

COURSE GUIDE

MPA 723 PROJECT MANAGEMENT

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CONTENTS	PAGE
Introduction.....	iv
Course Contents.....	iv
Course Aims.....	iv
Course Objectives.....	iv
Course Materials.....	v
Study Units.....	v
Tutor-Marked Assignment.....	vi
Final examination and grading.....	vi
Summary.....	vi

INTRODUCTION

MPA 723 – Project Management is a semester course work of two-credit units. It is available to all students taking the MPA programme in the School of Business and Human Resources Management.

The course consists of 16 units covering the entire facets of project management. The course involves visits to organisations, mostly government parastatals. The idea is to enable you have first-hand knowledge of how project management is carried out in practice.

The course guide tells you what the course MPA 723 is all about, the materials you will need and how to make use of the materials to ensure good study. Other information contained in the course guide includes information on Tutor-Marked Assignment. There will be tutorial classes.

COURSE CONTENTS

The course deals with the nature and purpose of Project Management, Project Management Organisation, Cost Estimation, Project Planning, Scheduling and Project Implementation.

COURSE AIMS

The aim of this course is to expose you to the knowledge of project management. It also aims to enrich your skills in the management of various projects. The aims will be achieved by:

- explaining the nature of project management
- identifying the key functions in project management
- describing the key processes in project management
- explaining project implementation
- visits to organisations to have practical experience.

COURSE OBJECTIVES

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

- explain the nature and purpose of project management
- discuss the key functions in project management
- explain the project management process
- explain project implementation processes.

COURSE MATERIALS

- Course guide
- Study units

STUDY UNITS

There are three modules consisting of 16 units in this course which should be studied carefully.

Module 1

Unit 1	The Nature and Purpose of Project Management
Unit 2	Project Management Organisation
Unit 3	Administration Functions in Project Organisation
Unit 4	Project Definition
Unit 5	Project Team Building

Module 2

Unit 1	Cost Estimates – Definitions and Principles
Unit 2	Cost Estimates – Practical Estimation
Unit 3	Financial Project Appraisal
Unit 4	Commercial Management of Projects
Unit 5	Introduction to Project Planning and Scheduling

Module 3

Unit 1	Network Analysis
Unit 2	Principles of Scheduling Resources
Unit 3	Practical Scheduling of Resources
Unit 4	Materials Management
Unit 5	Project Implementation – An Introduction
Unit 6	Managing Progress in Projects

Each study unit will take you at least two hours and it includes the Introduction, Objectives, Main Content, Self-Assessment Exercise, Conclusion, Summary, Tutor-Marked Assignment, and References. There are textbooks and other suggested reading materials under References/Further Reading. These materials are to give you additional information as you study. Attempt the questions under Self-Assessment Exercise and Tutor-Marked Assignment for greater understanding.

TUTOR-MARKED ASSIGNMENT

You are expected to do all the Tutor-Marked Assignments in this course. In answering the Tutor-Marked Assignments, you are expected to apply all that you have learnt in this course. The assignments constitute 30% of the total score.

FINAL EXAMINATION AND GRADING

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

SUMMARY

MPA 723 will expose you to key project management skills. On the successful completion of this course, you would have been armed with the necessary knowledge for managing projects.

**MAIN
COURSE**

CONTENTS	PAGE
Module 1.....	1
Unit 1 The Nature and Purpose of Project Management.....	1
Unit 2 Project Management Organisation.....	8
Unit 3 Administration Functions in Project Organisation.....	14
Unit 4 Project Definition.....	21
Unit 5 Project Team Building.....	28
Module 2 	36
Unit 1 Cost Estimates: Definitions and Principles.....	36
Unit 2 Cost Estimates: Practical Estimation.....	44
Unit 3 Financial Project Appraisal.....	50
Unit 4 Commercial Management of Projects.....	58
Unit 5 Introduction to Project Planning and Scheduling.....	65
Module 3 	71
Unit 1 Network Analysis.....	71
Unit 2 Principles of Scheduling Resources.....	81
Unit 3 Practical Scheduling of Resources.....	85
Unit 4 Materials Management.....	93
Unit 5 Project Implementation: An Introduction	102
Unit 6 Managing Progress in Projects.....	109

MODULE 1

Unit 1	The Nature and Purpose of Project Management
Unit 2	Project Management Organisation
Unit 3	Administration Functions in Project Organisation
Unit 4	Project Definition
Unit 5	Project Team Building

UNIT 1 THE NATURE AND PURPOSE OF PROJECT MANAGEMENT**CONTENTS**

1.0	Introduction
2.0	Objectives
3.0	Main Content
3.1	Definition of Project
3.2	Meaning of Project Management
3.3	Purpose of Project Management
3.4	Types of Projects
3.4.1	Tangible Projects
3.4.2	Intangible Projects
3.5	Project Objectives
3.5.1	Completion Time
3.5.2	Performance
3.5.3	Budget
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

1.0 INTRODUCTION

Project management is assuming greater importance in both the public and private sectors of the economy. As managers in our different callings and organisations, we may be involved in the management of projects and are given assignments within a project management team. We therefore need to understand at the onset, the nature of project management.

In this unit, we will discuss the nature and purpose of project management. We shall look at the definition of project management and also the core nature.

2.0 OBJECTIVES

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

- define and explain the nature of project management
- describe the purpose of project management.

3.0 MAIN CONTENT

Project management has evolved because of the need to manage complex public and private sector activities. But before we go into our discussions on project management, we need to understand the subject matter. We also need to understand our operating terminology.

3.1 Definition of Project

Project has been defined in various ways. Some authorities see projects as mere activities while others see them as programmes of action. *Longman Dictionary of Contemporary English* defines a project as “an important and carefully planned piece of work that is intended to build or produce something new, or to deal with a problem.”

From this simple definition, we can see that a project, apart from being important, should be carefully planned so as to produce something.

Some of the things that a project seeks to produce may be tangible or intangible. A motorcycle is a tangible product but conducting a census is not a tangible product.

The following are examples of projects:

- a. construction of a 50-bed hospital at Ikeja by the Lagos State government.
- b. dualisation of the Benin-Lagos highway by the Federal Ministry of Works.
- c. sinking of 10 water boreholes at Ikorodu town by the local government council.

From whatever angle we see these projects, some of their features are that they will require the commitment and deployment of scarce resources. Also, the products will not manage themselves. They will be managed.

3.2 Meaning of Project Management

If we define a project as an important piece of work, project management is the planning, organising, directing and controlling of resources for a relatively short-term objective that has been earlier established to complete specific goals. For example, the construction of a 50-bed hospital at Ikeja by the Lagos State government will require a lot of resources: financial, material and labour.

There will be need for procurement of land. There will also be need for architects to design the hospital. There will be need for structural engineers, civil and building engineers and electrical engineers. Different types of equipment will be sourced for e.g. X-ray machines, laboratory equipment, etc. to equip the hospital.

There should be a way in which all these resources should be coordinated and managed for effective and time management. In situations like these, project management comes in handy to provide much needed expertise.

3.3 Purpose of Project Management

From the onset, it will be necessary to stress that many projects are very complex in nature. The complexities may be introduced by the nature of technology required to execute the project. For example, a census project is one of the most difficult and complex projects that public sector managers may face. Also, managing the 2007 election in Nigeria was another complex project.

Most projects such as we have mentioned may require elements of critical risks and uncertainty. For example, how do we predict what will happen next year? Even if we could predict the political future with a measure of certainty, predicting the movement of prices and costs of materials in Nigeria involves a lot of risks and uncertainty.

In all cases therefore, we would say that the purpose of project management is to foresee the future and associated problems and therefore, plan, organise and control key activities so that projects are completed successfully and on time too.

If we see project management from that perspective, it follows logically that project management starts even before financial resources are committed and lasts until the completion of the project.

SELF-ASSESSMENT EXERCISE 1

Explain the meaning and purpose of project management.

3.4 Types of Projects

We have discussed the meaning of project management and also the purpose. Let us go further and discuss the various types of projects that we might encounter in our different organisations as managers. Some of the types include:

3.4.1 Tangible Projects

Tangible projects are those projects whose output are tangible and can be seen with the naked eye. They may include the following:

- a civil engineering project
- a hospital building project
- a water borehole project
- an aircraft manufacturing plant
- a milk manufacturing plant
- an urban play ground.

3.4.2 Intangible Projects

Intangible projects are those that require commitment of resources but whose output cannot be seen with the naked eye. In most cases, they are social projects and in some cases they may be political projects. Examples of intangible project in Nigeria include the 2007 elections and the national census.

SELF-ASSESSMENT EXERCISE 2

Discuss five tangible projects you may find in a new and emerging city.

3.5 Projects Objectives

Projects must have objectives. It is one of the important tasks of project managers to see that the projects they manage meet their objectives. Let us now discuss the objectives of projects.

3.5.1 Completion Time

Most projects, when formulated, have completion times. A normal football match lasts for about 90 minutes. It is the duty of the referee to

ensure that the football match is completed within the set time. Most public sector projects even at the time they are awarded or initiated always have a time frame attached to them. For example, the rehabilitation of the Lagos-Benin expressway may be projected to be completed in 24 months. That is the projected duration of the project. Any contractor who is given the contract for such a job should ensure that the road is completed on time.

Another point to note about completion time of projects is that late completion or delivery of an agreed project will not please the sponsor of a project. Consider, for example, that the Federal Ministry of Works awards a contract for the dualisation of the Owerri-Onitsha road to Julius Berger and the road is to be completed in 24 months under the terms of the underlying contract. If Julius Berger, the contractor, fails to complete the road project in 24 months, the Ministry of Works will not be pleased with it. Besides, time is money and if a contractor fails to operate within a time frame, inflation may set in and delay the project completion or increase the cost.

3.5.2 Performance

All projects have objectives which they set out to achieve. For example, a public hospital project should have the objective of providing safe and affordable healthcare to the community. Also, a private sector fast food project has the objective of manufacturing hamburgers, fish cake, hot dogs, etc. for its customers. This is a performance objective.

Also, apart from the performance objective, most projects have a quality objective. For example, a hospital should have the objective of providing healthcare. This is a performance objective. But the provision of the service should be safe. For example, hospital workers (nurses, doctors, etc.) while treating patients must take adequate care so as not to infect the patients with the HIV through use of unsterilised needle. This is a quality objective.

Most organisations have quality as one of their major objectives. See, for example, what Daimler Benz has done with Mercedes Benz cars.

Sony products are reputed for their amazing quality. Finally, another aspect of performance is reliability. A good product should also be reliable especially in the case of medical testing devices like PH meters.

In patient care, an unreliable thermometer may raise a false alarm concerning the health of a patient and lead to wrong diagnosis.

3.5.3 Budget

All projects involve financial outlays. The financial outlays (expenditures) attached to a project are usually controlled by the budget. The budget sets a limit as to the quantity of funds a project can consume. In most organisations, the budget for every project is usually set aside. The reason why a project should be monitored is that failure to do so in some cases may lead to exhaustion of funds and abandonment of the project in question.

We have seen that projects may have three main objectives, namely: time, performance and budget objectives. A major task facing project managers is how to balance these three objectives. What it means is that at all times the focus of managers must be on the three items. To retain our understanding of project objectives, we will go a step further to look at a simple triangle of objectives.

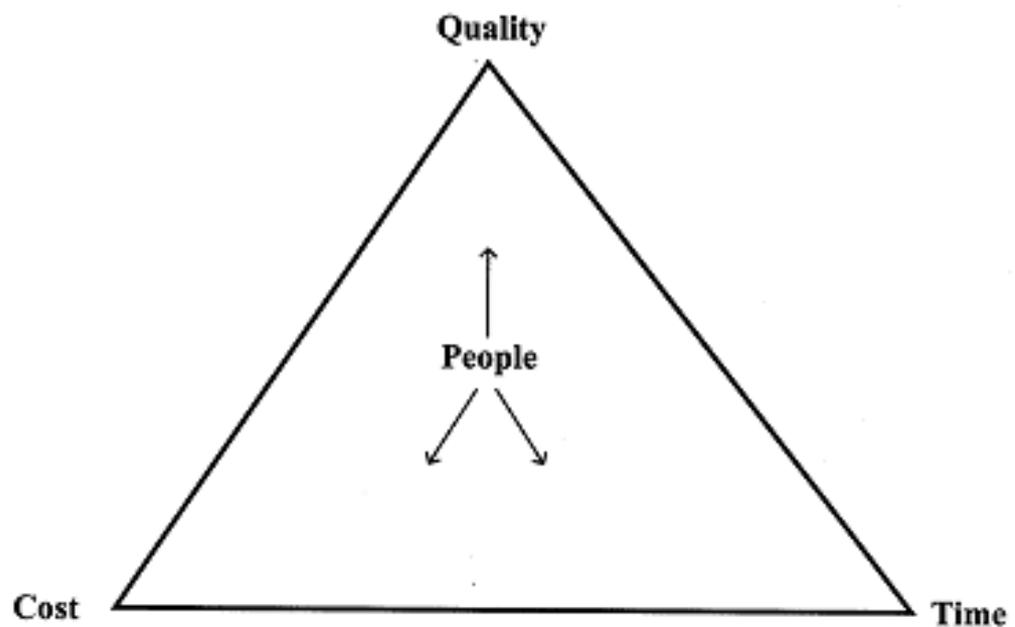


Fig. 1: The Triangle of Objectives

SELF-ASSESSMENT EXERCISE 3

Discuss the objectives of executing a project.

4.0 CONCLUSION

In this unit, we have discussed the nature and purpose of project management. We looked at the definition of a project and also a working definition of project management. We also looked at types of projects and also project objectives.

5.0 SUMMARY

This unit is a foundation unit in our study of project management. It tries to provide a starting point for our discussions on the key aspects of our study of project management.

It discusses the nature of projects and also the purpose of project management. With this background, we will now move ahead with our work.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the key objectives of project management.

7.0 REFERENCES/FURTHER READING

Belbin, R.M. (1996). *Management Teams: Why They Succeed or Fail*. Oxford: Butterworth-Heinemann.

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

UNIT 2 PROJECT MANAGEMENT ORGANISATION

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Communications in Project Management
 - 3.2 The Need for a Project Manager
 - 3.3 Types of Project Management Structures
 - 3.3.1 Functional Matrix
 - 3.3.2 Project Matrix
 - 3.3.3 Pure Project Team Organisation
 - 3.3.4 Site Teams
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

We have earlier discussed the fact that projects require the commitment of resources and people to get them executed and to meet project objectives.

It is obvious then to think that if the project objectives are to be achieved, the resources, people, communication and jobs must be organised. But there is no standard way in which projects should be organised. Organisation of project management varies significantly between organisations.

In project management organisation, we shall discuss the importance of communication in project management and also examine the types of project management organisations. This discussion will enable us to understand the fundamental organisation structures that are necessary to ensure effective management.

2.0 OBJECTIVES

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

- discuss project management organisation
- explain the different types of project management organisation.

3.0 MAIN CONTENT

3.1 Communication in Project Management

In management theory, we did learn that communication is very important in every organisation. The organisation structure helps to describe the clear lines of authority. Also, communication in an organisation is a two-way affair. Communication flows from top to bottom and then from bottom to top. Communication ensures that the jobs of information and coordination are made easy.

A problem usually encountered in a project situation is how best to structure communication flow so as not to disrupt activities in an existing set-up. For example, a local government clinic is undergoing training on the use of a new malaria drug. But the project supervisor is a community development officer from the health ministry who is much junior to the head of the local government health department. It is obvious that the malaria project will require communication between the outside parties (the community development officer) and the Local government clinic. The communication flows must be structured in such a way as not to introduce friction or mass discontent arising from loss of team spirit.

3.2 The Need for a Project Manager

In a real life situation like in a company, a project manager may be an individual who is appointed to manage a project. In some cases project managers are consulting firms of either architects or other professionals. They may be appointed to oversee very large and complex projects.

A project manager ensures that all the activities relating to the project are planned, coordinated and closely directed to meet the set objectives. The key functions of the project manager are communication and coordination. The project manager implements the project and reports routinely to the project initiator or purchaser.

Let us look at the role of a project manager in the healthcare industry. Our example is a new anti-malaria drug being developed by the Federal Ministry of Health in conjunction with the World Health Organisation.



Fig. 1: A Public Sector Drug Development Project

From fig. 1, it will be observed that the project manager is involved in the total project from the drug design stage to the sale of the drug to the final consumer.

SELF-ASSESSMENT EXERCISE 1

List and discuss main functions of a project manager.

3.3 Types of Project Management Structures

We have discussed the project manager and the important roles assigned to him or her. But we did not discuss the types of structures that the project manager will be in when managing projects. We want to see how he/she relates to the existing organisation and to the new project. This leads us to a discussion on the types of structures in project management.

3.3.1 Functional Matrix

At times, it is possible for a project manager to be appointed within an organisation which has other routine activities. In such a situation, there

are existing departments and work flow continues normally. The project manager when appointed within such an existing framework is usually required to pay attention to the new project. In this peculiar situation, the project manager ordinarily plays the role of a coordinator and has no direct line authority over any other manager or existing staff.

In a project management situation, this type of organisational arrangement is referred to as a functional matrix.

If, for any reason the project manager is not receiving the level of cooperation he requires, problems arise and disrupt the project management task.

Functional matrix organisations are mainly found in private manufacturing companies with single or multiple product lines.

Situations arise where many project managers exist in a firm or organisation and have different projects which they manage. They may begin to compete for the resources of the organisation resulting in conflict amongst them.

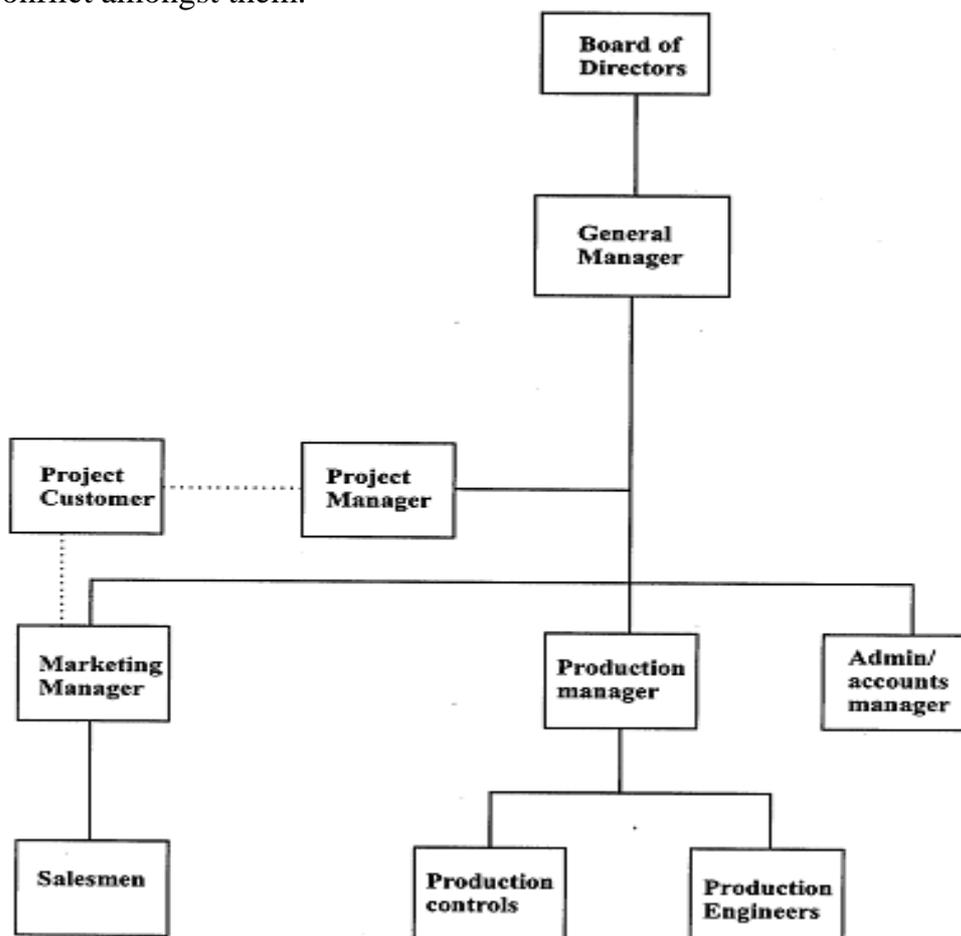


Fig. 2: A Functional Matrix for a Single Project in a Simple Manufacturing Company

3.3.2 Project Matrix

A project matrix is different from a functional matrix. In a project matrix, project managers are given greater authority over other functional managers. In this situation, it is usual for departments to contribute staff that they release to a project manager working on a particular project. For example, in the computerisation of a bank, when a project manager is appointed, staffs are handpicked from other departments or units to join the project team. In this situation, as long as the computerisation project lasts, all the project staff report to the project manager.

We will see that the project matrix situation makes room for effective project management but it also has its own limitations.

3.3 Pure Project Team Organisation

A third type of project management structure is known as the pure project team organisation. In a pure project team organisation, a work group or project team is created for each project with the project manager as head of the team. In this type of arrangement, the project manager is given absolute authority over the project team.

