analysts. Practically, some firms still use payback period and it guides them in selecting their investment projects given an array of projects. Also, analysts are beginning to worry that the future cannot be easily determined and as such, projects with shorter payback period should appeal to investors and management alike.

Even at that, at the rudimentary level of business, the emphasis of an investor is on early recovery of the investment outlay. We have discussed the concept of payback period. Next, we shall discuss another traditional investment criterion known as the Accounting rate of return method.

### **3.2 Accounting Rate of Return Method**

We have just discussed the payback period as a traditional investment criterion. We are now taking a look at the Accounting rate of return method.

The Accounting Rate of Return (ARR) method uses accounting information to measure the profitability of an investment proposal.

The accounting rate of return is calculated by dividing average income after taxes by the average investment. Average investment is equal to original investment plus salvage value divided by two (2).

Thus the accounting rate of return is given by the following:

$$\text{ARR} = \frac{\text{Average income}}{\text{Average investment}}$$

We shall use a rural poultry farm to demonstrate the computation of the accounting rate of return. But before we do that, we shall first briefly look at two concepts which will assist us to understand fully the accounting rate of return method.

- **Depreciation**

Depreciation is a non-cash expense item. Depreciation is the allocation of cost of the fixed assets used in a business. It involves an accounting entry and does not involve any outflow of cash. But, depreciation is usually charged to the profit and loss account because it is an accounting way of matching costs of fixed assets with the benefits. For example, a firm purchases a lorry for its transportation of raw materials. The lorry may cost for example N5,000,000 but the useful life may stretch for over 10 years. It makes sense that every year of its use, it provides benefits to the firm.

- **Salvage Value**

Salvage value can be seen from two angles. The first is the cash salvage value. Cash salvage value of an investment or asset is the market price of the investment or asset at the end of its life. On the other hand, book salvage value is the cost of the machine or asset at the end of its life. In the accounting rate of return method, the book salvage value is usually used as we shall shortly see.

### **Worked Example**

A rural poultry farm costs N5,000,000 to set up and has a scrap value of N1,000,000. Its stream of income before depreciation and taxes during the first five years is N1,000,000, N1,200,000, N1,400,000, N1,600,000 and N2,000,000. If depreciation is on straight-line basis and tax rate is 50%, calculate the accounting rate of return (ARR).

Solution

Computation of the Accounting Rate of Return

	Year 1	Year 2	Year 3	Year 4	Year 5
Earnings before depreciation & taxes	1,000,000	1,200,000	1,400,000	1,600,000	2,000,000
Depreciation	800,000	800,000	800,000	800,000	800,000
Net earnings before taxes	200,000	400,000	600,000	800,000	1,200,000
Taxes at 50%	100,000	200,000	300,000	400,000	600,000
<b>Book Value of Investment</b>					
Beginning	5,000,000	4,200,000	3,400,000	2,600,000	1,800,000
Ending	4,200,000	3,400,000	2,600,000	1,800,000	1,000,000
Average	4,600,000	3,800,000	3,000,000	2,200,000	1,400,000

$$\text{Average earnings after taxes} = \frac{N100,000 + N200,000 + N300,000 + N400,000 + 600,000}{5}$$

$$= \text{N320,000}$$

$$\text{Average investment} = \frac{N4,600,000 + N3,800,000 + N3,000,000 + N2,200,000 + N1,400,000}{5}$$

$$= \text{N3,000,000}$$

$$\text{Accounting rate of return} = \frac{\text{Average income}}{\text{Average investment}}$$

$$= \frac{N320,000}{N3,000,000}$$

$$\text{Accounting rate of return} = 10.666\%$$

**SELF ASSESSMENT EXERCISE 2**

List four public sector projects in your neighbourhood.

Under the accounting rate of return method, the acceptance or rejection rule is to accept those investment proposals which ARR is higher than the minimum rate established by management. Also, the investment proposals which ARR is lower than the minimum rate established by management will be rejected.



### 3.2.1 Evaluation of ARR Method

One of the major advantages of the accounting rate of return method is that it is relatively easy to use. It can be easily calculated using accounting data. It uses accounting profits to measure the rate of return. Although the ARR is relatively easy to use, it suffers from the two main serious disadvantages.

Firstly, it ignores the time value of money. By so doing, profits occurring at different times are given the same value and of course that is very wrong.

Secondly, it uses accounting profits, not cash flows, to appraise investment proposals. It is incompatible with the firm's objective of maximizing the market value of shares. This is because share values depend on cash flows, earnings and not upon accounting rates.

## 4.0 CONCLUSION

In this unit, we discussed Traditional Investment Appraisal Methods. We discussed Payback Period Method and the Accounting Rate of Return Method (ARR). Both are Traditional Investment Appraisal Methods.

## 5.0 SUMMARY

This unit treats Traditional Investment Appraisal Methods. We discussed two of the methods – Payback Period and Accounting Rate of Return. These methods are very simple to use and therefore appeal to project analysts.

In the next unit, we shall treat Discounted Cash Flow Methods of Investment Appraisal.

## 6.0 TUTOR-MARKED ASSIGNMENT

A hospital costs N5,000,000 to set up and generates year end cash flows of N1,000,000, N1,500,000, N2,000,000, N3,000,000. The cost of capital is 10%. Calculate the net present value of the hospital investment.

## 7.0 REFERENCES/FURTHER READING

Van Horne (1989). *Financial Management and Policy*. New Delhi: Prentice Hall.

## **UNIT 4 DISCOUNTED CASH FLOW METHODS OF INVESTMENT APPRAISAL**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Discounted Cash Flow Methods of Investment Appraisal
    - 3.1.1 Time Value of Money
    - 3.1.2 The Cost of Capital
    - 3.1.3 The Net Present Value (NPV) Method
    - 3.1.4 Interpretation of Net Present Value (NPV)
    - 3.1.5 Evaluation of Net Present Value Method
  - 3.2 The Internal Rate of Return (IRR) Method
    - 3.2.1 Interpretation of IRR
    - 3.2.2 Measurement of Cash Flows
    - 3.2.3 Depreciation and Cash Flows
    - 3.2.4 Fixed Assets and Cash Flows
    - 3.2.5 Salvage Value and Cash Flows
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In the last Unit (Unit 3), we discussed Traditional Investment Appraisal Methods. We discussed the Payback Period, one of the traditional methods of Investment Appraisal. We then discussed Accounting Rate of Return (ARR).

In this unit, we shall discuss the Discounted Cash Flow Methods of Appraisal. It is fairly difficult to understand. But you need to understand it all the same.

### **2.0 OBJECTIVES**

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

- describe the concept of the discounted cash flow Methods of Investment Appraisal
- discuss their practical relevance.

### 3.0 MAIN CONTENT

#### 3.1 Discounted Cash Flow Methods of Investment Appraisal

When in Unit 13, we discussed Payback Period and the Accounting Rate of Return (ARR), we came to the conclusion that both of them were defective as Investment Appraisal methods.

A main reason advanced was that both methods failed to recognize the time value of money. Because of that shortcoming, we will improve our analytical skills by discussing alternative investment appraisal methods that recognize the time value of money. The two methods are the Net Present Value (NPV) method, and the Internal Rate of Return (IRR) method. As a group, they are known as the discounted cash flow methods. Our task in this unit is to discuss them. However, we will first discuss two topics that will assist us to understand the discounted cash flow methods of project and investment appraisal. The two topics are time value of money and the cost of capital.

##### 3.1.1 Time Value of Money

In most of our discussions concerning money, we usually treated money in absolute terms. We did not consider time when computing the value of money. For example, a student may not easily see the difference between N50,000 bursary advanced to him in January 2008 or December 2008. Technically speaking, a sum of N50,000 in January 2008 is not the same as N50,000 in December 2008 because of what is known as "the time value of money". And truly speaking, the two sums of money do not have the same value.

In terms of rationality, a rational person who is offered to collect the sum of N3,000,000 in January 2008 or December 2008 would prefer to collect the sum of money in January 2008 instead of December 2008 due to the following reasons:

- The future is uncertain and anything can happen to cancel the opportunity of receiving the money later.
- The desire to spend now instead of later
- The money could be invested immediately to earn interest.

We will now say that this attitude of preferring money now instead of the future is known as an individual's time preference for money.

Apart from this time preference for money, there is also the time preference rate. In the literature, the time preference for money is usually expressed by an interest rate. This interest rate is usually known as the time preference or discount rate. The discount rate is very

important in the investment analysis because different firms have their own discount rates.