For example, in a community water project, a project manager might be appointed to handle the project. The team will undertake the design and construction of the necessary buildings. The team will also design the installation of the plant and machinery. The team will purchase the necessary equipment and see the water project to completion.

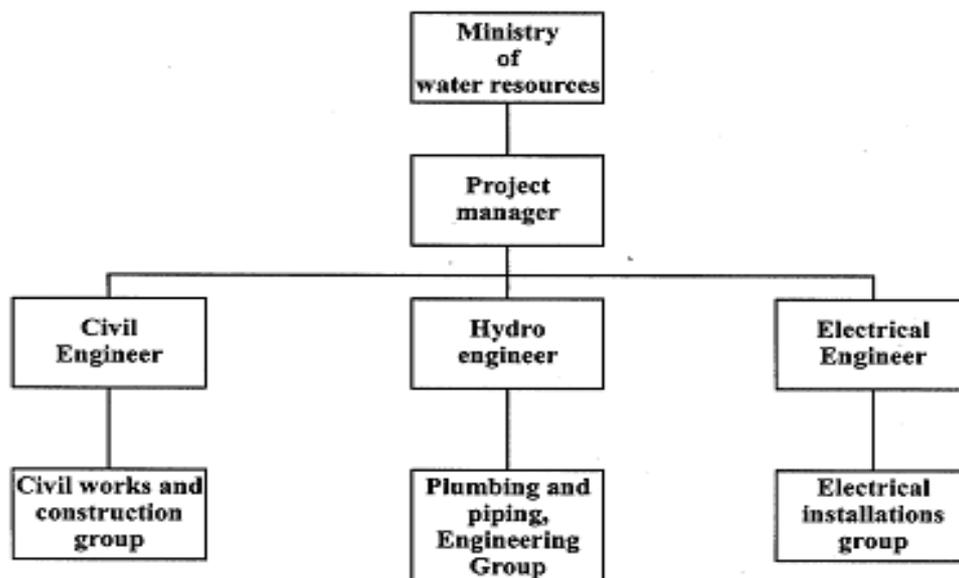


Fig. 3: Project Team Organisation

The above example shows the organisation of a team brought together to construct a local government water project.

3.3.4 Site Teams

At times, situations arise that warrant site teams to be created. This is usually where a project is located far away from an organisation's head office. An example would be a communication company like MTN trying to set up a communication mast at Calabar in Cross River State. In such a situation, it will be very appropriate to raise a site team to be deployed at Calabar under the leadership of the project team leader. The team leader supervises the project and reports day-to-day progress to the head office in Lagos.

SELF-ASSESSMENT EXERCISE 2

Appraise the different types of project management structures.

4.0 CONCLUSION

In this unit, we have looked generally at project management organisation. We discussed communication in a project situation. We also examined the need for a project manager and discussed the types of project management structures.

5.0 SUMMARY

This unit treated project management organisation which is very important in our study of project management. The knowledge gained in this unit will assist us forge ahead by providing much needed background information.

6.0 TUTOR-MARKED ASSIGNMENT

With particular reference to project management structures, discuss the differences between a functional matrix and a project matrix.

7.0 REFERENCES/FURTHER READING

Crosby, P. B. (1979). *Quality is Free: The Art of Making Quality Certain*. New York: McGraw-Hill.

Klien, R. L. & Ludin, I. S. (1992). *The People Side of Project Management*. Aldershot: Gower.

UNIT 3 ADMINISTRATION FUNCTIONS IN PROJECT ORGANISATION

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Administration Function in a Pure Project Team
 - 3.1.1 Motivation and Leadership
 - 3.1.2 Good and Easier Communication
 - 3.2 Administration Function in a Matrix Organisation
 - 3.3 Administration Function in a Hybrid Organisation
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

In unit 2, we discussed project management organisation. We also discussed various project management organisation structures like the functional matrix, the project matrix, the pure project team organisation and site teams.

These are all different arrangements under which a project could be organised. In this unit, we will discuss the administration function in these different organisation types and also try to examine the merits and demerits of the various organisation types.

2.0 OBJECTIVES

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

- discuss the nature of administration functions in project organisation
- explain the differences in administration between the various types of project organisations.

3.0 MAIN CONTENT

When an organisation wants to embark on a project, some of the central questions that will arise are:

1. What type of project management organisation should be adopted and why?
2. Should a project team be built and over which should be placed a project manager to report to management?
3. Should the organisation adopt a functional matrix? If the answer is yes, then the project manager if appointed will be held responsible for the project but has no direct line authority over the staff that he/she works within the project.

Our interest in such situations is based on the fact that the key functions of a project manager are administration and management. But we will quickly realise that the administration function will depend to a large extent on the type of project management structure that is in place.

In most cases, project managers do not select their own staff or be allowed to recruit staff. Most of the time, staff are selected and imposed on the project manager. Again, the members of a project team may not all share the general sentiments attached to a project. Some members will end up becoming passive members while others might have a sense of team spirit and contribute positively to team objectives. In each case, project managers are still faced with the task of administration.

Now let us start by discussing the administration function in a pure project team.

3.1 Administration Function in a Pure Project Team

When a pure project team has been set up, it has the primary advantage that resources and energies can be directed towards meeting the objectives set for the team. In most of pure project teams, they are independent and also have their own budgetary allocation of resources of both money and people.

An important aspect of pure project teams is the idea of motivation which invariably affects team spirit. When people are motivated, team spirit is generated and this helps in team building. So in most pure project teams, the members usually will feel a deep sense of belonging and strive to meet team goals and objectives.

Everybody working within a pure project team reports either directly to the project manager, or to another manager who reports to the project manager. It is easy for us to see that in this situation, the line of authority is very clear.

Communication flow is very easy from the top to the bottom and from the bottom to the top. Instructions move from the project manager to other managers within the project and then to other members of the project team. Let us display communication flows in a pure project team in the diagram below.

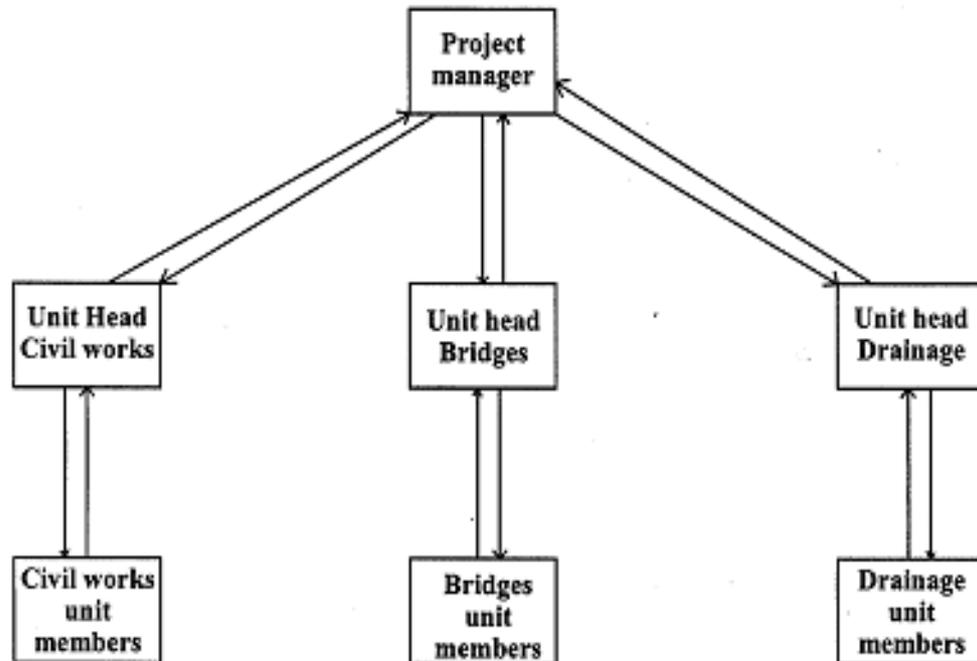


Fig. 1: Communication Flow in a State Road Maintenance Agency

Apart from the clearly defined communication lines which we have just seen in our example, you will note as managers that there are clearly defined lines of authority in a project team. The command structure is perfect.

Having discussed communication flows in a project team, let us now bring out what we see as the advantages of a pure project team in terms of administration.

3.1.1 Motivation and Leadership

A major advantage of pure project teams is the issue of motivation and leadership. In most teams, members are motivated and when people are motivated, leadership becomes easier and administration is also made much easier.

3.1.2 Good and Easier Communication

Because of the nature and structure of pure project teams, communication flows are fast and efficient. Information moves very fast within the team.

We have seen the advantages of structuring a pure project team especially in terms of administration and communication. However, there are some disadvantages that are inherent in pure project teams. Let us discuss some of the disadvantages.

Because of the way most project teams are structured, they tend to be rather rigid or inflexible. Everything within the team is defined. For example, if a project team has five engineers working on a dam project, the absence of two of the engineers may critically affect the job since it is not very easy to bring in temporary members into a structured project team.

Again, situations may arise when a medical doctor is attached to a project team of about 20 people when in the alternative the same medical doctor could treat 100 patients daily in a general hospital. When such situations arise, it is easy to notice inefficient use of scarce resources. Rigidity can also arise from the following situations:

- a. where the budget for the project team becomes insufficient
- b. where the project manager is unable to deviate from the project objectives even where this will benefit the organisation.

3.2 Administration Function in a Matrix Organisation

We have discussed the administration function in a pure project team. In this segment we will discuss the administration function in a matrix organisation. It is important that you should remember that a matrix organisation is structured along the establishment of specialist functional groups within an organisation. For example, in a university teaching hospital, you will have various functional departments.

Each of the departments will have specialists. Work is expected to continue in perpetuity as long as the teaching hospital exists. The teaching hospital may initiate several projects, but they may be of short duration.

SELF-ASSESSMENT EXERCISE 1

Discuss the merits and demerits in a pure project team like:

- a. medical microbiology
- b. pathology
- c. surgery
- d. internal medicine
- e. ear, nose and throat.

A major advantage which a matrix organisation has is the building of competence. For example, in the university teaching hospital set up, we will note that it is structured along departmental lines. In the department of surgery, there will be so many surgeons. Some will be thoracic surgeons, plastic surgeons, cardiologists, etc.

There will be formal seminars and cross-fertilisation of ideas and knowledge. Therefore, we can say that a matrix organisation encourages the build-up of skills organised along specialist lines.

For example, in an engineering firm, we will have civil engineers, mechanical engineers, electrical engineers and architects. Though they are structured along departmental lines, most members end up acquiring more skills due to cross-fertilisation of knowledge.

This type of advantage is not available to a specialist engineer deployed to supervise a particular project.

A major disadvantage that generates administration difficulties in the matrix organisation is the issue of split responsibilities which members face. For example, when a project team is raised in a teaching hospital, a medical officer in the surgery department may have two reporting lines, namely: reporting to the head of surgery department and reporting to the project team manager in the university teaching hospital.

Sometimes, organisations are either project teams or matrix organisations. They may also combine both features. Such an organisation is referred to as a hybrid organisation.

SELF-ASSESSMENT EXERCISE 2

How can competence be built up relative to administration function in a matrix organisation?

A hybrid organisation usually has a matrix organisation but sets up various project teams when the need arises. In a hybrid organisation, the various specialist groups are arranged along functional lines each headed by a specialist. Within the specialist groups, project teams could be set up.

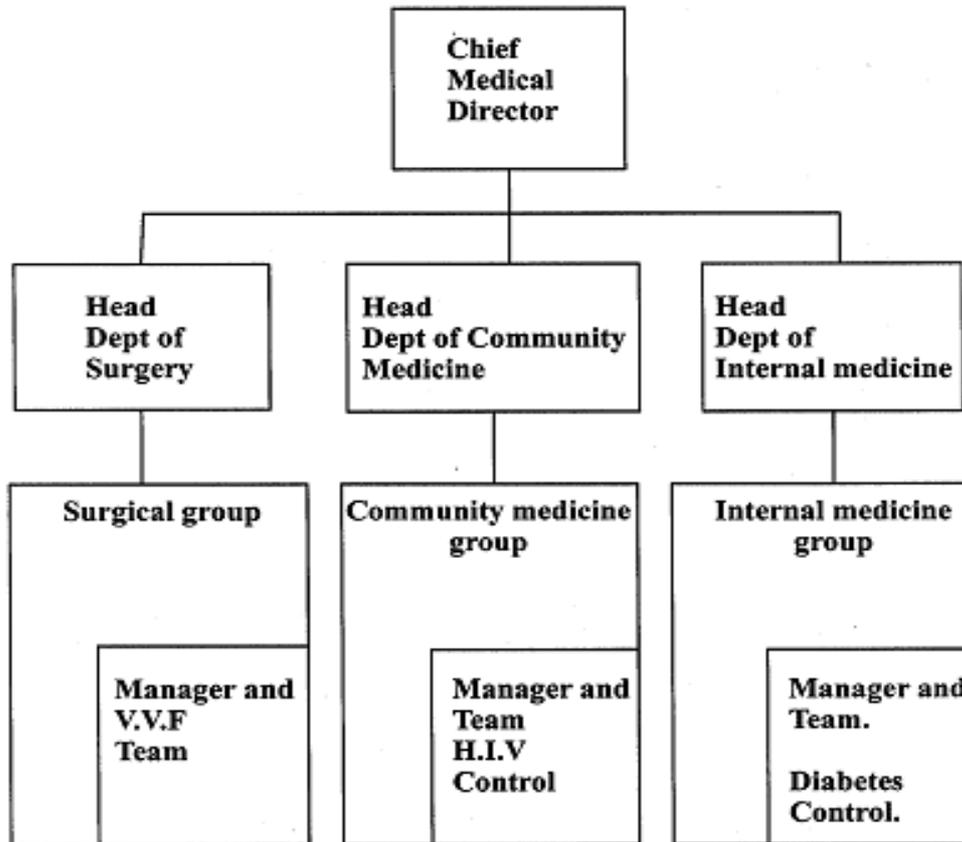


Fig. 2: Hybrid Organisation

A university teaching hospital has functional departments. Within each department is a project team.

A major advantage in administration of the hybrid organisation is that the project teams which are within the departments can count on the technical and managerial support of their department. For example, the HIV control team within the Department of Community Medicine can ask for support from the department.

SELF-ASSESSMENT EXERCISE 3

Explain the hybrid organisation with emphasis on the advantages.

4.0 CONCLUSION

In this unit, we have discussed the administration function in a project management organisation. We discussed the way information flows in the pure project team and the matrix. We also learnt that some organisation combine both project team and matrix features—hybrid organisations.

5.0 SUMMARY

This unit treats administration functions in project organisation. It tries to examine the flow of information and managerial dynamics within the various types of project organisation. The knowledge gained in this unit will be very useful to us in the near future as we progress in our study.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the advantages and disadvantages in using a pure project team to execute a project

7.0 REFERENCES/FURTHER READING

Central Computer and Telecommunications Agency (CCTA) (1997).

An Outline. London: The Stationery Office.

Wearne, S. (1993). *Principles of Engineering Organisation*. London: Thomas Telford.

UNIT 4 PROJECT DEFINITION

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Meaning of Project Definition
 - 3.2 The Project Cycle
 - 3.2.1 The Project Idea Stage
 - 3.2.2 Project Identification Stage
 - 3.2.3 Project Evaluation Stage
 - 3.2.4 Project Selection Stage
 - 3.2.5 Project Execution Stage
 - 3.3 Defining a Project for Financial Appraisal
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

In this unit, we will discuss project definition which is a very important aspect of our study as it begins to sharpen our focus on the core study of projects. Project definition is very important since it helps us to define a project under discussion.

2.0 OBJECTIVES

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

- explain the project definition process
- discuss a project cycle.

3.0 MAIN CONTENT

3.1 Meaning of Project Definition

Project definition is a process which seeks to describe a project from the idea stage to the stage when the project has been completed.

All information about the project is usually embodied in the definition of the project. Usually, before a project starts, it must be properly defined so that the parties involved properly understand their clear roles.

Discussion Case: Rehabilitation of Lagos-Ibadan Expressway

Let us use a familiar case as a discussion case. In 2005, the federal government decided to rehabilitate the Lagos-Ibadan expressway which was in a terrible state. The engineering firm of Julius Berger Nigeria PLC was chosen as the competent firm to carry out the rehabilitation work. We can describe the project by considering the various processes involved before the project was commissioned.

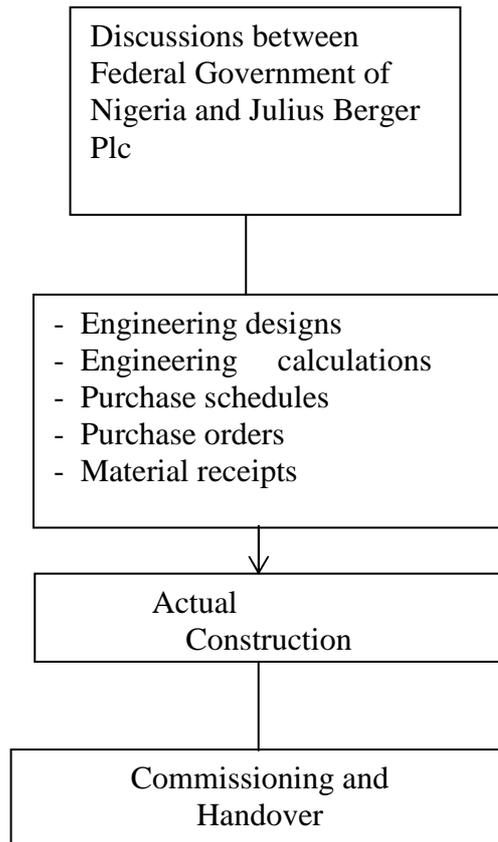


Fig. 1: The Process of Project Definition for the Rehabilitation of the Lagos-Ibadan Expressway

We have looked at a simple case of a road rehabilitation project. We will now deepen our knowledge by discussing the project cycle.

SELF-ASSESSMENT EXERCISE 1

Explain project definition?

3.2 The Project Cycle

The project cycle tries to describe the various stages that are involved from the conception of a project idea to when the project is executed or

actually takes off. Understanding of a project cycle is really very important as it enables us to get the total picture of a project. Let us now examine the various stages of a project cycle.

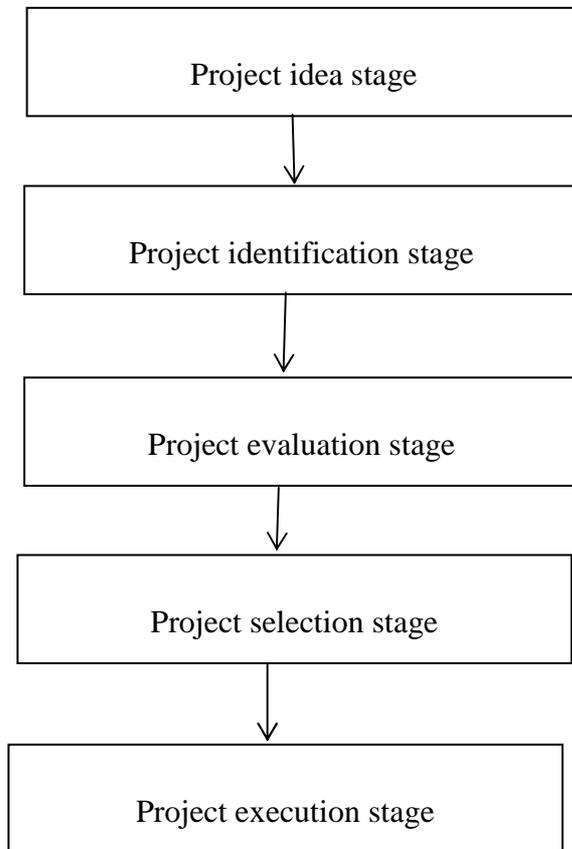


Fig. 2: The Project Cycle

3.2.1 The Project Idea Stage

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

New project ideas could originate from within an organisation or from outside it. In a public sector organisation, it emanates mainly from the assigned roles of the relevant body. For example, **a rural farmers' fertiliser distribution project** is most likely to emanate from a state ministry of agriculture and natural resources. The idea of a rural medical clinic is also likely to emanate from a health ministry.

In the private sector, project ideas could emanate from within an organisation or from outside. From within, it could arise out of contacts between salesmen and customers. It could also arise from outside if customers specifically request for possible bigger or better products.

New project ideas may fall into any of the following categories:

- a. A proposal to build a community health centre in a very remote village in Kwara State.
- b. A proposal to upgrade a rural medical clinic to a general hospital.
- c. A proposal to conduct a population census in Nigeria prior to an election.
- d. A proposal to build a mega railway line that will link the western part of Nigeria with the eastern part.

3.2.2 Project Identification Stage

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

A government agency may conceive the idea of poverty alleviation in a particular local government area of Bauchi State. But you will realise that the concept of poverty alleviation covers a very vast area of possible interventions. So apart from simply coming up with the poverty alleviation, the government agency should go ahead to identify the mode of intervention. The poverty alleviation project could be any of the following:

- a. a rural women *kunu* making seminar/workshop
- b. a rural women micro-credit scheme
- c. a millet planting project.