Before we go further, there is this concept that we would like to introduce to help our further analysis. This concept is the Cost of capital.

### **3.1.2 The Cost of Capital**

In the investment analysis and appraisal, the cost of capital appears to be very critical and important.

The major reason for wanting to know the cost of capital is that it helps the analyst to make intelligent financial decisions when there are two options namely:

- accept a project
- reject a project

So we will go ahead and define the cost of capital as the minimum rate of return required on an investment project. It is a cut-off rate of return. There is also what we call the expected rate of return on an investment.

These two rates may not be equal.

Truly speaking therefore, the firm will undertake the investment proposal if the expected rate of return is greater than the cost of capital.

Usually, when appraising the investment proposal, the cost of capital will be given.

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

The Net Present Value method is the most admired among the discounted cash flow methods. This is because it is relatively easy to compute and also recognizes the time value of money. Inherently, it correctly advances the view that cash flows that arise at different periods have different values.

When you want to compute Net Present Value (NPV), three steps are very important.

Firstly, an appropriate rate of interest is selected which will be used to discount the cash flows. This rate of interest is the firm's or project's cost of capital.

Secondly, the present values of investment proceeds (inflows) are computed and the present values of investment outlay (outflows) are computed using the cost of capital as the appropriate discount rate.

Thirdly the Net Present Value (NPV) is computed by deducting the present value of cash outflows from the present value of cash inflows. If the present value of cash inflows is greater than that of outflows, then the project has a positive Net Present Value (NPV). However, if the present value of cash inflows is less than the present value of cash outflows, then the present value of the investment proposal will be negative.

Assuming that all cash outflows of an investment are made in year  $t_0$ , then the equation for the Net Present Value is given by:

$$NPV = \left( \frac{A_1}{(1+k)} + \frac{A_2}{(1+k)^2} + \frac{A_3}{(1+k)^3} + \dots + \frac{A_n}{(1+k)^n} \right) - C$$

Where  $A_1, A_2 \dots + A_n$  = cash inflows

$K$  = the firm's cost of capital

$C$  = cost of the investment proposal

$n$  = expected life of the investment proposal

Under the net present value method, the acceptance rule is to accept the investment proposal if the Net Present Value is positive and to reject it if the Net Present Value is negative.

### Worked Example

A bakery project costs N2,000,000 to set up and generates year end cash inflows of N800,000, N900,000, N1,000,000 and N800,000 over a four year period. The required rate of return is 10%. Calculate the net present value of the bakery project.

### Solution

<u>Year Value</u>	<u>Cash Inflow (₦)</u>	<u>Discount factor at 10%</u>	<u>Present Value Of Cash Inflow (₦)</u>
1.	800,000	.909	727,200
2.	900,000	.826	743,400
3.	1,000,000	.751	751,000
4.	800,000	.683	<u>2,768,400</u>
	Less Project Cost		2,000,000
	Net Present Value		768,000

### **3.1.4 Interpretation of Net Present Value (NPV)**

We have used the example of the bakery project to compute Net Present Value (NPV). But we need to understand what NPV is and be able to interpret it. The positive net present value may be interpreted as the immediate increase in the firm's wealth if the investment proposal is accepted. It is equivalent to an unrealized capital gain. The unrealized capital gain will be when the expected cash inflows materialize.

### **3.1.5 Evaluation of Net Present Value Method**

We have discussed the net present value concept and used an example to compute the NPV of a project. We shall go ahead to evaluate NPV method. The most important merit of the NPV method is that it recognizes the time value of money. Also, it considers all the cash flows that arise throughout the duration of the investment project. The NPV method is consistent with the objective of maximizing the objective of the firm.

However, the net present value method suffers from some limitations. Firstly, it is difficult to use. It involves the use of discount tables and also computers.

Secondly, in calculating NPV, it is assumed that the appropriate discount rate is known. The discount rate to be used is the firm's cost of capital. The cost of capital is not very easy to compute.

The NPV method may not give satisfactory answers when the projects in question have different initial outlays. NPV result may be misleading when we are dealing with alternative projects – under capital rationing situations.

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

We have discussed the net present value method and did a computation of NPV. We shall now discuss the Internal Rate of Return (IRR) method. The internal rate of return is another discounted cash flow technique which recognizes the time value of money and apparently the magnitude and timing of cash flows. 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. At that rate (IRR), the net present value of cash outflows of an investment is zero (0). It is called an internal rate because it depends entirely on the outlays and inflows of the investment and not any other rate outside the investment.