3.2.3 Project Evaluation Stage

When a project has been identified, the next step is to evaluate the project. Project evaluation involves the estimation of the costs and benefits of a project. Costs and benefits should be measured in terms of cash flows. It will be important here for us to understand that the estimation of cash flows of a project is a very difficult task. It is difficult in the sense that cash flows which are likely to arise in the future may be difficult to estimate.

In a public sector set up, other factors come into play when evaluating a project. For example, the employment generation potentials of a project may be taken into consideration when estimating the benefits of a project. Besides, political considerations may also come into play.

3.2.4 Project Selection Stage

After the project evaluation stage, the next stage is the project selection stage. Faced with an array of projects with different values and worth, there is need to select which projects will be embarked upon. Besides, budgetary considerations will also come into play since the resources for projects are limited.

Project selection is a top management responsibility. In the selection of projects, top management usually considers the financial cost outlays involved and match them with the benefits to be derived from a project. Projects that add positive benefits to the community should be selected.

3.2.5 Project Execution Stage

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

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

SELF-ASSESSMENT EXERCISE 2

Discuss the project cycle.

3.3 Defining a Project for Financial Appraisal

Virtually all projects involve financial expenditures but at different levels. Some aspects of a project may be ignored but there is no way that we may be able to ignore the financial aspects of a project.

Before a project is embarked upon, all aspects of financial appraisal must be conducted so that the total expenditures and inflows/benefits of the project can be estimated well in advance.

To guide us in defining a project for financial appraisal, let us draw up a checklist.

Table 1: Checklist for Defining a Project for Financial Appraisal

ITEMS	YES OR NO
Cost of land and land acquisition Construction of building offices, etc. Drainage Perimeter fence Electrical power Water Sewerage Roads Cost of equipment/machinery Material costs Skilled labour Unskilled labour Operating/maintenance costs Local government rates and taxes Vehicles Professional fees Communication Revenue/benefits Projected income statement Projected cash flow statement Payback period estimation	

4.0 CONCLUSION

In this unit, we have discussed the concept of project definition. We also discussed the concept of the project cycle which runs from the project to the project execution stage.

5.0 SUMMARY

This unit treated project definition. It tried to examine how a project can be defined. In doing this, we used an example of a road rehabilitation project to define a project. We also discussed the project cycle.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss fully the concept of a project cycle.

7.0 REFERENCES/FURTHER READING

Association of Cost Engineers. (1991). *Estimating Checklist for Capital Projects*. (2nd Ed.). London: Spon.

Klien, R. L. & Ludin, I. S. (1997). *Reducing Project Risk*. Aldershot: Gower.

UNIT 5 PROJECT TEAM BUILDING

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Team-Based Structures
 - 3.1.1 Pure Project Teams
 - 3.1.2 Task Force Teams
 - 3.1.3 Quality Improvement Teams
 - 3.2 Group Dynamic and Team Building
 - 3.3 Team Work
 - 3.3.1 One Unit Goal
 - 3.3.2 Group Cohesiveness and Support
 - 3.3.3 Team Spirit
 - 3.3.4 High Expectations
 - 3.3.5 Willingness
 - 3.4 Communication within Project Team
 - 3.4.1 Vertical Communication
 - 3.4.2 Horizontal Communication
 - 3.4.3 External Communication
 - 3.5 Building Goal Interpersonal Relations within the Team
 - 3.5.1 Effects of Poor Interpersonal Relations
 - 3.5.2 Principles of Interpersonal Relations
- 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 2, we discussed project management organisation. There we briefly discussed pure project team organisation. Here, we shall fully discuss the project team and discuss other aspects of it which we did not touch when we introduced the matter.

In a pure project team organisation, a special work group or team is created for a special project with a project manager as the head of the team.

As the case may be, the project manager may be given absolute authority over the project team. Our direction in this unit is to take a critical look at the team and discuss ways in which such a team will be made effective so as to be seen as a project team.

2.0 OBJECTIVES

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

- explain the mechanics of project team building
- discuss the dynamics of project teams.

3.0 MAIN CONTENT

3.1 Team-Based Structures

In a very large organisation including a multinational, we come across situations where there are many teams within the organisation. The teams may be created for various purposes. Let us briefly discuss some examples of teams in a practical organisation setting. To organise our thoughts we shall define team-based structures as "employee teams". It is a design where work is structured for groups. The groups are then given authority and discretion over matters such as process improvement, service development, quality management or even new product development. Team approach to management was developed mainly by Japanese companies like Toyota, Honda, Mitsubishi, Sony, and a whole lot of others. What we see today are giant Japanese firms which control a large segment of global trade?

Let us briefly discuss some of the team-based structures that are in place in some organisations.

3.1.1 Pure Project Teams

A pure project team is a specially constituted work group formed within the organisation and given a special assignment or task. The assignment could be any of the following:

- a. installation of a new computer system
- b. design of a new product
- c. design of a new service format.

Usually, members of a pure project team are nominated to join the team based on certain criteria. A team leader or manager is usually placed at the head of the team. In most cases, after the assignment has been completed, the team is disbanded.

3.1.2 Task Force Teams

A task force is created by top management to tackle or solve a major problem. In the Nigerian setting, we have witnessed the advent of one task force or the other. There was the task force on ports congestion. Members of a task force are usually drawn from various organisations with a team leader as the head. Usually at the end of the assignment or when the task force loses focus, it is disbanded.

3.1.3 Quality Improvement Teams

Today, quality has become an issue that has taken the front line in business discussions. Most organisations are drawing heavily from the Japanese firms that have long imbibed quality as their watch word.

In Nigeria today, total quality management (TQM) has become an important issue and many firms are setting up internal quality teams specially empowered to address ways to improve quality.

SELF-ASSESSMENT EXERCISE 1

What do you understand by team-based structures?

3.2 Group Dynamics and Team Building

Recall that organisations grow out of the need for people to cooperate for the achievement of set goals. The coming together is based on the fact that different people have different skills. That precisely explains briefly the origin of teams or groups.

Although groups have been variously defined in the literature, our working definition is that a group is a collection of two or more people who perceive themselves as a group, share a common interest, goal, norm and a sense of belonging. They may have a leader.

Invariably, the following can be seen as groups:

- a. a computer steering committee
- b. a product launch committee.

We have just defined a group but we need to go further to examine the group content. In an ideal project team or group, there will be different people from different backgrounds and different skills. When people join a project team or group, they may lose their work identity especially if the group they joined has a work culture or ethics.

Practically, organisations use groups or teams for the following purposes:

- a. To distribute work along clearly defined lines. In a bank, for instance, you could find the energy group, treasury group, etc.
- b. To monitor and control work. After a group has been formed, the group needs to be managed and that is why every group or team should have a leader.
- c. Problem solving. At times, groups are used to solve organisational problems as they arise. Problems facing an organisation are many. They may be major or minor. In most cases, when major problems arise, management can set up a team to look into the problem.

3.3 Team Work

Building project teams is not the end of the task ahead. The most important task is how to build team spirit. Like we said earlier, members of the team may come from various units or departments to join a particular team set up at the head office. The critical task and which is the duty of the team leader is to ensure that the group members see themselves as members of a team and also work like a team.

If members of a team are to perform as team players and work towards team objectives, then certain things should be present in the team. Let us examine those things:

3.3.1 One Unit Goal

It is important that every member of a team perfectly understands the goals and objectives of the team. Every action of each member must be directed towards the set objectives of the team.

3.3.2 Group Cohesiveness and Support

A group is made up of a number of people with different qualities and characteristics. A good group is one in which there is that cohesiveness. This cohesiveness binds the group together and makes them act in one direction and towards the same objectives.

3.3.3 Team Spirit

Individual spirit is not the same as team spirit. Team spirit is based on group affinity and affection amongst members. Team spirit makes an individual member imbibe the spirit of a group and behave like the group.

3.3.4 High Expectations

There must be high expectations amongst the various members of a team. For example, when you form a 15-man football team to represent Nigeria, each team member usually will have high expectations arising from team dynamics and spirit.

3.3.5 Willingness

Team members must be willing to be members of the team. They should not be unwilling members because if they are, they will be frustrated and this will affect the team as a whole.

3.4 Communication within Project Team

We need to now discuss communication within a project team. In a project team, there will be a lot of people who need to communicate with each other.

Communication is the process of exchanging information between one person or another or between one person and a group of persons. Communication also conveys knowledge of or information about a subject matter. Communication is all about sharing information. Generally, in a team situation, there is the need for effective communication amongst the members. The importance of communication is that it is the life blood of any organisation and by implication the team.

Communication as a process assists management functions to be accomplished. Communication enables the team leader to communicate with other members of the team and also enables other team members to communicate with the team leader. Communication provides a link between people in a team or organisation.

The real purpose of communication is to effect change in an organisation and influence action towards organisational objectives. Communication organises the human resources in an organisation or team. Let us discuss the lines of communication in a project team.

3.4.1 Vertical Communication

Vertical communication within the project team could be from the team leader to subordinates or from the subordinates to the team leader. Vertical communication assists in passing information on policies and provides feedback mechanism through which staffs respond to communication.

3.4.2 Horizontal Communication

In a project team, communication can flow horizontally across staff at the same level in the project team. It could be communication to all the managers in the team or at the same level.

3.4.3 External Communication

Within a project team, external communication is a situation where the team or group exchanges information with the larger organisation. For example, when a team leader reports progress to the managing director, we regard the information as a form of external communication as it is outside the team.

SELF-ASSESSMENT EXERCISE 2

There is need for communication within a project team. Discuss?

3.5 Building Good Interpersonal Relations within the Team

An organisation may possess enormous capital, good organisational structure, highly trained manpower. But if the staff do not relate properly to one another, then problems may likely occur frequently and retard corporate performance. And so it is with a team. As discussed earlier, a team can be made up of people from different units and backgrounds.

It is therefore, very important that at all times, managers should be aware of the need to build and maintain good interpersonal relationship with their subordinates, bosses and peers within the organisation.

Put simply, interpersonal relations are the way and manner people get along with one another. It could be the relationship between one person and another or between one group of persons (e.g. staff) and another group of persons. If people are friendly and understanding, then good interpersonal relations develop and everyone performs his or her tasks properly.

3.5.1 Effects of Poor Interpersonal Relations

- a. Tension between staff and other fellow staff
- b. Tension between staff and management
- c. Tension amongst management staff
- d. Unhealthy internal rivalry between all staff
- e. Industrial misery and hostility
- f. Strike

- g. Corruption
- h. General dishonesty
- i. Crime in the work place
- j. Disloyalty to the organisation.

In a situation where there is no good interpersonal relation, obviously productivity is lowered and this gives rise to lower earnings for the organisation.

3.5.2 Principles of Interpersonal Relations

- a. Act like a member of a team. Do not let personal interest affect that of the organisation
- b. Remember that other staff come from different backgrounds and will at times behave differently from your expectations
- c. Learn to be accommodative
- d. Keep your boss informed of your movements at all times
- e. Avoid gossips in the workplace
- f. Display a positive attitude to your job
- g. Be friendly and cooperative
- h. Treat your subordinates with respect
- i. Stick to the chain of command
- j. Learn to wear a smile on your face always
- k. Show interest in other peoples' problems
- l. Always learn to say "thank you"
- m. Avoid aggressive behaviour
- n. Always learn to apologise when you are wrong
- o. Greet people in the morning, afternoon and evening
- p. Be polite
- q. Be respectful
- r. Be honest
- s. Be responsive
- t. Show good hygiene.

SELF-ASSESSMENT EXERCISE 3

Discuss the effects of poor interpersonal relation within the team.

4.0 CONCLUSION

In this unit, we discussed project team building. We discussed team-based structure, pure project teams and task force teams. We also discussed group dynamics and team building, team, work and interpersonal relations. All these enabled us to properly understand project team building.

5.0 SUMMARY

Understanding team building is a very crucial aspect of our study since most projects practically involve the setting up of project teams. It is necessary that we properly understand how to generate team spirit and cohesiveness within a project team.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the importance of communication within a project team.

7.0 REFERENCES/FURTHER READING

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MODULE 2

Unit 1	Cost Estimates: Definitions and Principles
Unit 2	Cost Estimates: Practical Estimation
Unit 3	Financial Project Appraisal
Unit 4	Commercial Management of Projects
Unit 5	Introduction to Project Planning and Scheduling

UNIT 1 COST ESTIMATES: DEFINITIONS AND PRINCIPLES

CONTENTS

1.0	Introduction
2.0	Objectives
3.0	Main Content
3.1	Cost Definitions and Principles
3.1.1	Direct Costs
3.1.2	Factory Costs
3.1.3	Fixed Costs
3.1.4	Indirect Costs
3.1.5	Standard Labour Costs
3.1.6	Overhead Recovery
3.2	Work Breakdown
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

1.0 INTRODUCTION

Generally in project management, it is very important to accurately estimate the cost of a project. It is even more necessary for management decision and control. Before a project comes on stream, the cost implications must be known well in advance and properly estimated. This serves as a guide to proper project management and control. Proper cost estimation will allow for proper planning of costs, allocation of resources to various units of a project, cost control and most importantly budgetary control.

2.0 OBJECTIVES

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

- explain the general nature of cost estimates

- discuss the definitions and principles of cost estimation.

3.0 MAIN CONTENT

3.1 Cost Definitions and Principles

The word “cost” when used in accounting conveys lots of meaning and so must be properly qualified. There are many types of costs and part of our discussion in this unit is to properly discuss various costs and see how they properly fit into the study of project management. It is so because when we mention “cost”, we should clarify the type of cost we are talking about.

Let us discuss the key types of costs that are important for our study.

3.1.1 Direct Costs

Direct costs are those costs which are attributed directly to a job or project. For example, if an engineer spends five hours to design an engineering column, then that time spent by the engineer can be described as a direct labour and the cost can be recorded as a direct cost to be charged directly to the design of the engineering column.

3.1.2 Factory Costs

The concept of factory cost is mainly applicable to manufacturing concerns. Factory cost is the total cost of a job or project before the addition of a mark-up for the purpose of profit. Factory costs will include the following:

- a. direct materials costs
- b. direct labour costs
- c. indirect labour costs
- d. design costs.

3.1.3 Fixed Costs

Fixed costs are those costs which remain virtually unchanged and must continue to be incurred even though the workload might fluctuate between zero and the maximum or installed capacity. Fixed costs will generally include the following:

- a. management salaries
- b. administrative salaries
- c. heating and electricity expenses
- d. insurance

- e. maintenance of building, etc.
- f. business permits.

3.1.4 Indirect Costs

In an ideal setting like a manufacturing facility, the provision of office accommodation, management, welfare services, accounting, heating and lighting all constitute costs that must be incurred in running the manufacturing facility. Others will include salaries and wages.

Generally, all these cost are termed indirect costs or overhead costs.

SELF-ASSESSMENT EXERCISE

- i. What is “cost” in relation to project management?
- ii. Discuss the types of costs.

Table 1: Cost Structure for a Simple Manufacturing Project

ITEM	₦
Iron flat sheets	1,000,000
Brass rods	2,000,000
Aluminum profiles	3,000,000
Total cost of direct materials	6,000,000
Direct Labour	
Design – engineering labour	200,000
Manufacture – factory hands	700,000
Total direct labour	900,000
Overheads	1,350,000
Total factory cost	8,250,000
Mark up at 30%	2,475,000
Market selling price	10,725,000

3.1.5 Standard Labour Costs

Labour constitutes a very critical component of project cost. It includes the labour of both junior and senior personnel, engineers, accountants and the rest who are involved in a project. When trying to estimate the labour cost for any project, it would be very difficult to use the different rates of pay to be earned by every individual. There might be two engineers engaged in a project but they may not be earning the same salaries. Generally, in project management, it is advisable to use standard costing to estimate the cost of labour.

For labour costs, it is convenient to classify people according to some convenient rules based on the type of jobs that they do.

For example, engineers in a project may be averaged out to cost ₦1,000,000 per annum. Therefore, we can estimate that the standard cost for an engineer for a project is ₦1,000,000 per annum. That is the cost that will be imputed in the cost estimate for engineers.

Also, for accountants involved in a project, there may also be the need to work out the standard cost for an accountant. For example, we might estimate the standard cost for an accountant to be ₦1,500,000 per annum.

For all types of labour, we should have estimates of the standard costs. It enables the project to be properly cost.

Table 2: Example of Labour Grade for Standard Costing in a Project Engineering Company

Grade	Those Included	Comments	Salary per annum ₦
01	Company Director	-	5,000,000
02	Divisional Heads	Rank of general manager	4,000,000
03	Assistant Divisional Heads	Rank of assistant general manager and above	3,000,000
04	Management Cadre	Rank of senior managers and above. Includes senior engineers and architects	2,500,000
05	Engineers	Managers	2,000,000
06	Technologists	Deputy managers	1,500,000
07	Draughtsmen	Assistant managers	1,500,000
08	Administrative Staff	Clerks, Secretaries, etc.	1,000,000

3.1.6 Overhead Recovery

In table 1, we saw the cost structure for a simple manufacturing project. We easily computed the cost of direct materials and also direct labour. We also recorded overheads. In practical terms, direct labour costs are not difficult to estimate.

Direct labour cost is equal to time recorded on a job multiplied by the standard hourly rate. So, how can we recover overheads?

An amount can be added that is proportional to labour cost (usually a percentage) to recover a part of a company's indirect overhead costs. In table 1, we saw total direct labour as ₦900,000. Overheads standing at ₦1,350,000 is about 150% of total direct labour costs. Generally, the method of recovering overheads as a levy on direct labour costs is called absorption costing.

However, setting the percentage overhead rate is a technical matter requiring professional accounting skills.

3.2 Work Breakdown

Consider a project to build a new university at Ulakwo which is about 20 kilometres from Owerri, the Imo State capital. Even where we have defined the project as a new university, it will be very necessary to consider the total picture of the new university project.

The university project will include the following:

- a. access roads
- b. administrative buildings
- c. lecture halls
- d. clinics
- e. laboratories
- f. churches and mosques
- g. students hostels
- h. university teaching hospital complex.

Breaking the total project into smaller units constitutes what is referred to as a work breakdown. Work breakdown enables the project managers or administrators to break down a large or complex project into smaller and more manageable units.

The ideal thing to do is to break a project into smaller units called sub-projects. The sub-project itself could be further divided into much smaller units for effective analysis and design.

When a project is broken down into smaller sub-projects, it becomes very easy to cost each sub-project properly. After costing each sub-project properly, then we could then add up the costs of the sub-projects to generate the cost of the total project.

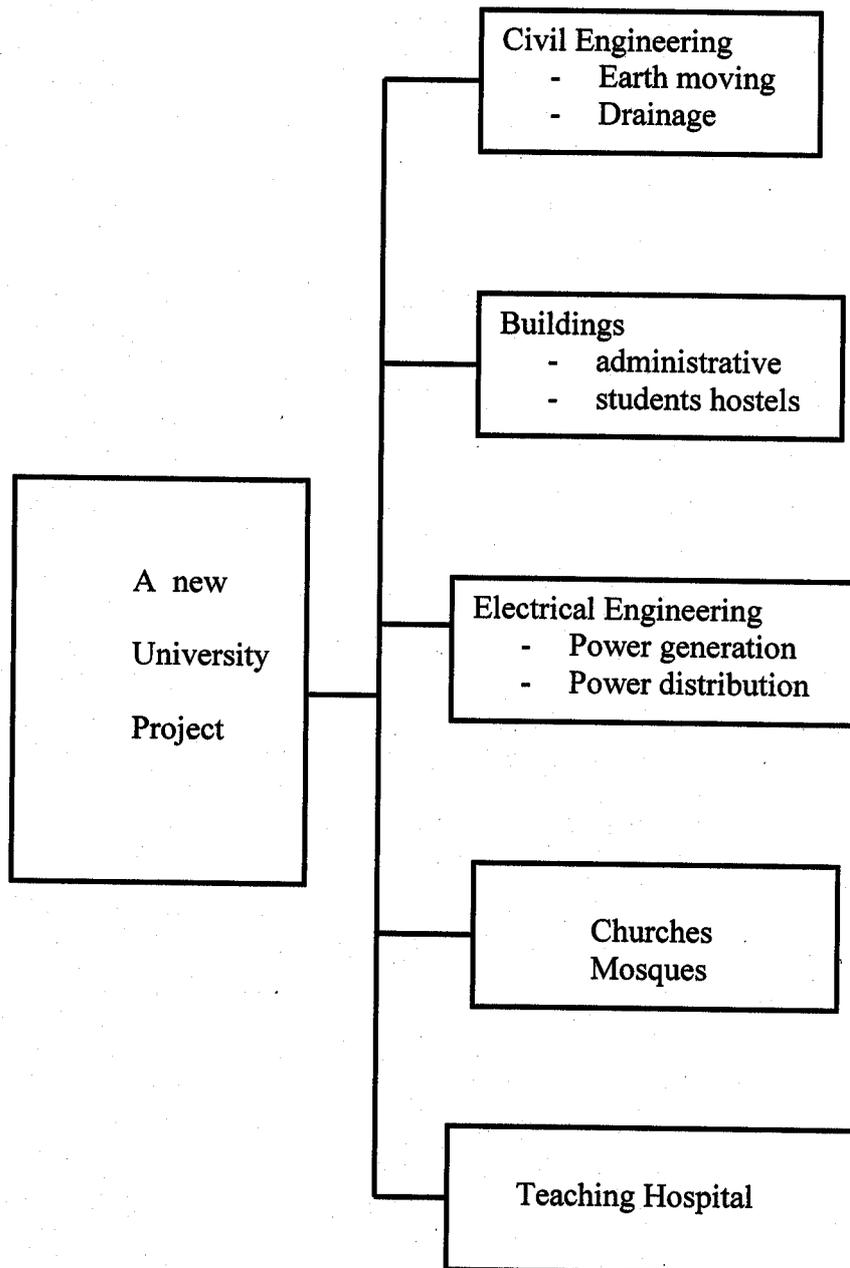


Fig. 1: Work Breakdown for a New University Project

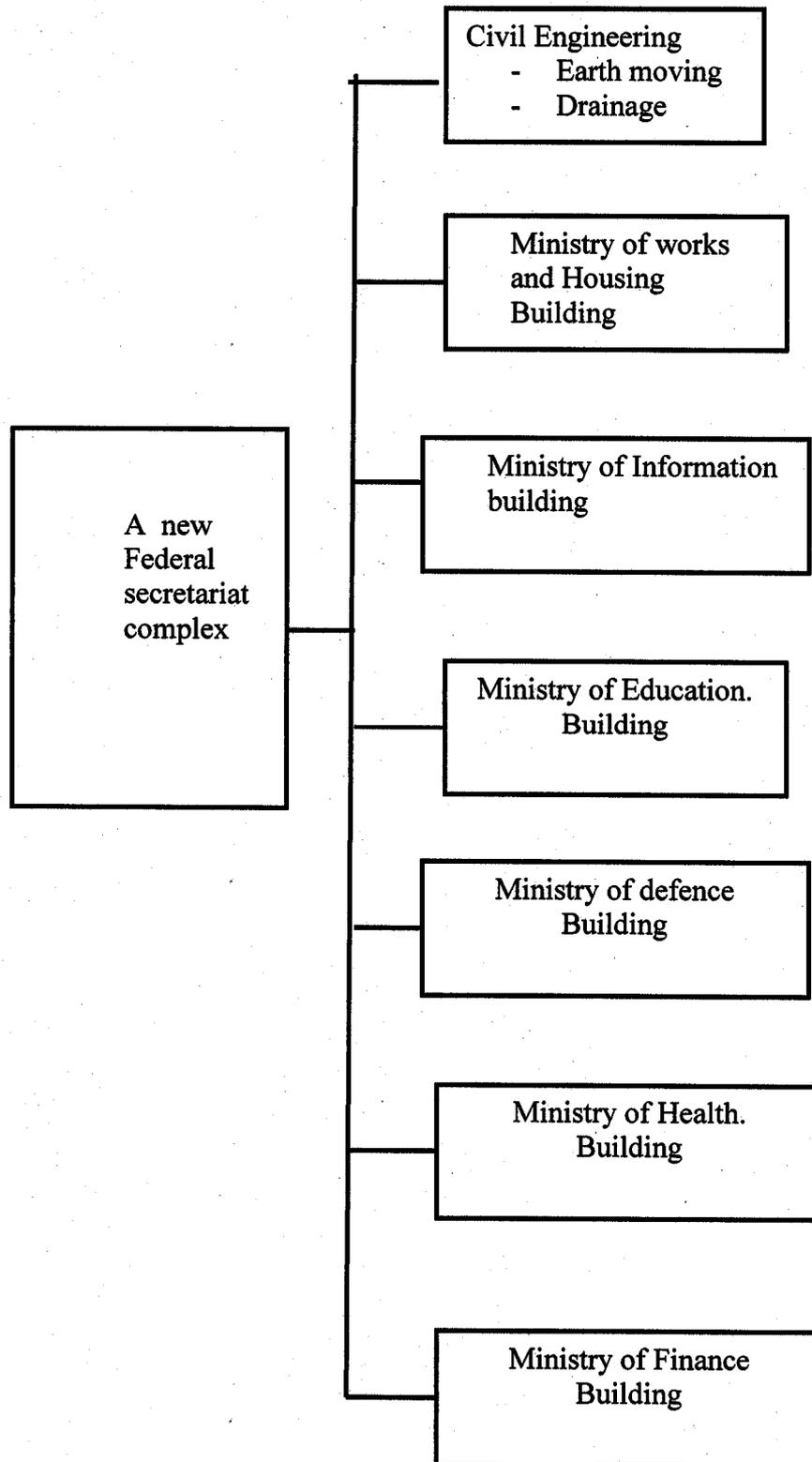


Fig. 2: Work Breakdown for a New Federal Secretariat Complex at Abuja

4.0 CONCLUSION

In this unit, we discussed cost estimates: definition and principles. We discussed direct costs, factory costs and fixed costs. We discussed standard labour costs and overhead recovery. We also discussed the concept of work breakdown. All these have enabled us to understand the basic principles of cost estimates.

5.0 SUMMARY

This unit treats cost estimates: definitions and principles. The definitions and principles enable us to have a general background to the understanding of project costs.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss, using a practical example, the concept of work breakdown.

7.0 REFERENCES/FURTHER READING

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UNIT 2 COST ESTIMATES: PRACTICAL ESTIMATION

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Practical Estimation
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

In unit 1, we laid the foundation for unit 2. We discussed definitions and principles of cost estimates. In this unit, we want to take a practical approach and use a practical example of a project. To guide our discussions, we shall define project costs as all those costs that are incurred in the process of setting up a project. The costs must be attached to the project. The list of project cost item must be exhaustive.

2.0 OBJECTIVES

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

- explain cost estimates in practice
- prepare the cost estimates of a project.

3.0 MAIN CONTENT

3.1 Practical Estimation

We need to arrange the cost items in an orderly and consistent manner so that like items stay together. To ease our discussions and to make them as easy as possible, we shall divided project costs items into the following sub-headings:

- a. cost of land
- b. cost of building
- c. cost of machinery and equipment
- d. cost of utilities
- e. cost of furniture and other fittings
- f. cost of vehicles
- g. pre-operational expenses

h. working capital.

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

Table 1: Cost of Land Checklist

	Have you included this in your cost
Cost of purchase of the land Cost of surveying the land Cost of certificate of occupancy Cost of legal documentation Cost of perimeter fence	

Table 2: Cost of Land Checklist

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

Table 3: Cost Buildings Checklist

	Have you included this in your cost
Cost of locally purchased machinery Cost of imported machine Freight and insurance costs Custom duties and other costs Installation and commissioning costs Test running costs	

Table 4: Cost of Machinery/Equipment Checklist

	Have you included this in your cost
Cost of private transformer Cost of generator Cost of water borehole with fittings	

Table 5: Cost of Utilities Checklist

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

Table 6: Cost of Vehicles Checklist

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

SELF-ASSESSMENT EXERCISE

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

Worked Example

Breakdown of Project Cost in a Vegetable Oil Refining Plant

Estimates of Project Cost	₦
Land for the project	4,000,000
Civil works and foundations	5,000,000
Steel Structures	
Includes H beams, U channels, angles, checker plates, railing pipes, roofing materials	13,000,000

Total Land, Building and Steel Structures 22,000,000

Storage Tanks

2 Units crude oil tank -200 tons	-	3,000,000
1 Unit refined oil tank – 300 tons	-	2,000,000
1 Unit fatty acid tank – 50 tons	-	850,000
1 Unit water storage tank – 20 tons	-	750,000
1 Unit diesel storage tank – 20 tons	-	750,000
1 Unit furnace oil tank – 20 tons	-	750,000

Sub-Total = **8,100,000**

Utilities

1 Unit 500 KVA transformer	-	3,500,000
1 Unit 500 KVA generator	-	10,000,000
1 Unit water borehole	-	500,000

Sub-Total = **14,000,000**

Machinery and Equipment (Imported)

Full line vegetable oil refining plant consisting of the following:

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

Total C & F Lagos US\$ 695,000 x ₦132	=	91,740,000
Bank charges (L/C, etc.)	=	500,000
Port clearing and other misc. charges	=	6,500,000
Sub-total machinery and Equipment	=	98,740,000

Pre-Operational Expenses

Feasibility Studies	=	300,000
Project management consulting services	=	500,000
NAFDAC for registration/documentation	=	150,000
Travels and tours (local and overseas)	=	500,000
Sub-total pre-operational expenses	=	1,450,000

Summary of Project Cost

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

Analysis of Working Capital Requirements**₦**

1 week purchase of raw materials	=	9,697,261
1 month factory salary/wages	=	482,820
1 month diesel, oil and lubrication expenses	=	<u>437,913</u>
Total	=	<u>30,617,994</u>

Proposed Financing Plant (₦)

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

Contribution ratio

Project sponsor	=	43.3%
Bank	=	56.7%
Total	=	100%

4.0 CONCLUSION

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

5.0 SUMMARY

Project cost analysis is important to both the project initiator and the financial analyst who may want to evaluate a project. In the next unit, we shall discuss financial project appraisal.

6.0 TUTOR–MARKED ASSIGNMENT

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

7.0 REFERENCES/FURTHER READING

- Leon, Ikpe (1999). *Project Analysis and Evaluation*. Impressed Publishers.
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UNIT 3 FINANCIAL PROJECT APPRAISAL

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Characteristics/Qualities in Project Appraisal Criteria
 - 3.2 Project Appraisal Criteria - Types
 - 3.2.1 Traditional Criteria of Project Appraisal
 - 3.2.2 Discounted Cash Flow (DCF) Method
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

Financial project appraisal seeks to present the methods to be adopted to measure the value of a project. The appraisal enables the analyst to choose between two or more projects once the values are known. Financial project appraisal enables government or management of a company to take proper investment decisions based on sound financial principles that are verifiable.

2.0 OBJECTIVES

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

- explain what financial project appraisal is
- discuss the various methods used in appraising projects.

3.0 MAIN CONTENT

3.1 Characteristics/Qualities in Project Appraisal Criteria

Any project appraisal criteria to be adopted should possess the following characteristics:

- a. It should provide a means of distinguishing between acceptable and unacceptable projects.
- b. It should be able to rank projects in order of their desirability.
- c. It should also be a criterion that is applicable to any conceivable project.

- d. It has to recognise that bigger cash flows are preferable to smaller ones and that early cash flows or benefits are preferable to later cash flows.

3.2 Project Appraisal Criteria - Types

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

3.2.1 Traditional Criteria of Project Appraisal

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

Payback Period

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

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

Example

A project requires a cash outlay of ₦200,000 and yields an annual cash inflow of ₦50,000 for a period of 10 years. Calculate the payback period.

$$\text{The payback period is } \frac{\text{₦200,000}}{\text{₦50,000}} = 4 \text{ years}$$

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

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

However, despite its simplicity, the payback period may not be very desirable investment criteria. In the first place, it fails to recognise the

cash flows that come in after the payback period. Again, it fails to consider the pattern of cash inflows and that early cash inflows are better than later cash inflows.

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

Accounting Rate of Return (ARR)

The Accounting Rate of Return (ARR) is a method that uses accounting information to measure the profitability of an investment. The Accounting Rate of Return (ARR) is computed by dividing the average income after taxes by the average investment.

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

Example

A project costs ₦100,000 and has a scrap value of ₦40,000. The streams of income before depreciation and taxes are ₦40,000, ₦50,000 and ₦60,000 for the first three years. The tax rate is 50% and depreciation is on straight line basis. Calculate the accounting rate of return for the project.

Solution

	Year 1	Year 2	Year 3
Earnings before depreciation and taxes	40,000	50,000	60,000
Depreciation	20,000	20,000	20,000
Net earnings before taxes	20,000	30,000	40,000
Taxes at 5%	10,000	15,000	20,000
Net earnings after taxes	10,000	15,000	20,000
Book value of investment beginning	100,000	80,000	60,000
Ending	80,000	60,000	40,000
Average	90,000	70,000	50,000

$$\text{Average earning} = 10,000 + 15,000 + 20,000 \div 3 = 15,000$$

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

$$\begin{aligned} \text{Accounting rate of return} &= \frac{15,000}{70,000} \\ &= 21.42\% \end{aligned}$$

As an 'accept' or 'reject' criterion, the ARR method will accept all those projects whose ARR is greater than the minimum rate established by management. If the ARR is lower than the minimum rate established by management, then the project should be rejected. The ARR method is very simple from three main weaknesses. First, it uses accounting profits not cash flows in appraising projects. Second, ARR ignores the time value of money. The profits occurring in different periods are valued equally. Third, it does not allow the fact that profit can be reinvested to earn more profits.

SELF-ASSESSMENT EXERCISE 1

Carefully appraise the accounting rate of return as a method of project appraisal.

3.2.2 Discounted Cash Flow (DCF) Method

We have discussed two of the traditional methods for appraisal of projects. One is the payback period while the other is the Accounting Rate of Return (ARR). Although two of them are simple to use and understand, they are not theoretically sound. Both of them fail to consider the timing of cash flows. Both fail to consider the time value of money. Because of these limitations, we shall consider two superior investment criteria which fully recognise the timing of cash flows. The two methods are the Net Present Value (NPV) method and the Internal Rate of Return (IRR) method. These two methods are referred to as Discounted Cash Flow (DCF) methods or the time-adjusted methods.

Net Present Value (NPV) Method

The Net Present Value (NPV) method is one of the Discounted Cash Flow (DCF) methods used in project appraisal. It fully recognises the time value of money. The method also correctly recognises the fact that cash flows arising at different time periods differ in value and are comparable only when their equivalent present values are found out.

The following steps are followed when computing the Net Present Value (NPV).

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

less present value of cash outflows.

The acceptance rule using the NPV method is to accept a project if the NPV is positive, and to reject it if the NPV is negative. If NPV is greater than zero, then the value of the firm is expected to increase. It is also important for us to understand the interpretation of net present value. Net present value may be interpreted to mean the immediate increase in the wealth of a firm if the investment proposal is accepted.

It is equal to an unrealised capital gain. Also, net present value can also be interpreted to represent the amount the firm could raise at a required rate of return in addition to the initial cash outlay to distribute immediately to its shareholders and by the need of the project's life to have paid off all the capital raised plus interest on it.

Example

Calculate the net present value of a project which cost ₦500,000 but generates cash inflows of ₦150,000, ₦300,000 and ₦400,000 over a three year period respectively. The required rate of return is:

Year	Cash inflows ₦	Discount factor at 10%	Present value of cash inflows ₦
1	150,000	.909	136,350
2	300,000	.826	247,800
3	400,000	.751	300,400
		Total	684,550
		Less investment outlay	500,000
		Net present value	184,550

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

First, it is fairly difficult to use. Second, in computing the NPV, it is assumed that the discount rate which usually is a firm's cost of capital is known. But as we know, the cost of capital is a fairly difficult concept to measure in real life. Third, net present value may not yield a consistent answer when the projects being compared involved different amounts of investment.

Internal Rate of Return (IRR) Method

We have earlier discussed net present value as one of the Discounted Cash Flow (DCF) methods used in project appraisal.

The Internal Rate of Return (IRR) can be defined as that rate which equates the present value of cash inflows with the present value of cash outflows of an investment. Put in another way, the internal rate of return is the rate at which the NPV of an investment is zero.

It is called the internal rate because it depends solely on the outlays and the resulting cash inflows of the project and not any rate determined outside the investment.

Let C = Cash outlays of an investment

$\frac{A1}{(1+r)}$ = Cash inflow received in year 1 discounted at the cost of capital r .

$\frac{A2}{(1+r)^2}$ = Cash inflows received in year 2 discounted at the cost of capital r .

$\frac{A3}{(1+r)^3}$ = Cash inflows received in year 3 discounted at the cost of capital r .

Write the basic equation

$$C = \frac{A1}{(1+r)} + \frac{A2}{(1+r)^2} + \frac{A3}{(1+r)^3}$$

$$0 = C - \frac{A1}{(1+r)} + \frac{A2}{(1+r)^2} + \frac{A3}{(1+r)^3}$$

The value of r in the equation at which total cash outlays equal total cash inflows is called the internal rate of return (IRR). Usually, the value of r can be found out by the trial and error. Generally, if the calculated present value of the expected cash inflows is lower than the present value of cash outflows, a lower rate should be tried. On the other hand, if the calculated present value of the expected cash inflows is higher than the present value of cash outflows, a higher rate should be tried.

Example

A barbing salon costs ₦32,400 to establish and is expected to generate cash inflows of ₦16,000, ₦14,000 and ₦12,000 over its life of 3 years. Calculate the internal rate of return.

Solution

Let us start by trying 16%

Year	Cash inflow ₦	Discount factor at 16%	Present value ₦
1	16,000	.862	13,792
2	14,000	.743	10,402
3	12,000	.641	7,692
	Total		31,886
	Less cash outlay		32,400
	Net Present Value (NPV) =		-514

The net present value is – ₦514. at 16% discount factor. Let us try a lower rate like 14%.

Year	Cash inflow ₦	Discount factor at 14%	Present value ₦
1	16,000	.877	14,032
2	14,000	.769	10,766
3	12,000	.675	8,100
	Total		32,898
	Less cash outlay		32,400
	Net Present Value (NPV) =		498

You will observe from the above calculations that when we tried 16% discount rate, the NPV was negative at – ₦514. When we tried 14% discount rate, the NPV became positive at ₦498. Therefore, the internal rate of return we are looking for lies between 14% and 16%.

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

It is important that we understand the interpretation of the internal rate of return (IRR). The internal rate of return (IRR) represent the highest rate of interest a firm would be ready to pay on funds borrowed to

finance the project without being financially worse off, by repaying the loan principal plus accrued interest out of the cash inflows generated by the project.

We should also see the internal rate of return method as a very sound method. As we said, it is a discounted cash flow method and also it considers the time value of money.

It is also compatible with the firm's desire to maximise the owner's wealth. However, the IRR method is fairly difficult to understand and it involves complex computations.

SELF-ASSESSMENT EXERCISE 2

Distinguished between the net present value and the internal rate of return as criteria for project appraisal.

4.0 CONCLUSION

In this unit, we discussed project appraisal criteria which we said constitutes a very crucial topic in this course. We discussed traditional criteria of project appraisal where we dealt with the payback period and the Accounting Rate of Return (ARR). We also discussed discounted cash flow criteria. Here, we treated the Net Present Value (NPV) method and the Internal Rate of Return (IRR).

5.0 SUMMARY

Project evaluation criteria provide us with the tools with which we can choose from various investment proposals using acceptable techniques. The appraisal criteria guides the project initiated and assists us to choose from among alternative projects. Also, banks use project appraisal criteria to decide whether or not to lend money for a project.

In the next unit, we shall discuss commercial management of projects.

6.0 TUTOR-MARKED ASSIGNMENT

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

7.0 REFERENCES/FURTHER READING

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

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UNIT 4 COMMERCIAL MANAGEMENT OF PROJECTS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Sourcing Finance for Projects
 - 3.1.1 Borrowing from Banks
 - 3.1.2 Borrowing from the Bank of Industry Limited
 - 3.1.3 The Small and Medium Enterprises Equity Investment Scheme (SMEEIS)
 - 3.1.4 Other Sources of Finance
 - 3.2 Contracts
 - 3.2.1 Offer and Acceptance
 - 3.2.2 Consideration
 - 3.2.3 Capacity of Contract
 - 3.3 Insurance
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

In the last unit, we discussed financial project appraisal. In discussing financial project appraisal, we saw the various appraisal methods used in evaluating projects. The appraisal methods enable investors to choose among competing projects.

In this unit, we shall discuss commercial management of projects. Commercial management of projects focuses attention on the keys areas, namely:

- a. sourcing finance for projects
- b. contracts
- c. insurance.

2.0 OBJECTIVES

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

- appraise the sourcing of finance for projects
- explain commercial management of projects.

3.0 MAIN CONTENT

3.1 Sourcing Finance for Projects

Sourcing finance for projects is a very important aspect of project management decisions. Whether it is a public sector or private sector project, the sources of finance must be properly identified.

3.1.1 Borrowing from Banks

A key function of a bank is to lend money to individuals and organisations. Small businesses may be owned by individuals or by organisations and they too are entitled to approach banks for the various loan facilities.

Let us now discuss the various types of finance that are available from the banks.

Banks Loans

Banks normally grant loans to eligible business organisations to enable them undertake capital investments in sectors like agriculture, industry, and commerce.

Loans when granted are for specific reasons like purchase of manufacturing equipment, etc. Loans are usually payable over a fixed period of time and at agreed interest rates, and most banks will insist that the borrowers provide collateral security when borrowing from them.

Bank Overdraft

Bank overdrafts are advanced in most cases to organisations for enhancing of working capital. Most organisations obtain bank overdrafts and deploy them towards purchase of raw materials for manufacture of goods or to procure finished goods for resale. Usually, bank overdrafts are for short periods of time like for one year. In practice, overdrafts are renewable.

Lease Finance

A lease is a contract whereby one party (the lessee) hires equipment from another party (the lessor) in a way that the lessee uses the equipment without purchasing it. In return, the lessee pays lease rentals and at the end of the lease period may have the option to purchase the equipment.

Lease finance is becoming a more popular type of finance for firms that do not want to purchase equipment.