If we write the equation:

$$C = \frac{A_1}{(1+r)} + \frac{A_2}{(1+r)^2} + \dots + \frac{A_n}{(1+r)^n}$$

Where C = investment outlay

$A_1 + A_2 + \dots + A_n$  = Cash inflows

$$\text{Then } 0 = \frac{A_1}{(1+r)} + \frac{A_2}{(1+r)^2} + \dots + \frac{A_n}{(1+r)^n} - C$$

The value of r in the equation where the cash inflows and the investment outlay is zero is known as the internal rate of return. Under the Internal Rate of Return (IRR) method, a project is accepted if the internal rate of return is higher than or equal to the minimum required rate of return. This minimum required rate of return is known as the firm's cost of capital.

### 3.2.1 Interpretation of IRR

The interpretation of IRR is that it is the highest rate of interest that a firm will be ready to pay on the funds borrowed to finance a project without being financially worse off after repaying the principal and interest. In a technical sense, the IRR is the break-even rate of borrowing from a bank. Obviously, if a firm is able to borrow at a rate lower than the internal rate of return, the investment project will be profitable.

### 3.2.2 Measurement of Cash Flows

In the earlier section of this unit, we discussed two of the discounted cash flow methods – the Net Present Value (NPV) and the Internal Rate of Return (IRR) methods. And we saw that the two methods used information on cash flows for the investment analysis.

In discussing both methods, we discussed cash inflows and cash outflows. But at this point in time, we are going to take a technical look at cash flows and make sure we understand how they are used in the investment analysis.

A lot of students do confuse profit and cash flows. So, we must first draw a line between the two. Changes in profits may not lead to changes in cash flows. Increase in profit may be tied up in credit sales with no increase in cash flow. So, a firm may be very profitable but at the same time will be experiencing severe cash flow problems.

So, it is to be stated that in the investment analysis, it is the inflows and outflows of cash that is important. In an ideal situation, the receipt of cash is a clearly defined corporate objective.

### 3.2.3 Depreciation and Cash Flows

In computing cash flows, the net cash flow is usually on an after-tax-basis. That is to say that taxation should be deducted before arriving at the net cash flow. In the computation of after-tax net cash flows, the treatment of non-cash items deserves special treatment. One of those non-cash items is depreciation. Depreciation is a way of allocating cost of fixed assets. In accounting, depreciation is usually charged to the profit and loss account as a way of matching cost of fixed assets with their benefits. Depreciation however does not involve any outflow of cash. So, depreciation is usually ignored in cash flow computation. In a situation where depreciation has been deducted before arriving at profit after tax, the ideal is to add back depreciation to arrive at after tax net cash flow.

#### Worked Example

Below is the projected income statement of Fellowship Aluminum Limited. Compute the net-cash flow after taxation.

**Note:** The company has an outstanding loan for which it pays N10,600,000 per annum.

#### Projected Income Statement

##### Fellowship Aluminum Limited

Year Ending	31/12/2007 (N)
<b>Revenue</b>	
Sales revenue	839,280,000
<b>Direct Cost of Production</b>	
Production raw materials	567,927,360
Electricity and gas	6,880,000
Repairs and maintenance	500,000
Depreciation of machinery	3,346,000
Total Direct Costs	578,653,360
<b>Indirect Costs</b>	
Management and Labour	2,508,000
Interest and bank charges	3,000,000
Selling expenses	7,250,000
Insurance of assets	50,000
Total Indirect Costs	12,808,000
Total direct + indirect costs	591,461,360
Profit before taxation	247,818,640
Taxation	74,000,000
Profit after taxation	173,818,640



## Solution

### Projected Cash Flow Statement – Fellowship Aluminum Limited

<b>CASH INFLOWS</b>		<b>₦</b>
Profit before taxation	247,818,640	
Add back depreciation	3,346,000	
Total cash inflows	251,164,640	
<b>CASH OUTFLOWS</b>		
Loan repayment	10,600,000	
Taxation	74,000,000	
Total Outflows	84,600,000	
Cash inflows less cash outflows	166,564,640	
Opening cash balance	-	
Closing cash balance	166,564,640	

#### 3.2.4 Fixed Assets and Cash Flows

After treating depreciation, another item which we need to understand properly is fixed assets. What we are really interested in is the treatment of purchase of fixed assets. In the cash flow analysis, when an asset is purchased, the purchase cost is treated as an outflow.