3.1.2 Borrowing from the Bank of Industry Limited

The Bank of Industry Limited is Nigeria's oldest and largest Industrial financing institution. It was established in year 2001 out of the Nigerian Industrial Development Bank (NIDB) Limited, which was incorporated in 1964.

The bank's authorised share capital is set at \$400 million. The mandate given to the Bank of Industry Ltd (BOI) is "providing financial assistance for the establishment of large, medium and small projects as well as expansion, diversification and modernisation of existing enterprises and rehabilitation of ailing ones,"

The Bank of Industry Limited can assist the following:

- a. Small, medium and large enterprises excluding cottage industries.
- b. New or existing companies seeking expansion, modernisation or diversification.
- c. Credit worthy promoters who will be required to prove their commitment to the project by contributing at least 25% of the project cost excluding land.
- d. Borrowers whose management capability, financial situation (including availability of collateral and guarantee) character and reputation are incontrovertible.
- e. Clients with demonstrable ability to meet loan repayments.
- f. Borrowers with no record of unpaid loans to erstwhile development finance institutions and other banks.

3.1.3 The Small and Medium Enterprises Equity Investment Scheme (SMEEIS)

Another good source of finance for the small business is the Small and Medium Enterprises Equity Investment Scheme (SMEEIS). It is a scheme under which small and medium enterprises receive special funding by way of equity investment by the bank. The investment by the bank enables them to grow and expand their business.

The small and medium enterprises equity investment scheme is a voluntary initiative of the Bankers Committee approved in 1999. The initiative was in response to the Federal Government's concern and policy measures for the promotion of small and medium enterprises (SMEs) as vehicles for rapid economic development, poverty alleviation and employment generation.

Under the scheme, 10% of the profit before tax (pbt) of all banks is set aside annually to be invested as equity investment in small and medium enterprises. The funding to be provided under the scheme shall be in the form of equity investment and or loans. The following are eligible to get funding under the scheme:

All those engaged in the following activities:

- a. Agro-allied businesses
- b. Information technology and telecommunications
- c. Manufacturing
- d. Education establishments
- e. Services
- f. Tourism and leisure
- g. Solid minerals
- h. Constructions.

The limitation under the scheme is that the investing bank must not take more than 40% equity investment in a small and medium business.

3.1.4 Other Sources of Finance

Other sources of finance for the small business are:

- a. Finance houses
- b. Mortgage banks
- c. Microfinance banks.

SELF-ASSESSMENT EXERCISE

Discuss sources of finance that are available to an investor of the manufacture of fruit juice.

3.2 Contracts

Most projects involve contracts between the project and other parties such as suppliers or land owners. Ordinarily, all contracts made by a project contractor and suppliers should be in writing and also properly drafted. The type of contracts that a project may execute will vary depending on the nature of the project in question and the third party concerned.

However, for all contracts, several conditions must be satisfied for a legally binding contract to exist. The following are some of the conditions:

3.2.1 Offer and Acceptance

For any transaction or document to be termed a contract, there must be offer and acceptance. For example, a project contractor in entering into a contract must state definitely his offer and state willingness to contract on specified terms. The party dealing with the contractor has to properly accept the offer without qualification.

3.2.2 Consideration

In every contract, there must be a consideration. A contract must result in each party promising the other a valuable benefit. For most projects, this means that one party promises to deliver some stated goods, property or service at a specified date and the other party will also promise to accept the stated goods and pay for them.

3.2.3 Capacity to Contract

Another condition for a contract to exist is the issue of capacity. The parties to a contract must have the capacity to contract. For example, a minor may not have the capacity to enter into a contract. For a firm, the powers and the capacity to contract can be found in the memorandum and articles of association.

In practical terms, some of the contracts that an organisation can execute with other parties may include some of the following:

- a. Contract for the purchase of land for a project
- b. Contract for the design of buildings
- c. Contract for civil engineering jobs
- d. Contract for the supply of machinery
- e. Contract for the maintenance of machinery
- f. Contract for the supply of raw materials
- g. Contract for the supply of skilled personnel
- h. Contract for the sale of finished goods
- i. Contract for the training of personnel
- j. Contract for the management of certain aspects of a project.

Most projects must have a contract scope. The contract scope specifies the scope of the contract, i.e. where it begins and where it ends. Some of the various contract scopes are described below:

- a. Build–own–operate–maintain (BOOM)
- b. Build–own–operate–transfer (BOOT)
- c. Build–own–train–operate (BOTO)
- d. Operate–maintain–train – (OMT)

- e. Turnkey (TK)

3.2 Insurance

A major aspect of commercial management of projects is the issue of insurance. Insurance has to do with the management of risks. Every organisation faces risks, and so do all projects especially if they are start-up projects.

When a project is initiated, part of management's responsibility is to identify the various risks likely to arise and devise ways to manage or minimise the risks. So in most cases, the priority of management is to ensure that all physical and commercial risks facing a project are reduced to the barest minimum.

Let us discuss some of the risks identified and types of insurance that can apply particularly with respect to projects and their management.

Legal Liabilities Insurance

Legal liabilities relate to payments to third parties as a result of statutory, contractual or professional commitments. It also relates to compensations awarded by the courts.

Ordinarily in commercial and industrial projects, some responsibilities will be placed on the project owner or contractor to insure against several risks. For example, in the construction of a 20-storey building, it will be in the best interest of the contractor handling the project to take out insurance to cover compensation to third parties for bodily harm. The third parties may be workers on site, visitors or members of the public.

Liability insurance features prominently in project contracts and extends to the following:

- a. Property loss or damage
- b. Infringement of property rights
- c. Accidents
- d. Professional negligence as in the case of medical doctors
- e. Contractors all risk insurance to protect work in progress against fire, storm, theft and malicious damage
- f. Accident and sickness insurance.
- g.

4.0 CONCLUSION

In this unit, we discussed commercial management of projects. We also discussed various sources of funds for projects as well as contracts in respect of projects. These discussions threw more light on the commercial management of projects.

5.0 SUMMARY

This unit treats the commercial management of projects. It focuses attention on the key aspects of the commercial management of projects. It treats the issues of finance for projects, contracts and insurance of projects.

6.0 TUTOR-MARKED ASSIGNMENT

List and discuss the sources of finance for a project.

7.0 REFERENCES/FURTHER READING

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UNIT 5 INTRODUCTION TO PROJECT PLANNING AND SCHEDULING

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Factors Affecting Project Planning
 - 3.2 Project Plan and Schedule – Meaning
 - 3.3 The Planning Time Frame
 - 3.3.1 Free Planning Approach
 - 3.3.2 Target-led Planning Approach
 - 3.4 Project Matrix Charts
 - 3.5 Bar Charts
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

All projects involve commitment of resources towards certain pre-set objectives. And in most cases, there is always a time frame or deadline for the implementation of the project. It is therefore, safe to assume that there must be a plan of some sort if the envisaged project will be completed on time. Most projects are complicated in nature and have to be properly planned.

2.0 OBJECTIVES

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

- explain factors affecting project planning
- discuss project planning and scheduling.

3.0 MAIN CONTENT

3.1 Factors Affecting Project Planning

A project manager, when appointed, will realise that he/she is confronted with a number of factors within and outside the organisation which influence a project.

We shall divide the factors into two for ease of discussion, and they are external factors and internal working factors.

They are illustrated in Figs. 1 and 2.

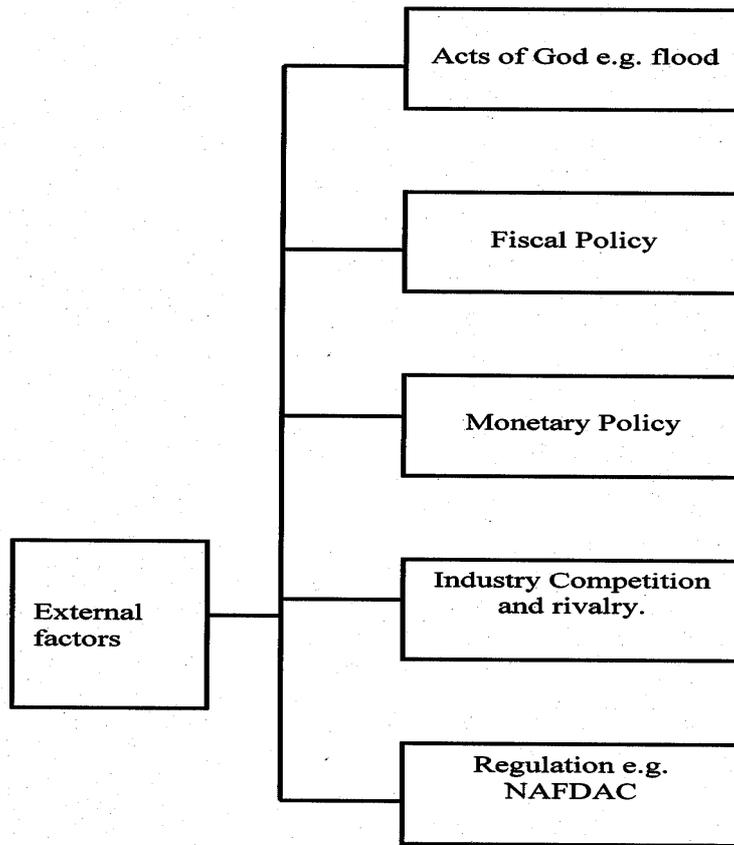


Fig. 1: External Factors Affecting Project Planning

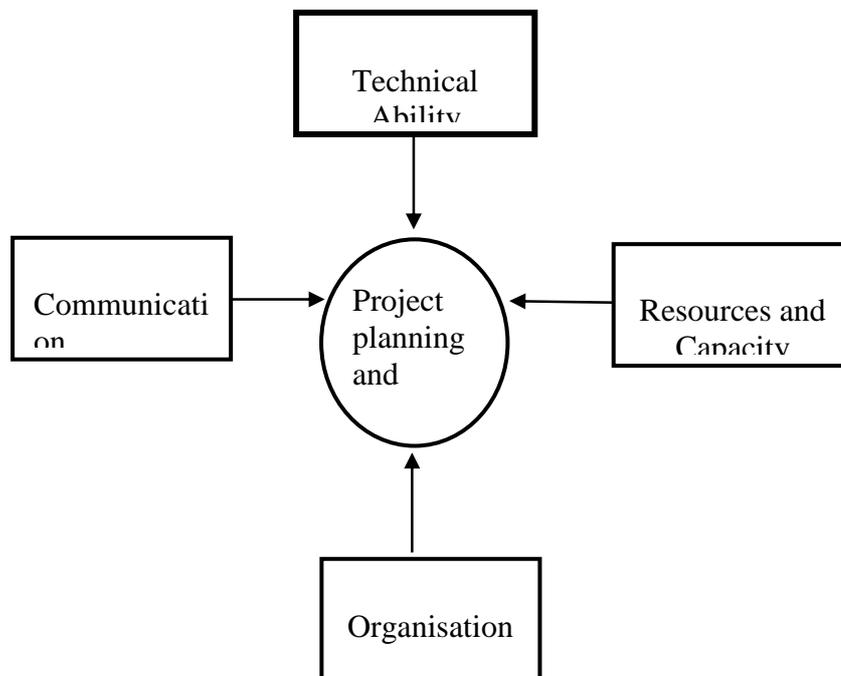


Fig. 2: Internal Working Factors Affecting a Project Planning

3.2 Project Plan and Schedule

A project plan is the listing or display that emerges when major project activities have been estimated, subjected to their logical sequences and timed. In an ideal situation, network analysis is usually a preferred method for producing a project plan.

On the other hand, a project schedule is obtained by doing further work on the project plan. The resources needed to execute the plan must have been estimated and then taken into account.

We can therefore, describe a project schedule as a working document that results from matching the organisations available resources to the project plan. From the foregoing, we can say that project plans and scheduling go hand in hand. They are usually linked.

3.3 The Planning Time Frame

Every project to be executed must have a time frame. There are two ways of considering a project time frame, namely: the free planning approach and the target led approach.

3.3.1 Free Planning Approach

Under the free planning approach, a set of physical and financial estimates are obtained and used to produce a project plan that predicts the completion time of the project. This predicted completion time will now be accepted by the project manager or team.

3.3.2 Target-Led Planning Approach

The target-led planning approach appears to be the direct opposite of the free planning approach. In the target-led planning approach, the project target delivery or completion date is determined well in advance. And so the project manager must work with the available resources to meet the target delivery date for the project. For example, if there is going to be an army exhibition on Independence Day (1 October), all the officers involved in the exhibition will take October 1 as the target date for the project delivery and work to meet the deadline.

It should be realised that target-led planning at times leads to project planners having to build overtime into the project just to ensure the completion.

If project plans are made with full consideration of the organisation's available resources, then the execution of the project will not encounter problems along the line.

SELF-ASSESSMENT EXERCISE 1

- i. Give meanings to project plan and project schedule. Is there any relationship between them?
- ii. Distinguished between free planning approach and target-led approach in relation to project time frame.

3.4 Project Matrix Charts

Let us briefly recall that every project consists of people, tasks and resources. These three items are present in every conceivable project. There must be a way or manner in which the three items will be organised to be able to ensure project execution.

Matrix charts list one set of factors at the extreme left-hand side of tabulation and on the right-hand side, factors directly associated with them across columns.

There are many variations of the matrix chart. In project management, matrix charts are very useful for managers who have the responsibility of allocating tasks to different people in a project team. Matrix charts are very useful for planning and controlling projects. The matrix charts can be used to allocate people to tasks, or tasks to people. In some cases, the matrix chart is used to allocate people to machines.

Table 1: Simple Matrix Chart for Planning and Controlling a Book Publishing Project

Book Title	Author	Fee agreed ₦	Due Date	Editing done
Introduction to strategy	C. Okoro	50,000	31/12/2007	NO
Corporate Strategy	A. Abdul	50,000	31/12/2007	NO
Competitive Strategy	P. Oshai	50,000	31/12/2007	NO
People Management	C. Okoro	50,000	31/12/2007	NO
Risk Management	J. Sanni	50,000	31/12/2007	NO
Basic Marketing	C. Okeke	50,000	31/12/2007	NO
Law of Contract	T. Okoro	50,000	31/12/2007	NO
Law of Evidence	T. Okoro	50,000	31/12/2007	Yes
Quality Management	A. Oshodi	50,000	31/12/2007	Yes
Network Management	A. Oshodi	50,000	31/12/2007	Yes
Basic Chemistry	W. Oke	50,000	31/12/2007	Yes
Basic Physics	W. Oke	50,000	31/12/2007	Yes
Bank Management	S. Hassan	50,000	31/12/2007	Yes
Marketing Management	A. Buka	50,000	31/12/2007	Yes

Table 2: Simple Matrix for Assigning Medical Students to Wards in a Medical Training Project

	Monday	Tuesday	Wednesday
A. Okoro	Surgery	Children	Accident
C. Okoro	Accident	Children	Surgery
C. Peter	Surgery	Children	Accident
A. Abraham	Accident	Children	Surgery
A. Sanni	Surgery	Children	Accident
P. Abubakar	Accident	Children	Surgery
S. Okeke	Surgery	Children	Accident
A. Anang	Accident	Children	Surgery
A. Ekong	Surgery	Children	Accident
T. Mshelia	Accident	Children	Surgery
S. Tinubu	Surgery	Children	Accident
T. Oke	Accident	Children	Surgery
S. Amakiri	Surgery	Children	Accident

3.5 Bar Charts

Bar charts are derived from Gantt Charts named after their originator, Henry Gantt. Bar charts are used in planning and scheduling. They are very easy to draw and can be adapted to suit many planning and scheduling jobs.

When properly prepared, bar charts turn out to be very handy planning and scheduling aid to a project planner.

Table 3: A Simple Project Bar Chart

Task	Jan	Feb	March	April	May	June
Engineering design						
Materials purchase						
Manufacture						

In using the bar chart, the project manager will usually identify each task within a project and then go ahead to allocate a time frame for the

completion of each task. With this information, the bar chart is then constructed.

SELF-ASSESSMENT EXERCISE 2

Discuss the external factors that affect project planning.

4.0 CONCLUSION

In this unit, we discussed the introduction to project planning and scheduling. We also discussed external and internal factors affecting project planning. We discussed project plans and schedules.

We looked into the planning time frame as well as the project matrix charts and bar charts. All these help to improve our understanding of project planning and scheduling.

5.0 SUMMARY

This unit treats project planning and scheduling. It discusses the introductory elements necessary to understand project planning and schedules. It tries to expose how plans and schedules can assist in project execution.

6.0 TUTOR-MARKED ASSIGNMENT

How does a project plan differ from a project schedule?

7.0 REFERENCES/FURTHER READING

Reiss, G. (1995). *Project Management Demystified: Today's Tools and Techniques*. (2nd Ed.). London: Spon.

Burke, Rory (1999). *Project Management: Planning and Control*. (3rd ed.). Chichester: Wiley.

MODULE 3

Unit 1	Network Analysis
Unit 2	Principles of Scheduling Resources
Unit 3	Practical Scheduling of Resources
Unit 4	Materials Management
Unit 5	Project Implementation: An Introduction
Unit 6	Managing Progress in Projects

UNIT 1 NETWORK ANALYSIS

CONTENTS

1.0	Introduction
2.0	Objectives
3.0	Main Content
3.1	Network Notation System
3.1.1	Arrow Network
3.1.2	Activity Duration
3.1.3	Dummy Activities (Dummies)
3.1.4	The Forward Pass
3.2	Critical Path Analysis Using Precedence Notation
3.2.1	Identification Numbers
3.2.2	Logical Dependencies
3.2.3	Activity Duration Estimates and Descriptions
3.3	Implementing Network Analysis
3.3.1	Arranging a Project Meeting
3.3.2	Identifying Critical Details in Network Planning
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

1.0 INTRODUCTION

Generally, we shall use the term “network analysis” to describe several planning methods which owe their origin to developments in Europe. Network analysis achieved great prominence during World War II and was used successfully for the planning of the United States of America defence projects. When we discussed charts, we saw that they were really easy to construct and also could be easy to understand.

Network analysis, on the other hand, is not as easy as it assumes a lot of familiarity with logic and argument.

Network diagrams simply show all the tasks within a project together with their logical sequence. Network diagrams are more powerful than bar charts since they clearly show the interdependencies between job tasks in a project. For example, before a building can be started, network analysis will inform the planner that the foundation of the building will be the starting point of the project.

A major strength of network analysis is that it enables all the tasks in a project to be clearly defined. The tasks deemed to be very critical are also identified and completion times of every task estimated.

2.0 OBJECTIVES

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

- explain network analysis
- apply network analysis to project management.

3.0 MAIN CONTENT

3.1 Net Notation Systems

In the literature, there are several network notation systems. Each network system usually reflects the thinking of its inventors.

3.1.1 Arrow Networks

Arrow networks are activity-on-arrow systems. There are various names used under arrow networks. Some of them include the following:

- a. Critical Path Methods (CPM)
- b. Critical Path Analysis (CPA)
- c. Programme Evaluation and Review Technique (PERT).

The strong point of the arrow network is the arrow diagram, logic diagram or network. Let us use a simple example to demonstrate the key elements of an arrow network.

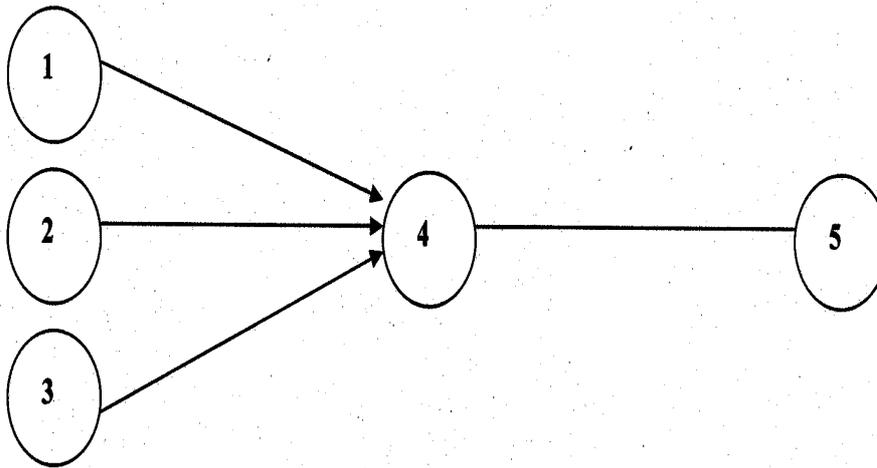


Fig. 1: Key Elements of Arrow Network Logic

Now take a look at fig. 1. Each circle represents a project event such as the start or finish of an activity. The arrow joining any two events shows the activity or time needed to progress from one event to another.

The numbers inside the circles are used to identify the events. If you note carefully, activities 1, 2, 3 must be completed before thinking of moving ahead to any other activity.

Another issue that should be clearly understood in network analysis is the issue of direction. Conventionally, activity arrows are drawn from left to right.

Another important element in arrow diagrams is the issue of logical dependencies. In an arrow diagram, no event can be considered complete until all the activities that lead into it have been completed.

For example, in fig. 1, activity 4 cannot be achieved until activities 1, 2 and 3 have been completed. Also, activity 5 cannot take off until activities 3 and 4 have been completed.