#### 3.2.5 Salvage Value and Cash Flows

When we talk of salvage value, we are talking of the estimated value of an asset at the completion of its useful life for the firm. Normally, salvage value is of two types namely:

- Book salvage value is the cost of the asset at the end of its useful life.
- Cash salvage value is the market value of the asset at the end of its useful life.

#### SELF ASSESSMENT EXERCISE

List four expense items that you consider as cash outflows in a firm's profit and loss account.

## 4.0 CONCLUSION

In this unit, we have discussed cash flow criteria. We discussed the Net Present Value (NPV) and the Internal Rate of Return (IRR).

## 5.0 SUMMARY

In this unit, we have treated discounted cash flow criteria which we saw are more sophisticated than the traditional criteria. We also discussed cash flows.

In the next unit, we shall discuss Economic Appraisal and Evaluation of Projects.

## **6.0 TUTOR-MARKED ASSIGNMENT**

Net Present Value (NPV) method is an investment appraisal method. Discuss the method.

## **7.0 REFERENCES/FURTHER READING**

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

Pandey, I. M. (2002). *Financial Management*. (8<sup>th</sup> ed) New Delhi: Vikas Publishing House; PVT Ltd.

## **UNIT 5 ECONOMIC APPRAISAL AND EVALUATION OF PROJECTS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
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    - 3.1.1 Financial and Economic Analysis (A Comparison)
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    - 3.1.3 Adjustments to Financial Analysis
    - 3.1.4 Linkage Effects of a Project
- 4.0 Conclusion
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- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In the last unit (4) we discussed Discounted Cash Flow Methods of Investment Appraisal. We discussed the Net Present Value (NPV) method and the Internal Rate of Return (IRR) method.

In this unit, we shall discuss Economic Appraisal and Evaluation of Projects.

### **2.0 OBJECTIVES**

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

- explain the meaning of economic appraisal
- describe economic appraisal and evaluation.

### **3.0 MAIN CONTENT**

#### **3.1 Economic Appraisal and Evaluation of Projects**

Generally, in the analysis and evaluation of a project, we focused mainly on the cash inflows and the cash outflows. Here, we tried to analyse critical income flows of a project. We also tried to evaluate critical expenditures of a project. The type of analysis we conducted basically focused attention on private sector projects. Financial analysis tries to provide only a micro view of a project and concentrates mainly on trying to estimate accounting profits. The private sector is usually

interested in profits. However, if we are evaluating private sector projects, we will not be conducting financial analysis rather, we will be conducting what is known as economic analysis.

Economic analysis tries to consider and evaluate projects from a macro view point as opposed to financial analysis that views projects from micro view point. Economic analysis seeks to evaluate projects from the larger society's point of view.

The types of questions economic analysis tries to answer are:

- (1) Will the project under consideration lead to general well being of the community, the State and Nigeria as a whole?
- (2) Will the project generate employment at various levels in the Nigerian economy?
- (3) Will the project lead to economic growth and development?
- (4) What are the linkages that the project has forward or backward linkages?
- (5) Will the project generate more technical knowledge?

The questions that we have asked are not exhaustive. But rather, they are used here to demonstrate the type of questions that economic analysis seeks to answer.

### **3.1.1 Financial and Economic Analysis (A Comparison)**

To make sure that we fully understand what economic analysis is, we will try to compare it with financial analysis.

In the general theory, financial analysis tries to solve resource allocation problems. It tries to use financial information from projects, to determine whether or not to embark on a particular project. On the other hand, economic analysis also tries to solve resource allocation problems in an economy. In the economic theory, resources are known to be very scarce and it is part of any good analysis to allocate resources between competing projects. In a public sector setting for example, resource allocation problems can arise if a community is trying to decide whether to build a school or a hospital with its limited resources.

Financial analysis also, as we said, tries equally to allocate resources. But this is from a micro point of view. In a sense therefore, both financial analysis and economic analysis solve resource allocation problems.

Financial analysis also focuses attention on issues of benefits and costs arising from a project: streams of costs are evaluated and then deducted

from the streams of benefits. If the streams of benefits are greater than the streams of costs, then the project will be accepted.

However, if the streams of benefits are lesser than the streams of costs, then the project will be rejected. Economic analysis also is concerned about the costs and benefits attached to a project. If the streams of benefits are greater than the streams of costs, then the project in question has a positive value and should be accepted. However, if the streams of costs are greater than the streams of benefits, then the project under consideration has a negative value and should be rejected.

We now assert that financial analysis and economic analysis both concern themselves with costs and benefits attached to a project. They both provide the project analyst with answers as to the question of whether or not to accept a project under consideration. In their analysis, both use discounting and compounding techniques to arrive at their answers.

However, despite the similarities between them, there exist conceptual differences between financial analysis and economic analysis. A major difference is that while financial analysis has the primary objective of establishing the viability and acceptability of a project, 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.

Also in reaching the critical decision of whether or not to accept a project, financial analysis and economic analysis differ in their description of what constitutes costs and benefits arising from a project.

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

### **3.1.2 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.

- **Net Present Worth**

Net Present Worth is the difference between present worth of benefits and 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 benefit-cost ratio is exactly 1 (one) then that project is a marginal project or a break even project.

- **Internal Rate of Return**

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 economic analysis. Some adjustments will be made to the financial calculations to arrive at the economic data.

Firstly, it may be very 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

Name three methods of evaluating the worth of a project.

### 3.1.3 Adjustments to Financial Analysis

We have stated that the starting point of economic analysis is financial analysis, so if we have financial data on financial analysis, we need to make some adjustment 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 analyzed in the economic analysis.

One of the first transfer payment we shall consider is interest. Interest is a reward for capital. For example, if a project is funded through 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 has lost (interest) has become a gain to the provider of funds.

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

The second transfer payment we shall consider is taxes. 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 economic analysis of a project, taxes are excluded because from the point of view of the society, they are only transfer of resources from one section of the economy to another.

The third transfer payment we shall consider 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. So, we say that in estimating the true cost of a project in economic analysis, subsidies should be included.

### **3.1.4 Linkage Effects of a Project**

We will now discuss the concept of linkage effects of a project. And to do that, we will consider a situation where a polytechnic is newly located in an environment. Many new investments will begin to spring up. Private hostels will begin to spring up driven mainly by the profit motive. Restaurants will spring up and so will hair dressing salons all to cater for the needs of the new polytechnic. A bank may even arrive on the scene. Such are the linkage effects of a project.

Basically, there are two types of linkage effects and we will go ahead to discuss them.

- **Forward Linkage Effects**

Forward linkage generally is the stimulus given to industries that use the products of a project. Consider for example a flour manufacturing plant that is newly located in an environment. Because flour has so many uses, it can give rise to bread manufacturing factories and other businesses that use flour. This is a case of forward linkage project.

- **Backward Linkage Effects**

Backward linkage generally demonstrates the stimulus given to industries that supply the inputs to a project. For example, the establishment of a flour mill in an environment will lead to the demand for wheat which is a major input for flour mills. The flour mill will lead to investment in the cultivation of wheat. Also, the establishment of car assembly plant will lead to the establishment of tyre manufacturing plants that need to supply tyres to the car assembly plant.

All these are examples of backward linkage.

### **A Global Example of Economic Analysis**

In 1986, the World Bank was considering the desirability or otherwise of assisting Nigeria set up a rice farm covering thousands of hectares in a rice producing area of Nigeria. Under the scheme, farmers will be allocated large hectares of land for cultivation of rice at a subsidized rate to encourage the farmers. Such things like fertilizers will be heavily



subsidized while technical advice will be provided by world bank experts and Nigerian agricultural experts. The forecast life span of the project is five years after which it is expected that diminishing returns will set in.

A financial analyst forecasts that the following is the incremental cash balances that will accrue to the farmers.

<b>Year</b>	<b>Amount</b>
1	-N300,000
2	+N600,000
3	+N700,000
4	+N800,000
5	+N900,000

The subsidies to the farmers in the 5 years is expected to be as follows:

<b>Year</b>	<b>Amount</b>
1	N50,000
2	N50,000
3	N30,000
4	N50,000
5	N60,000

Although technical advice is to be provided by world bank experts and their Nigerian counterparts, below is the value of the technical advice when reduced to monetary naira values.