3.1.2 Activity Duration

In building the network, we should also break down the activities properly and attach time estimates to them. Consider a hospital project to be initiated at Calabar by the state government.

Activity	Description	Estimated Duration
1 to 2	Build the hospital	6 months
2 to 3	Equip the hospital	3 months
3 to 4	Staff the hospital	2 months

The hospital project can now be displayed using arrow notation:

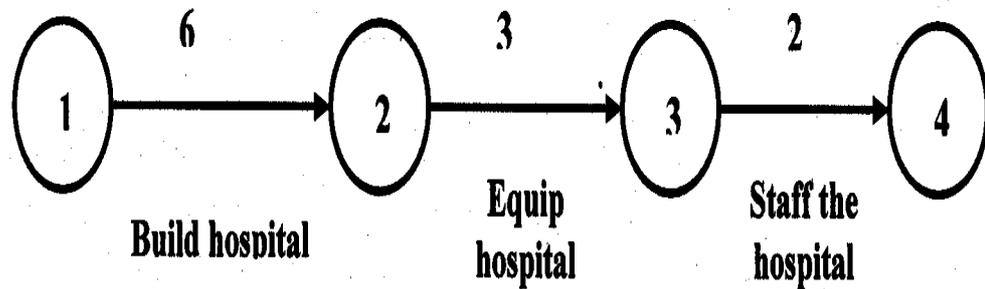


Fig. 2: The Hospital Project Network Using Arrow Notation

You will observe that the estimated duration for every activity is also indicated in the diagram.

SELF-ASSESSMENT EXERCISE 1

You have been appointed project manager to construct a new university at Lokoja. Develop an activity duration using arrow notation for the project.

3.1.3 Dummy Activities (Dummies)

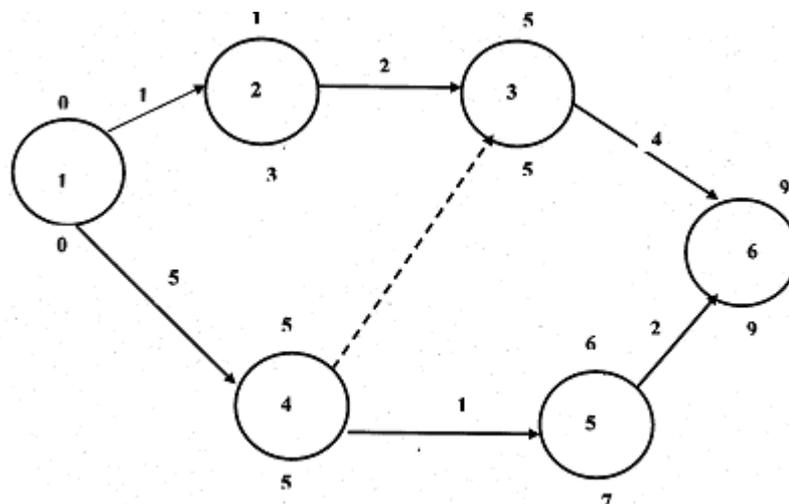


Fig. 3: Example of Arrow Network Time Analysis

In fig. 2, we saw a very simple network with which we displayed a hospital project. Fig. 3 is a much more complex network. As you can see, there are so many activities in the network with time notations. There is more than one path to the completion of the network activities. If you note properly, there are three possible routes to the final event 6.

One of the possible routes passes through the dotted linking event 4 to event 3. The dotted arrow linking event 4 to event 3 is called a dummy activity. A dummy activity does not represent work and so has no time duration. A dummy activity though having zero time duration acts as a logical link or constraint on activities that follows it.

For example, in fig. 3, the start of activity 3 to 6 depends not only on completion of activity 2 to 3, but, because of the dummy, also on the completion of activity 1 to 4.

Also you are to note that numbers written above event circles indicate the earliest possible time by which the event can be completed. This can be calculated by adding the activity durations from left to right. Where more than one path exists, the longest path determines the earliest possible event time. Numbers below the event circle are found by subtracting activity durations from right to left from the final event again taking the longest path.

3.1.4 The Forward Pass

You are still required to refer to fig. 3. In the figure, the earliest possible time for each event and also the earliest possible time for the entire project completion have been calculated by merely adding up activity duration estimates along the arrows from left to right. This time analysis is known as the forward pass.

Also, in the fig. 3, we are using the forward pass is complicated because there are many routes to the project completion. For example, we might be tempted to think that the earliest possible time for event 3 might be $1 + 2 = 3$ if the route of events 1, 2 and 3 are taken. That might not be really true. Event 3 may not be achieved until the end of week 5 because of the longer path through the dummy (activity path of 4 to 3).

3.2 Critical Path Analysis Using Precedence Notation

In our earlier discussion, we dealt with arrow networks. This time around, we shall discuss critical path analysis that uses precedence notation. In current times, precedence system has become very popular in project management for the following reasons.

- a. Precedence logic diagrams resemble engineering flow diagrams and are easy to understand.
- b. Precedence notations indicate clearly the start and finish of activities and even indicate overlapping activities.
- c. Precedence networks are supported by various computer software.

Generally, it is important to note that the flow of work in a precedence diagram is from left to right.

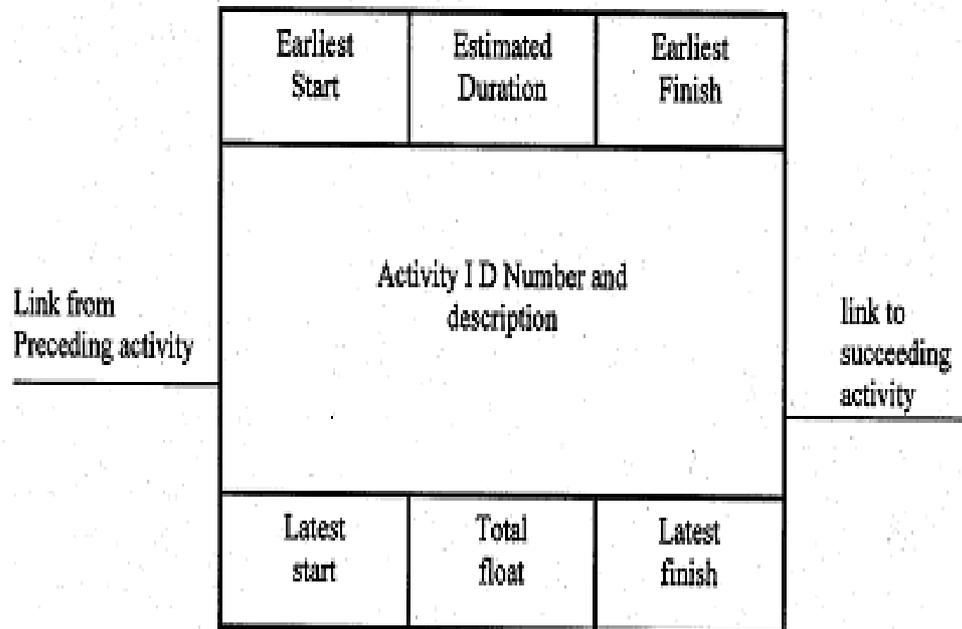


Fig. 4: An Activity in Precedence Notation

Let us now look at some features of the precedence system:

3.2.1 Identification Numbers

In a precedence system, every activity is usually given an identification number called the I D code. These codes are usually important especially for computer processing. The I D codes range from small serial numbers to complex alphanumeric codes with 10 or more characters.

3.2.2 Logical Dependencies

In the precedence system, all activities are joined by lines. You should recollect that they differ from arrow networks which use arrows to link activities. Now back to precedence systems. The precedence notation system allows the project manager the complete freedom to display relationships between various activities.

3.2.3 Activity Duration Estimates and Descriptions

Now let us go back to our simple project which we discussed in section 3.1.2 of this unit.

Activity	Description	Estimated Duration
1 to 2	Build the Hospital	6 months
2 to 3	Equip the Hospital	3 months
3 to 4	Staff the Hospital	2 months

The hospital project can be built into fig. 5.

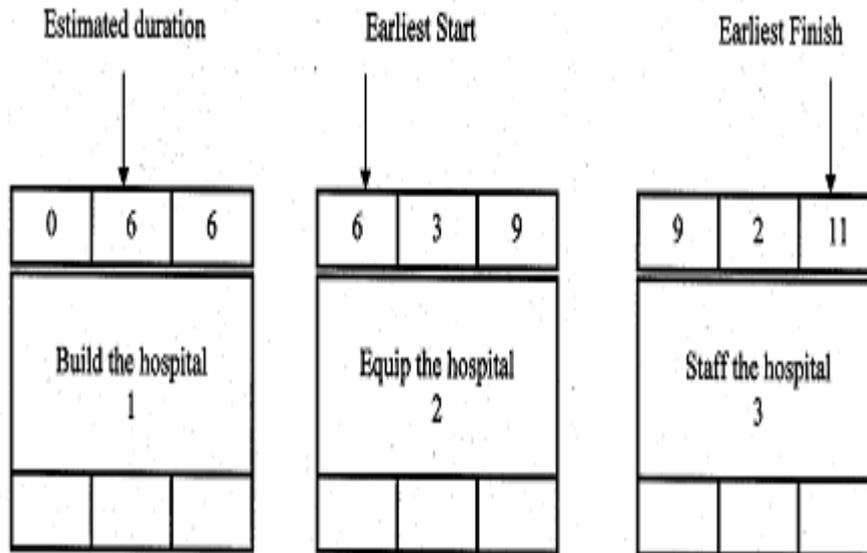


Fig. 5: Hospital Project using Precedence Notation

You are to note that fig. 5 shows the estimated duration, earliest start and finish times for the three activities in the hospital project.

3.3 Implementing Network Analysis

All along, we have been discussing the basic techniques of project network analysis. We discussed arrow networks, activity duration, dummy activities and the precedence notation in network analysis. All these are tailored towards our understanding of basic networks.

In this section, we shall discuss the procedures and methods used in the implementation of network analysis in an organisation. We shall take them one by one.

3.3.1 Arranging a Project Meeting

In an organisation, when a project is to be initiated or executed, someone is usually appointed as the project manager. The project could be the building of a general hospital, the building of a federal government secretariat complex or the building of a refinery complex.

In most cases, the project manager is appointed with members of the project team. The first step in a project meeting is to assemble all the members of the team and hold a brainstorming session. In an ideal situation, members of the project team will be chosen from various units or departments and also will be senior members of staff.

During the brainstorming session, the project will be laid bare and all the activities connected with the project will be discussed. Here the basic network of the project will be drawn so that all the team members can see it and make their own contributions.

Ideally, a digital projector can be used for the brainstorming exercise. In this case, arrow notations are better. After a lot of discussions have taken place, a final network analysis diagram will be produced which temporarily serves as the guide to the execution of the project.

3.3.2 Identifying Critical Details in Network Planning

We have just said that in implementing projects, there is the need to call a project meeting. Part of the things that the project meeting will seek to achieve is to identify the critical details in a network. Such critical details will include the following:

- a. Identification of all activities involved in the project
- b. Allocation of activities to people
- c. Work authorisations
- d. Work supervisors
- e. Start and finish times for every activity
- f. Obtaining building permits where necessary
- g. Issue of invitations to tender for supply of materials or equipment
- h. Receipt of tenders
- i. Approval of tenders
- j. Supplies of materials deadlines
- k. Handover of project.

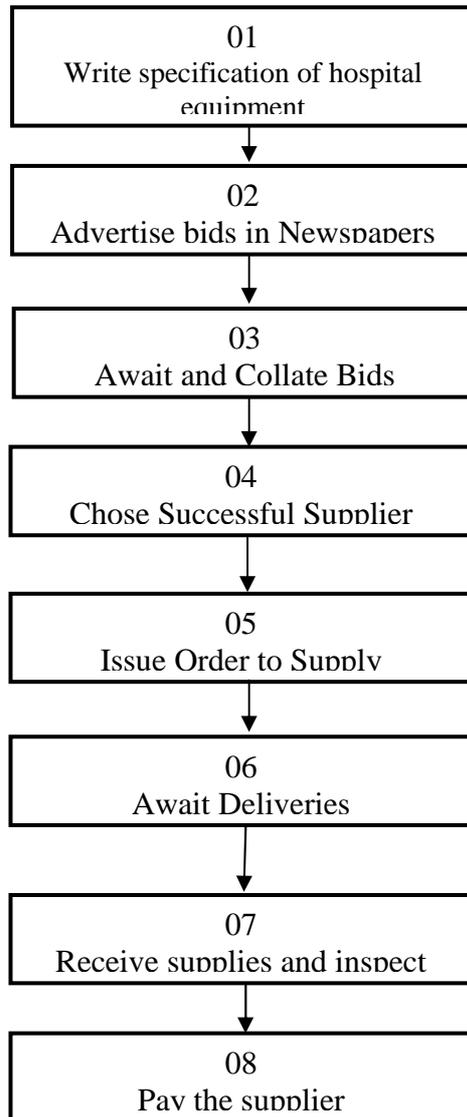


Fig. 6: Details in Purchasing Sequence for Supply of Medical Equipment to a Hospital

SELF-ASSESSMENT EXERCISE 2

Discuss the procedures and methods used in the implementation of network analysis in a chosen organisation.

4.0 CONCLUSION

This unit has treated network analysis which we saw as a very important management tool in project management. We discussed network notation systems especially arrow networks. We also discussed activity duration, dummy activities and critical path analysis using precedence notation. Finally, we discussed the identification of critical details in network planning.

5.0 SUMMARY

Network analysis is a management tool in the practice of project management. It equips project managers with the necessary skills for managing various projects. It emphasises the breakdown and analysis of project activities in a sequence that leads to project conclusion.

6.0 TUTOR-MARKED ASSIGNMENT

Why do you think that network analysis is important in project management?

7.0 REFERENCES/FURTHER READING

Meredith, J. R. & Mantel, S. J. Jnr (1995). *Project Management: A Managerial Approach*. (3rd ed.). New York: Wiley.

Reiss, G. (1995). *Project Management Demystified: Today's Tools and Technique*. (2nd ed.). London: Spon.

UNIT 2 PRINCIPLES OF SCHEDULING RESOURCES

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Project Resources
 - 3.2 Priority Rules for Scheduling Resources
 - 3.2.1 Resource Limited Scheduling
 - 3.2.2 Time Limited Scheduling
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

Research shows that scheduling of resources is a fairly complex topic because of the complexities of various types of projects in the environment.

Resources scheduling can be seen from many view points. It can be seen from point of view of a large industrial establishment like Nigerian Breweries Plc. where it is employed in the formulation of long-term plans. Resources scheduling can even take a wider dimension when one considers the complexities involved in running a refinery that produces petrol, diesel, kerosene, engine oil, aviation fuel and other petrochemicals.

We are not going to discuss resources scheduling from wider perspectives. Rather, we shall discuss it from the point of view of a project manager whose concern is basically with the short-term operations of a business or a specific project.

Resources scheduling problems differ from firm to firm or from organisation to organisation. An organisation which has a large percentage of its labour force as casual labour may not have the problem of scheduling of its labour resources. On the other hand, an organisation that handles its projects using its own workforce cannot ignore scheduling of resources. This is more applicable to engineering and road construction companies.

Principles of scheduling resources have come to the forefront of project management techniques as project managers find themselves in situations that require good knowledge of resources scheduling.

2.0 OBJECTIVES

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

- define scheduling
- enumerate project resources
- discuss the priority rules for scheduling resources.

3.0 MAIN CONTENT

3.1 Project Resources

All along, we have been using the work “resources” but we did not define what resources are. So let us now define a project resource. A project resource is any person (labour) equipment, tool or money that is needed for work on a project. Having briefly defined a project resources, we can now go ahead to list the various types of resources that can be used in a project.

- a. Land
- b. Natural gas
- c. Water
- d. Rubber
- e. Cocoa
- f. Cement
- g. Granite
- h. Sand
- i. Generator
- j. Factory buildings
- k. Offices
- l. Labour (casual labour)
- m. Labour (management)
- n. Computers
- o. Radio Stations
- p. X-ray machine
- q. Blow molding machine
- r. Dam
- s. Tractor
- t. Time

Before a project commences, there must be a total breakdown of all the activities that are required to execute the project. Also, there should be a list of resources required to execute the project. The type of resources will include the following:

- a. Skilled personnel, e.g. building engineers
- b. Skilled personnel, e.g. technologists
- c. Unskilled personnel, e.g. labourers.

Again, there should be a breakdown of the materials required for the execution of the project. Usually for the materials, there should be funds made available for their purchase.

Consider, for example, a project that involves the construction of a students' hostel in a university. The activities are shown in table 1, table 2 and table 3.

Table 1: Construction of a Student Hostel in a University

Dig soak away and drain trench (1)	Lay rubber and drain pipes inside trench (2)	Prepare chamber slabs with cement and iron rods (3)
Dig hostel foundation (4)	Lay concrete foundation works (5)	Lay floor base (6)
Mount bricks (7)	Fit lintel (8)	Build parapet (9)

Table 2: Construction of a Student Hostel in a University

Fit roof timber (10)	Fit and run fascia board (11)	Fit roof sheets (12)
Seal the roof (13)	Fit ceiling boards (14)	Fit gutters (15)
Hang doors and windows (16)	Fit electrical fittings and do plumbing work (17)	Paint (18)

Table 3: Students' Hostel Project: Task List and Time Analysis

Activity Description	Duration (days)	Resources available
1. Dig soak away and drain trench	2	Yes
2. Lay rubber and drain pipes	2	Do
3. Prepare chamber slabs with cement	2	Do
4. Dig hostel foundations	3	Do
5. Lay concrete foundation works	3	Do
6. Lay floor base	2	Do
7. Mount bricks	21	Do
8. Fit lintel	5	Do
9. Build parapet	4	Do
10. Fit roof timber	4	Do
11. Fit and run fascia board	4	Do
12. Fit roof sheets	6	Do
13. Seal the roof	10	Do
14. Fit ceiling boards	10	Do
15. Fit gutters	4	Do
16. Hang doors and windows	5	Pending
17. Fit electrical fittings and plumbing	10	Pending
18. Paint	10	Pending

SELF-ASSESSMENT EXERCISE 1

Define a project resource?

3.2 Priority Rules for Scheduling Resources

Scheduling of resources is based on two options or priority rules. One option is whether the scheduling of the resources should be resource-limited or time limited. We shall now consider each of the options.

3.2.1 Resource Limited Scheduling

In resource limited scheduling, the levels of available resources are known well in advance and as a matter of fact should not be exceeded. Following this, the completion time of the project will be a secondary objective. In real life, resource limited scheduling is found mainly in government establishments and parastatals where the annual or supplementary budget sets a limit to the amount that can be expended by a ministry or parastatal.

3.2.2 Time Limited Scheduling

In a situation where time is of essence in a project, the scheduling should be time-limited. For example, if a university is due to reopen in October and it is expected that a new students' hostel under construction will accommodate 2,000 new students, it means that at least the new students' hostel should be ready by September of the same year.

When a project is subjected to time-limited scheduling, overtime and hiring of excess labour usually resorted to in order to meet the time schedule.

In practical situations, project managers resort or fall back to a second-tier resource level.

SELF-ASSESSMENT EXERCISE 2

Using a practical example, explain the "time-limited scheduling."

4.0 CONCLUSION

In this unit, we discussed principles of scheduling resources. We discussed the meaning of resources and also the priority rules for scheduling resources. The options available to the project manager are resource-limited scheduling and time-limited scheduling of resources.

5.0 SUMMARY

Principles of scheduling resources guide the project manager in project management. It provides project managers with tools with which to schedule resources.

6.0 TUTOR-MARKED ASSIGNMENT

What do you understand by resource-limited scheduling?

7.0 REFERENCES/FURTHER READING

Meredith, J. R. & Mantel, S. J. Jnr. (1995). *Project Management: A Managerial Approach*. (3rd ed.). New York: Wiley.

Reiss, G. (1995). *Project Management Demystified: Today's Tools and Techniques*. (2nd ed.). London: Spon.

UNIT 3 PRACTICAL SCHEDULING OF RESOURCES

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Factors in Project Resource Scheduling
 - 3.2 Labour Resources to be Scheduled
 - 3.3 Scheduling Labour Costs
 - 3.4 Scheduling Costs for other Materials
 - 3.5 Scheduling 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, we discussed principles of scheduling resources. We defined the meaning of resources and also the priority rules for scheduling resources. We also discussed the options available to the project manager for scheduling of resources.

2.0 OBJECTIVES

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

- outline areas of practical scheduling of resources
- discuss practical scheduling of resources.

3.0 MAIN CONTENT

3.1 Factors in Project Resource Scheduling

In practical terms, before practical scheduling can be carried out, the appointed project manager with his or her team will first of all be faced with a number of critical questions that concern the project in question. They may have to highlight problems associated with the project and offer solutions. Let us now look at fig. 1 which highlights competing factors in project resource scheduling.