<b>Year</b>	<b>Amount</b>
1	N40,000
2	40,000
3	60,000
4	30,000
5	20,000

Because the farmers are expected to pay tax as other citizens do, the financial analyst in arriving at the incremental cash balances due to the farmers already had deducted the tax due from them. The estimates of taxation are reproduced below.

<b>Year</b>	<b>Amount</b>
1	- N10,000
2	N60,000
3	N70,000
4	N80,000
5	N90,000

The cost of the rice project initially is N1,000,000 to enable the project take off. Although the lending rate for agricultural projects is 9%, it is considered that the real opportunity cost of capital is 13%. Should the project be acceptable?

**Solution**

Although a variety of methods exist to appraise the project, the most favoured method is the net present worth method as earlier explained.

$$\text{NET PRESENT WORTH} = \left| \begin{array}{c} \text{Present Worth} \\ \text{of benefits} \end{array} \right| - \left| \begin{array}{c} \text{Present Worth} \\ \text{of costs} \end{array} \right|$$

- (a) Subsidies represent outflows of cash to the economy as a whole and so constitute costs of the projects. They now appear as negative entries to denote cash outflow.
- (b) Taxation is added back because it represents a transfer payment from the farmers to the government. It is to be recognized that the taxes arise because of the rice project. The negative tax entry in year one is the tax foregone as a result of the rice project.
- (c) Technical advice also constitutes a use of resources and has to be clearly recognized as an outflow of resources.

**Economic Analysis of World Bank Assisted Rice Project**

**Net present worth at 13%**

(Amount in Naira)

Year	Incremental Cash Balances due to Farmers	Subsidies	Taxes	Value of Technical Advice	Investment	Incremental Benefits (Cashflows)	Discount Factor 13%	Present Worth
1	-300,000	-50,000	-10,000	-40,000	-1,000,000	-1,400,000	.884	-1,237,600
2	+600,000	-50,000	+60,000	-40,000	-	+570,000	.783	+446,310
3	+700,000	-30,000	+70,000	-60,000	-	+680,000	.693	+471,240
4	+800,000	-50,000	+80,000	-30,000	-	+800,000	.613	+490,400
5	+90,000	-60,000	+90,000	-20,000	-	+910,000	.542	+493,220
Total	+2,700,000	-240,000	+290,000	-190,000	-1,000,000	+1,560,000		+663,570

Project has positive Net Present Worth and should be accepted.

### Steps in Economics Analysis

- (1) Prepare financial analysis of a project using market prices and taking into consideration items like taxation and interest charges.
- (2) Examine the entries in the financial analysis that are transfer payments and adjust such items. It follows that items like taxation which have already been deducted from the financial statement will have to be added back to estimate the benefits of the projects. The adjustment will affect such items like interest charges and subsidies.
- (3) If market prices differ from the shadow prices of inputs, adjust the input prices to reflect the true opportunity cost of inputs.
- (4) Estimate the adjusted incremental benefits arising from the project.
- (5) Using the discount rate chosen, estimate the present worth of the project benefits on a year to year basis taking into consideration the initial outlays of the project.
- (6) Using any of the measures of testing project worth, appraise the project to determine the acceptability or otherwise of the project.
- (7) Examine the externalities arising from the projects, clearly distinguishing between positive and negative externalities.
- (8) Examine the forward and backward linkage effects of the project bearing in mind the employment generation capacity of the macro project.
- (9) Estimate foreign exchange savings arising from the project especially where project will use local raw materials which hitherto have been imported.
- (10) Evaluate the employment generation potential of the project. It is to be noted that if a project leads to a forward project to capture the total employment potential due to the first project, cognizance should be taken of the spill-over effect.

### 4.0 CONCLUSION

In this unit, we discussed Economic Appraisal and Evaluation of Projects. We discussed the general nature of economic analysis.

## **5.0 SUMMARY**

Economic Appraisal and Evaluation provide us with the tools to conduct economic appraisal of projects. Financial analysis is the private sector's view of a project without considering the project's impact on the society. On the other hand, economic analysis is a macro view of a project, taking into consideration the project's impact on the society.

## **6.0 TUTOR-MARKED ASSIGNMENT**

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

## **7.0 REFERENCES/FURTHER READING**

Leon Ikpe (1991). *Project Analysis and Evaluation*. Lagos: Impressed Publishers.