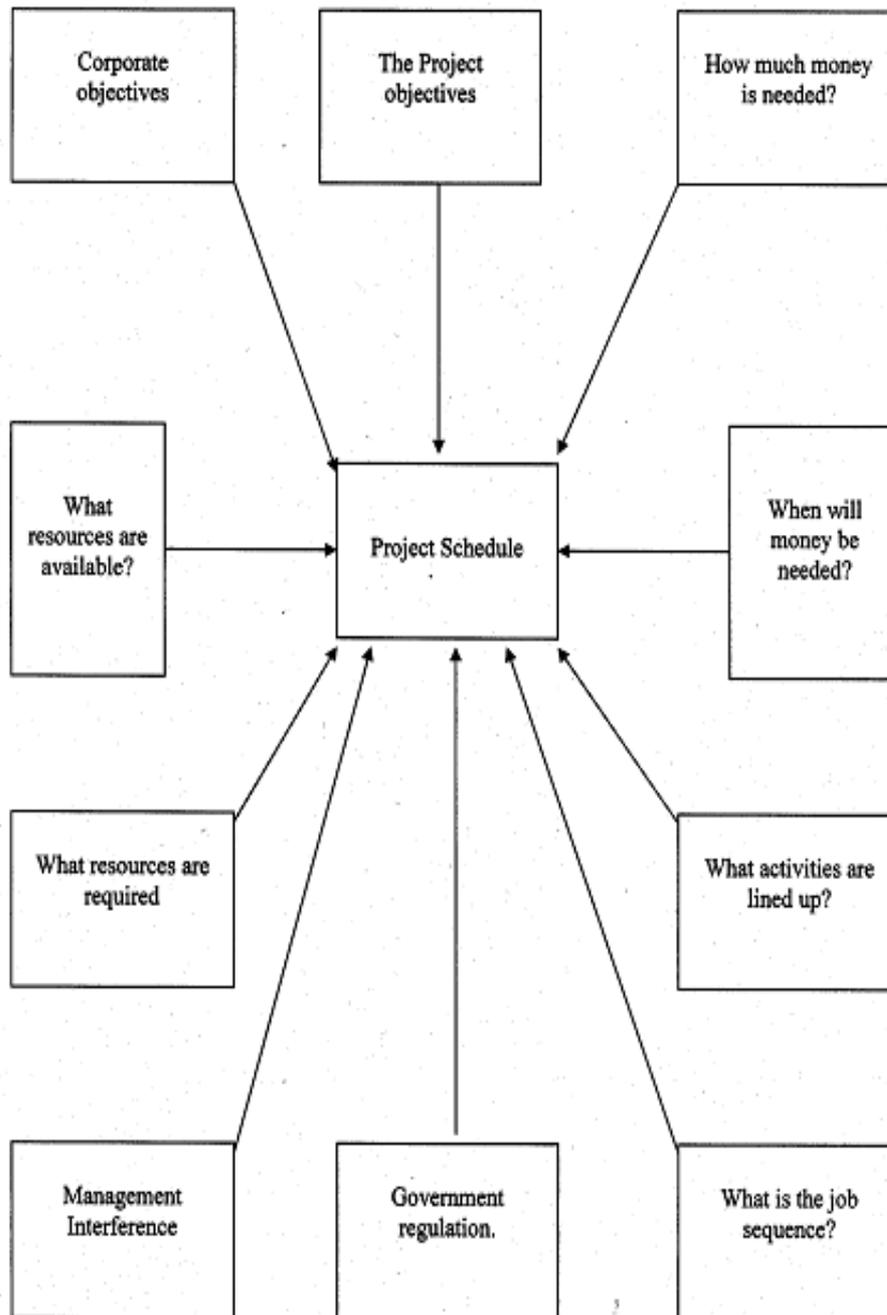


Fig. 1: Competing Factors in Project Resource Scheduling

SELF-ASSESSMENT EXERCISE 1

Explain the competing factors in project resources scheduling.

3.2 Labour Resources to be Scheduled

In fig. 1, we displayed the competing factors in project resources scheduling. Although a lot of factors have been highlighted, a very important resource that needs scheduling is labour. Whatever the nature

of the project concerned, the starting point is labour since it is labour that organises all the other factors that take part in a project. So whether it is large construction project, manufacturing project or a large petrochemical project, we will find that the following work activities should be scheduled. They include the following:

- a. Project layout design
- b. Civil engineering jobs
- c. Mechanical engineering jobs
- d. Structural engineering jobs
- e. Electrical engineering jobs
- f. Plumbing and hydro engineering jobs
- g. Production engineering jobs
- h. Chemical engineering jobs.

3.3 Scheduling Labour Costs

In section 3.2 we listed a number of work schedules that should be scheduled. In terms of schedules, we are specifically looking at labour intensive schedules. For example, in project design we are looking at the labour content of project layout design.

So in practice, it will be necessary to schedule the estimated expenditures for labour. The ideal thing to do is to choose a specific cost rate per unit of labour resource. For example, we could have the following estimates for labour costs in a project:

Category	Rates per Day
	(₦)
Civil engineering jobs	2,500
Structural engineering jobs	2,000
Plumbing jobs	1,000

3.4 Scheduling Costs for Other Materials

Apart from labour cost in a project, there is the need for other materials costs to be estimated and scheduled. In practice, all activities identified in a project should be recognised and the associated materials also identified for cost purposes.

Usually, the project accountant collects information about project activities from the project manager. He/She then matches the material cost with the associated activity.

Based on the network analysis, the accountant is issued with the priority list for the project so that adequate purchase arrangements could be

made. The cost of materials to be scheduled will vary depending on the nature of the project, the activities involved and of course the duration of the identified activities.

3.5 Scheduling Cash Flows

Cash flow schedules basically are schedules which show inflows (income) of a project and also outflows (expenditures) of a project.

As we discussed earlier, money is a very critical resource. Again, it is to be stressed that most resources for a project will be paid for with money. Therefore, schedules which show how money will flow in a project is very important.

It is also very important to note that the cash flow schedule is not an accounting statement or schedule. It is basically a schedule that shows the receipts of money and the spending of money in relation to a project.

The cash flow schedule is divided into two sections, namely: the cash inflow section and the cash outflow section. Two of them combine to form the cash schedule.

The cash inflow section of the cash schedule shows the various sources of cash for a project. Sources of cash for a project may vary. In the private sector projects, they will consist mainly of equity or bank loans. But that is understandable.

However, the sources of funds for a public sector project might be different. They may consist of local government, state or federal government funds. Also, public sector projects might attract external funds sources from outside Nigeria.

To drive home the practical construction of a cash flow schedule, we produce for your study two cash flow schedules for the following projects:

- A refinery project - Table 1
- A hospital project - Table 2

An important point to note about cash flow schedules is that apart from the fact that the schedule highlights the activities, the timing of the activities are duly captured. For example, in the refinery project (table 1) you will observe that the Bank of Industry loan is expected to come in by January and not February. The logic is simple. The loan will be required to undertake the engineering design work, civil engineering and other works.

At a glance, therefore, the project manager can see what activities will come up at different times and the amount of funds they will require.

In more complex cases, the cash flow schedule will highlight when the project will require external funding, etc.

SELF-ASSESSMENT EXERCISE 2

Discuss the scheduling of cash flow for a project with an example.

Table 1: Cash Flow Schedule for a Refinery Project

Cash Inflows	January	February	₦' Million March
Bank of Industry loan	10,000	-	-
European Investment Bank loan	-	-	10,000
Federal Government of Nigeria Equity	-	10,000	-
Total Cash Inflows	10,000	10,000	10,000
Cash Outflows	200	-	-
Engineering design	300	1,000	1,000
Civil engineering works	2,000	1,000	1,000
Structural engineering works	2,000	5,000	1,000
Mechanical engineering works	1,000	2,000	2,000
Electrical engineering works	100	100	100
Office buildings	100	-	-
Salary and wages	200	-	-
Environmental impact studies	-	-	9,600
Permits	6,000	9,200	14,800
Refining chemicals			
Total Cash Outflows	4,000	800	(4,800)
	-	4,000	4,800
Inflows Less Outflows	4,000	4,800	-
Opening Cash Balance			
Closing Cash Balance			

Table 2: Cash Flow Schedule for a Hospital Project

₦' Million			
	April	May	June
Cash Inflows			
World Health Organisation grant	200	100	-
Federal Government of Nigeria equity	300	-	50
TOTAL CASH INFLOWS	500	100	50
CASH OUTFLOWS			
Engineering design	10	-	-
Civil engineering works	100	10	-
Structural engineering works	30	10	-
Electrical engineering works	10	10	-
Wards and offices	200	30	-
Hospital equipment	100	10	10
Drugs and medicaments	-	-	30
Salary and wages	40	40	10
Total Cash Outflows	490	110	50
Inflows Less Outflows	10	(10)	-
Opening Cash Balance	-	10	-
Closing Cash Balance	10	-	-

Table 3: Steps in Project Resource Scheduling

S/No.	Step	Notes
1.	Define the objectives of the project and break them down into technical, financial and time objectives	Study the feasibility of the project
2.	Divide the project into manageable tasks using the network analysis	
3.	Make a list of all the tasks and their sequence	Use the Network Analysis
4.	Estimate all task durations and identify the critical paths	You may use a bar chart here plus the network analysis
5.	Match the tasks with the available resources	
6.	Assign tasks to team members or tea	

4.0 CONCLUSION

In this unit, we discussed practical scheduling or resources. We looked at the competing factors in project resource scheduling. We discussed labour resources to be schedules and the scheduling of labour costs. We

then discussed project cash flow schedules. We concluded the unit by highlighting steps in project resources scheduling.

5.0 SUMMARY

In this unit, we treated practical scheduling of resources which is a very vital topic towards our understanding of project management. We saw practically how resources are scheduled and using a cash flow schedule. We demonstrated scheduling of project resources. In the next unit, we shall discuss materials management.

6.0 TUTOR-MARKED ASSIGNMENT

What are the competing factors in project resource scheduling?

7.0 REFERENCES/FURTHER READING

Wallace, T. F (1995). *MRPH – Making it Happen: The Implementer's Guide to Success with Manufacturing Resources Planning*. Chichester: Wiley.

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UNIT 4 MATERIALS MANAGEMENT

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 The Purchasing Cycle
 - 3.2 Commercial Conditions of Purchase
 - 3.3 Timing of Purchase Orders and Deliveries
 - 3.4 Call-Off Orders
 - 3.5 Purchasing for Capital Projects
 - 3.6 Stores Administration
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

Materials management concentrates on the key aspects of purchasing and control that take place after a purchase order has been issued for materials of a project. Also, materials management concentrates on the purchasing procedures in projects defined as capital projects.

Purchasing is a vital function in project management because the supply of materials is very critical to ensuring that there are no delays in the supply of materials to projects. Also, buying on competitive terms and prices is considered to be very important to project managers.

Materials management also concentrates attention on the schedule inspection of project materials and goods when they are delivered to the project stores or sites. Stores management is also part of materials management.

Besides, it is to be realised that shortage of material can frustrate a project. So project managers in managing materials purchase must ensure that on no account should materials shortage occur once a project commences. Materials shortages delay projects if they are allowed to occur.

2.0 OBJECTIVES

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

- explain the purchasing cycle
- appraise the principle of materials management
- discuss stores administration.

3.0 MAIN CONTENT

3.1 The Purchasing Cycle

There is this misconception that a purchasing department consists of people (staff) whose only functions are to issue purchase orders and take delivery of materials and goods. This is not true. The purchasing function goes beyond issuing of local purchase orders (LPOs). We shall now discuss the purchasing cycle which will throw more light on the purchasing function.

The purchasing function may start with the project manager who discovers that some materials are needed for a project. Instructions are then issued to the purchasing department asking it to purchase the materials required. It may also start from the stores department of a project when it is discovered that certain materials are in short supply.

After the need for materials has been identified, the next stage in the purchasing cycle is to specify the materials or goods to be purchased. It is important to specify the required materials especially if they are engineering or specialist goods. They may even be chemicals which are also specialist goods not sold everywhere.

After specifying the materials, the next step is to shortlist vendors and invite tenders from the shortlisted vendors. When the tenders have been received from the shortlisted vendors, some organisations pass on the tenders to the tenders' committee which chooses the vendors. After the vendor has been chosen, the purchasing department now issues the local purchase order (LPO) for the materials.

When the materials are received, it is the duty of the purchasing department to inspect the goods before receipt. After receipt of the goods, payment will then be made to the vendor.

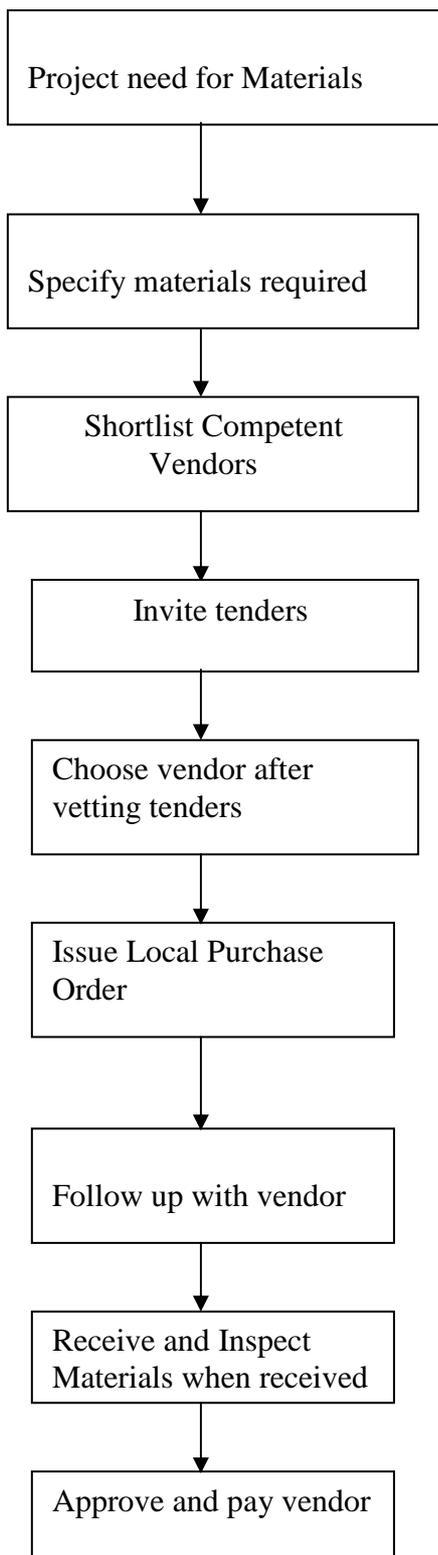


Fig. 1: The Purchasing Chain

SELF-ASSESSMENT EXERCISE 1

Describe the purchasing functions.

3.2 Commercial Conditions of Purchase

Since some projects purchase will run into billions of naira in monetary terms, it is important that the commercial conditions of purchase for any project be properly spelt out. In most organisations, the commercial conditions of purchase are usually spelt out on the reverse side of their local purchase order (LPO). Here is a list of some commercial conditions of purchase which appear in many purchase orders.

- a. **Goods** mean the supply and delivery of the goods specified in line with the organisation's purchase order.
- b. **Payment terms:** Payment may be made on delivery or against shipping documents.
- c. **Prices:** Prices are usually fixed for the period of the contract (LPO) and cannot be varied.
- d. **Quality** of the goods or materials shall conform to description or specification given by the organisation to the supplier.
- e. **Rejections:** The company may at any time before or after receipt of the goods reject the goods if they are found to be of inferior quality.
- f. **Delivery time:** The delivery time must not exceed the time stated on the LPO. However, if for any cogent reason, the supplier cannot deliver goods within the delivery time, the supplier shall notify the company in writing.

We have discussed the commercial conditions of purchase which we said should be written at the back or reverse side of a local purchase order (LPO).

In practice, however, for larger projects, project managers should engage the services of legal experts to draft the local purchase orders so as to reduce losses from legal actions.

SELF-ASSESSMENT EXERCISE 2

List and discuss the conditions of purchase which can appear in a local purchase order?

3.3 Timing of Purchase Orders and Deliveries

You will recall that in unit 1, we discussed network analysis. There we discussed project plans and schedules. An important aspect we discussed

was activity duration. We identified the start and finish time for an activity.

Every activity should have an earliest start time and earliest finish time. It follows logically therefore, that if the project manager knows when an activity should commence, then he/she should ensure that the materials required for an activity must be in place before the start of the activity. For example, if the foundation for a stadium project is scheduled to start on December 1, then the cement for the foundation laying must be on the project site latest by November 29 of the same year.

Project managers when handling projects must see to it that all items required in a project are fully identified. Also, when the various materials will be required should be identified and charted. If this is done, notice will be given in advance to the purchasing department to make the necessary purchase. There is therefore, a very strong link between timing of purchase orders, delivery and commencement of project activities.

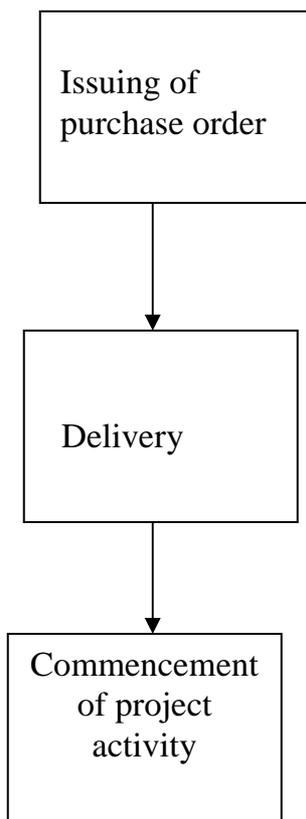


Fig. 2: Purchase Order Deliveries Project Activity Chain

In management of timing of orders and deliveries, project managers are relying on just-in-time (JIT) management techniques which were perfected by the Japanese. Just-in-time approach to purchasing and

manufacture was adopted to reduce stock holdings by manufacturers to almost zero.

Just-in-time techniques require that suppliers of materials should supply them direct to the work site at the right time.

In just-in-time techniques, a great deal of trust is built between the purchaser and the supplier and this ensures that the supplier delivers the goods at the work site at the right time and of the right quality.

Purchasing managers, fully aware of the time lag between issue of purchase orders and deliveries from suppliers, should plan purchases properly so as not to frustrate project activities due to late deliveries or non-delivery of materials.

3.4 Call-off Orders

Consider for example, a situation where a new university is to be built at Bauchi. The university will contain students' hostels, lecture halls, administrative buildings, senate buildings, roads, playgrounds, etc. The project no doubt will gulp billions of naira to complete and will also require a lot of cement, sand, concrete, wood, electrical parts, plumbing parts, etc.

If all the materials required for the university project are ordered at once, then there will be no storage space to receive the goods. In practice, if a large quantity of a particular material is required for a project, then the delivery of the materials (e.g. cement) can be arranged to be made in batches arranged between the purchaser and the supplier. This type of order is known as a call-off order. This is so-called because the materials are called off as they are required to suit a project schedule. However, call-off orders delay expenditures which will only be incurred when materials are delivered.

3.5 Purchasing for Capital Projects

So far, we have built the necessary background for the understanding of materials management. We shall now focus attention on purchasing for capital projects which are mainly what most of us will be faced with in practice.

Capital projects involve large commitment of resources (money and people) and therefore, it is important for us to understand the structure for managing purchases relating to them.

Capital projects will include the following:

- a. Design and construction of a new university complex
- b. Design and construction of a federal secretariat complex
- c. Design and construction of a new teaching hospital
- d. Design and construction of a national stadium.

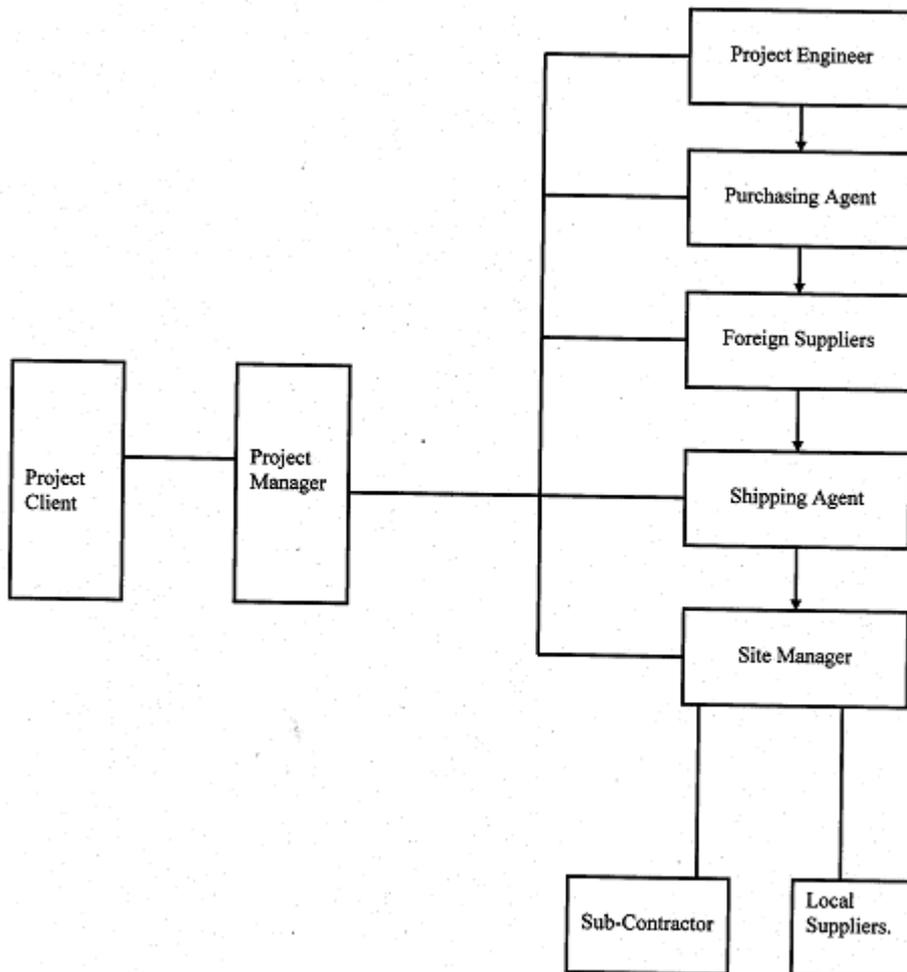


Fig. 3: Purchasing Organisation for a Capital Project

Table 1: A purchasing schedule for a capital project

Title	Schedule
Project Manager	Responsible to the client for scheduling and supervising all project activities until completion.
Project Engineer	Assists the project manager. Provides support to the purchase agent. Writes the purchase specifications for every item or equipment to be purchased.
Purchase Agent	Assists the project engineer. Issues invitation to tender to suppliers. Maintains suppliers records.
Foreign Suppliers	Prepare equipment bids and send same to the purchase agent. Proceeds with supply if bid is

	successful.
Site Manager	Examines equipment on arrival and arranges storage.
Local Suppliers	Supply equipment and materials direct to site manager.

SELF-ASSESSMENT EXERCISE 3

Describe the purchasing schedule for a capital market.

3.6 Stores Administration

Although purchasing is a critical aspect of materials management, stores administration complements the purchasing function. If materials and equipment for a project are delivered on site and not properly accounted for, pilfering and other vices can frustrate a project. Stores administration includes the following:

- a. Accommodation for equipment and materials
- b. Labeling the materials for easy identification
- c. Preservation and paying attention to peculiar storage arrangements
- d. Handling and issuing of equipment and materials records
- e. Security.

SELF-ASSESSMENT EXERCISE 4

What is the relationship between purchasing and stores administration?

4.0 CONCLUSION

In this unit, we discussed materials management generally. We discussed the purchasing cycle, commercial conditions of purchase, the timing of purchase orders and deliveries. Call-off orders was also discussed in addition to purchasing for capital projects. All these helped us to improve our understanding of project management.

5.0 SUMMARY

Materials management concentrates attention on the purchase, scheduled inspection of materials and deliveries. Stores management is an important aspect of materials management.

6.0 TUTOR-MARKED ASSIGNMENT

What do you understand by the term “purchasing cycle” with reference to materials management?

7.0 REFERENCES/FURTHER READING

Farmer, D & Van Weele, A. J. (Eds.) (1995). *Gower Handbook of Purchasing Management*. (2nd ed.). Aldershot: Gower.

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UNIT 5 PROJECT IMPLEMENTATION: AN INTRODUCTION

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Project Implementation Stages
 - 3.1.1 Project Authorisation
 - 3.1.2 Project Documentation
 - 3.1.3 Organisation of the Project
 - 3.1.4 Tasks Allocation
 - 3.1.5 Project Kick-Off
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

In practical terms, project implementation starts from the time that a project has been conceived, designed and authorisation duly given to proceed on the project. Authorisation can be given by a customer or project owner.

A project owner may be, for example, the Federal Ministry of Works and the project in question may be the dualisation of the Owerri-Onitsha highway.

Project implementation runs through the entire process of organisational initiation of a project to its full implementation. Project implementation highlights the basic principles and processes that are to be followed to ensure that a project is eventually implemented.

2.0 OBJECTIVES

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

- explain the process of project implementation
- discuss project implementation.

3.0 MAIN CONTENT

3.1 Project Implementation Stages

Generally, project implementation is broken into various stages. This is shown in fig. 1:

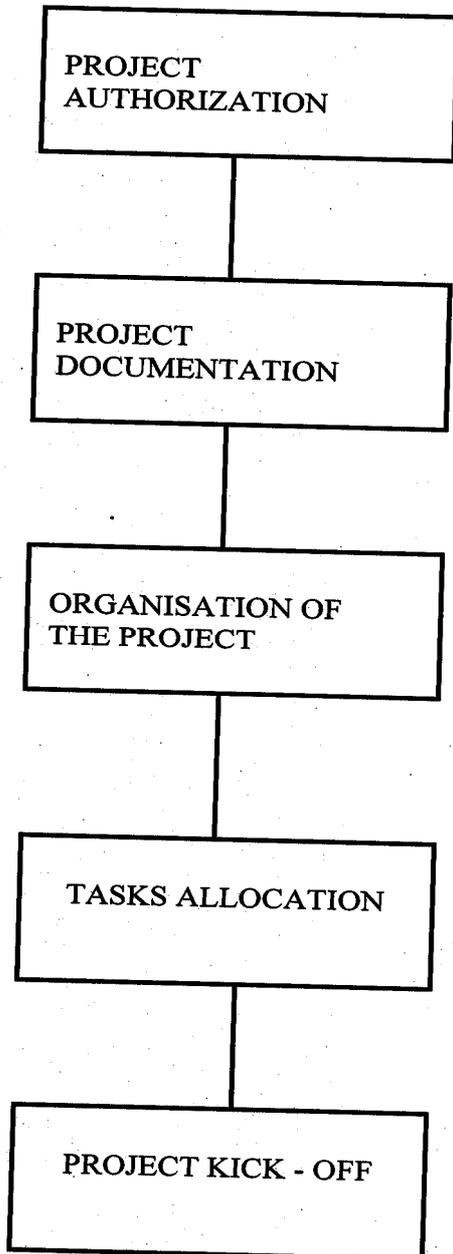


Fig. 1: Project Implementation Stages

3.1.1 Project Authorisation

Before we go into the discussion of project implementation proper, we shall first discuss project authorisation because it is the starting point to

describe the process of project implementation. When project authorisation occurs, it means that the project manager has been given proper authority and instruction to proceed with a project.

In a public sector setting, project authorisation may involve the ministry signing a formal contract with the project contractor or project manager as the case may be.

Even in a private sector setting where a project will be executed in-house, there must be a formal written authorisation from the private organisation. The authorisation document will state essential information on the project. It will state the nature of the project and the scope of work to be undertaken. It will also state the project amount. The project manager will also be stated.

Client Nature of project Scope of work Project amount Project manager Project engineer Site controller Project start date Expected finish date Authorised by	N
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Table 1: Project Authorisation Format for a Construction Company

SELF-ASSESSMENT EXERCISE 1

List and discuss the information that you can find in a project authorisation document.

3.1.2 Project Documentation

Normally, most organisations may have many projects at the same time. For example, the Federal Ministry of Works at every point in time may have well over 200 projects going on. Some of the projects may be road projects. Others may be building projects.

Practically therefore, there should be ways of distinguishing one project from the other. Whenever any new project is authorised, it has to be registered and given an identification number. For example, in the Federal Ministry of Works, we could have the following pattern of identification numbers.

Project I.D.	No.	Project Title
R.	101	Kano – Zaria expressway
R.	102	Kano – Maiduguri Road
R.	103	Yola – Biu Road
R.	104	Lagos – Ibadan Expressway
H.	101	Federal Housing Estate Ikoyi
H.	102	Federal Low Cost Housing Estate, Kano
H.	103	Federal Low Housing Estate, Calabar

The identification numbers are usually entered into a project register. Other information that should be entered in the register with respect to every project will be:

- a. The title of the project
- b. Nature of work to be done
- c. Scope of the work to be done
- d. Project amount and disbursement pattern
- e. The project manager
- f. The design architects for the project
- g. The structural engineers for the project
- h. The mechanical engineers
- i. The electrical engineers
- j. The supervising agent
- k. Project start date
- l. Project finish date

With the advent of the computer and information technology, most project registers are available in computer systems and this makes the retrieval of information about any project very easy.

SELF-ASSESSMENT EXERCISE 2

Why is it necessary to document the project?

3.1.3 Organisation of the Project

Once the project documentation stage of a project has been concluded, the next stage in the implementation process is the organisation of the project. In most situations, the project manager as the leader of the project team with his close subordinates will draw up the comprehensive organisation chart for the project which will clearly detail the following information:

- a. Teams that will work at head office level
- b. Teams that will work at the project sites
- c. Principal sub-contractors and their locations
- d. Supervising agencies
- e. Other logistics.

ITEM/QUESTION	POSITION AND ACTION PLAN
How many project teams do we have? What are their locations? How many people will be involved? Is accommodation available at sites? If yes what standards? Has accommodation been arranged? Has staff medical care been arranged? What is the access to the site? By air, road, rail or sea? What of the vehicle fleet? What no of vehicles are required? When will they be moved to site? Who will be responsible to move them? What are the things needed at the site? Electricity and generators Have equipment been moved to sites?	

3.1.4 Tasks Allocation

You will recall that network analysis identifies the principal activities that are involved in a project. That we have understood. In tasks allocation, the project manager identifies every activity that will be undertaken and goes ahead to allocate the tasks to the various units.

Every unit or team that is involved in a project must know what it is expected to do and the time frame allocated for every activity. A tool that assists the project manager to allocate tasks in a project is the responsibility matrix. The responsibility matrix consists of task types on one side and responsibilities on the other.

Each task in a project is allocated to the project team or unit that is responsible for the task.

A project responsibility matrix is shown in table 3.

Responsibility

Table 3: A Project Responsibility Matrix

	Project Manager	Purchasing Manager	Design Office	Project Accountant	Project Engineer
Task					
Designs			X		
Approval of designs	X				
Purchase orders (P.O)	X	X			
Planning and logistics	X				X
Progress report	X				X
Cost reports	X	X		X	

3.1.5 Project Kickoff

We have traced project implementation from the authorisation stage to the tasks allocation stage. The next stage which is the last stage is the project kick-off stage. Ideally, every project has a kick-off date which is usually known in advance. The kick-off date is arranged following series of meetings of the project team members. Before the project kick-off, grey areas must have been resolved.

In practice, most project managers will arrange a pre-kick-off meeting with key team members. The objective of the pre-kick-off meeting usually is to ensure that all critical aspects of a project have been covered and also to evaluate the readiness of all team members and leaders towards ensuring the success of the project.

The actual kick-off of the project is the beginning of proper project implementation.

4.0 CONCLUSION

In this unit, we treated project implementation. We discussed the various stages of project implementation. We discussed project authorisation, project documentation and organisation of a project, tasks allocation and project kick-off. All these are essential stages in project implementation.

5.0 SUMMARY

This unit treats project implementation at an introductory level. It highlights the key stages that are involved when a project is being implemented. Project implementation is not a one-off thing. It is an on-going process.

6.0 TUTOR-MARKED ASSIGNMENT

The Federal Government of Nigeria has approved the construction of a new Lagos-Ibadan expressway at a cost of ₦4 billion. Discuss the stages in the implementation of the project.

7.0 REFERENCES/FURTHER READING

- Healey, P. L. (1997). *Project Management: Getting the Job Done on Time and in Budget*. Oxford: Butterworth – Heinemann.
- Randolph, W. A. (1991). *Getting the Job Done: Managing Project Teams and Taskforces for Success*. Hemel Hempstead: Prentice-Hall.

UNIT 6 MANAGING PROGRESS IN PROJECTS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Managing Progress
 - 3.2 Management by Walk About
 - 3.3 Managing Sub-Contractors and Agency Staff
 - 3.4 Construction Site Management
 - 3.5 Conduct of Project Meetings
 - 3.6 Project Progress Reports
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

In the last unit, we discussed project implementation. We discussed the various stages of project implementation which include project authorisation, project documentation and organisation of a project, tasks allocation and project kick-off.

In this unit, we shall discuss managing progress in projects. This unit will conclude our study of project management.

2.0 OBJECTIVES

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

- explain managing progress in projects
- discuss the management of progress in projects.

3.0 MAIN CONTENT

3.1 Managing Progress

Once a project has been commissioned, there will be need to monitor its progress. For example, when the Federal Ministry of Works awarded the contract for the dualisation of the Onitsha-Owerri highway, it detailed the supervisory unit to periodically inspect the progress of work on the road project and report back to the headquarters.

When we discussed network analysis, we saw that every activity in a project has duration. Duration refers to how long it will take to finish an activity. We also noted that every activity has an earliest start time and earliest finish time. In managing progress, the project manager must compare the progress achieved on every activity against the planned schedule.

In situations where the project site is far away from the head office or headquarters, it becomes very necessary for the project manager through the necessary communication lines with the site managers to get on the spot progress of work at various locations.

Practically, there is resort to the use of a progress report questionnaire. The progress report questionnaire is designed to measure the progress of work in a project. It will usually describe the various activities in the project, their durations, earliest start dates and earliest finish dates. The respondent to the questionnaire is expected complete the relevant columns. Headquarters uses the questionnaire to monitor progress of various projects.

Consider, for example, a project that involves the construction of a students' hostel. A progress report questionnaire is shown in table 1:

Table 1: Progress Report Questionnaire for Students' Hostel under Construction in a University

Activity Description	Scheduled Start	Scheduled Finish	% Complete
Dig soak away and drain trend	1/1/2007	3/1/2007	100
Lay rubble and drain pipes	1/1/2007	7/1/2007	100
Prepare chamber slabs	7/1/2007	17/1/2007	100
Dig hostel foundations	4/1/2007	14/1/2007	100
Lay concrete foundation works	16/1/2007	21/1/2007	100
Lay floor base	22/1/2007	30/1/2007	100
Mount bricks	1/2/2007	30/4/2007	100
Fit lintel	1/5/2007	20/5/2007	100
Build parapet	21/5/2007	30/5/2007	100
Fit roof timber	1/6/2007	10/6/2007	100
Fit and run fascia board	11/6/2007	25/6/2007	-
Fit roof sheets	26/6/2007	10/7/2007	-
Seal the roof	11/7/2007	11/8/2007	-
Fit ceiling boards	12/8/2007	12/9/2007	-
Fit gutters	12/9/2007	25/9/2007	-
Hang doors and windows	26/9/2007	10/10/2007	-
Fit electrical fittings	12/8/2007	10/10/2007	-
Paint	11/10/2007	11/11/2007	-

The frequency of the reports will depend on the nature of the projects. Where computer systems are available, data and information on various activities can be keyed in at the various project sites.

3.2 Management by Walk About

The ideal methods in managing progress in projects involve the use of reports from team members on the various aspects of the project they are involved in. In that respect, all project team leaders usually will prepare periodic project reports which will be sent to the project manager for review and further action. But whilst the preparation of periodic reports is commendable, a practical project manager must be prepared to pay scheduled and unscheduled visits to the project sites to get first hand information on the state of work at the site.

This type of visits to the project sites is known as management by walk about. Apart from seeing things as they are on the site, one advantage of scheduled visits to sites is that it helps to boost the morale of workers at the site when they see their project managers and team members at the site reviewing progress. During such scheduled visits, project managers may take photographs of the project site which serve as documents at the headquarters. Photographs also will document the level of construction progress especially for a building project.

It has to be stressed that when a project is being monitored the control areas relate to:

- The state of progress at the various levels of activity of the project.
- Manpower deployment and utilisation including shortages.
- Expenditures of the projects and whether they are within the project budget.

SELF-ASSESSMENT EXERCISE 1

In managing progress in projects, a manager must be prepared to pay visits to the project sites. What are the benefits of this?

3.3 Managing Sub-Contractors and Agency Staff

In practical terms, most organisations use main contractors, sub-contractors and agency staff for project execution. This fact introduces the complexity involved in managing a project. First, the organisation's staff may differ widely in quality and conduct from that of the main contractor and also the sub-contractor.

Depending on their scope, most projects have their main contractor and also sub-contractors. Sub-contractors are usually engaged in projects especially where they are required to undertake tasks for which they are specialised and which may not be available to the main contractor. For example, the design and construction of a National Stadium at Abuja definitely involved the main contractor and a lot of other sub-contractors with different areas of specialisation.

Let us assume that Company A was awarded the contract to construct the new national stadium at Abuja at a cost of ₦20 billion. In this case, Company A is the main contractor but it has to engage many sub-contractors for various jobs related to the stadium project. A lot of sub-contractors may be hired for the following jobs:

- Foundations and piling jobs - Trevi Foundation Ltd.
- Wood works - Ashly and Bred Ltd.
- Plumbing works - Asea, Orly & Co.
- Electrical works - Newman Nig. Ltd.
- Painting - Bonalux Painters Ltd.

If you take a good look at the jobs that the sub-contractors were engaged to do, you will realise that they are outside the areas of competence of Company A which is the main contractor to the stadium project. So when we are talking of managing progress in a project, the project should be seen in totality.

Although the main contractor has the duty to supervise and manage the progress of the sub-contractor, the project manager's function is all encompassing. The project manager supervises and monitors progress in a project from a holistic point of view.

Apart from managing sub-contractors, some projects involve the use of agency staff that may either be deployed to work at the main contractor's location or deployed to work at other designated locations.

Usually, a main contractor resorts to the use of agency staff on a temporary basis; this usually is to cover staff shortage which normally arises in the course of project execution. All agency staff that are absorbed to work at the main contractor's premises must be properly supervised and monitored. A practical way of doing this will be to have induction training for them at the inception of the project.

SELF-ASSESSMENT EXERCISE 2

List three control areas that should be monitored in a project.

3.4 Construction Site Management

A lot of projects may involve construction sites and the management of these sites are crucial if projects are to be properly executed. Also, in many projects, the headquarters of the project manager may be very far away from the various construction sites. Take, for example, MTN which is involved in communications. The construction and deployment of communications masts nationwide involve many construction sites. Work at all of these sites must be properly supervised and managed. Therefore, there is the need for proper coordination and management of construction sites.

In construction site management, the primary focus is on the facilities at the various project sites. Some of the facilities will include the following:

- a. Road network
- b. Staff accommodation
- c. Office accommodation, e.g. Portakabin
- d. Communication equipment
- e. Computers
- f. Telephones
- g. Stationery.

All these facilities must be on site with other necessary items. If there is no power or water at the site, the project manager or main contractor must ensure that these are also provided. The health of the site workers must also be taken care of. In this case, local arrangements will have to be made to provide regular and emergency medical services to the staff at project sites. In more complex cases, banking facilities in addition to catering services will need to be provided for the workers at the project site.

3.5 Conduct of Project Meetings

Along the line when the project is ongoing, there is always the need to conduct project meetings to monitor and evaluate progress of work at different sites. Project meetings are very important. Project meetings may be held at a project site or at the headquarters of the project manager depending on the circumstances.

As with any other meeting, the following must be in place:

- a. Agenda
- b. Meeting room with adequate ventilation
- c. Visual aids

- d. Refreshments
- e. Accommodation for visiting members.

To ensure the best out of project meetings, the agenda for the meeting should be given well in advance to the various members so that they can study it and prepare their reports where necessary.

As we have indicated earlier, the objective of many project meetings is to evaluate progress of work. Also, meetings serve as avenues to identify problems associated with a project. At times, problems (especially engineering problems) arise during a project implementation. We discover that in most cases, teams working independently may be unable to solve the engineering problems. Such engineering problems if they arise may be brought to the attention of a larger audience, i.e. the project meeting. Also, project meetings may highlight interdepartmental or inter team problems which may be affecting work progress.

SELF-ASSESSMENT EXERCISE 3

Why is it necessary to conduct project meetings?

Table 2: Project Meeting and Action Sheet

DATE OF MEETING :	
PLACE OF MEETING :	
TIME OF MEETING :	
MEETING AGENDA :	
THOSE IN ATTENDANCE :	
1.	5.
2.	6.
3.	7.
4.	8.
KEY DECISIONS REACHED	UNRESOLVED ISSUES:
1.	1.
2.	2.
3.	3.
ACTION TO BE TAKEN AND BY WHOM	
1.	
2.	
3.	
Signatures	
Chairperson	Secretary

3.6 Project Progress Reports

Progress reports are usually addressed to any of the following:

- a. Company management
- b. Customer or client, e.g. The Federal Ministry of Works.

The progress report seeks to set out details of the technical and financial status of projects especially to compare the results achieved so far with the target objectives of the project. In most project contracts, reports may be required to be sent in weekly or monthly depending on the nature of the project. The progress report should contain, amongst other things, the following:

- a. Details of work done so far
- b. Details of outstanding work to be done
- c. Estimated project completion time of project
- d. Project cost discipline
- e. Project cost escalations – (if any).

4.0 CONCLUSION

In this unit, we have generally discussed managing progress in projects a very vital part of our study of project management. We discussed the concept of management by walk about which is a more practical approach to managing progress in projects. We also discussed the management of sub-contractors and agency staff, construction site management, project meetings as well as project progress reports.

5.0 SUMMARY

This unit treats managing progress in projects. It tries to examine the key features in the management of progress in a project. The importance of managing progress by walkabout cannot be underestimated in project management.

6.0 TUTOR-MARKED ASSIGNMENT

As a project manager, how do you manage progress in your projects?

7.0 REFERENCES/FURTHER READING

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

Crosby, P. B. (1979). *Quality is Free: The Art of Making Quality Certain*. New York: McGraw – Hill.