Course Title

Project Engineering

Chapter 1

Introduction to Project and Project Management

Lecture 1 (week 1)

Concept of project, resources of project, characteristics of project, difference between project and program, project management

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Learning Objective

The main objective of this lecture is to understand about:

- The concept of project.
- Resources of project.
- Characteristics of a project.
- Difference between project and program
- Introduction to project management.

1.1 CONCEPT OF PROJECT

Every product or services what we are acquiring today is the outcome of our necessity. For fulfilling the desire or necessity, an idea is generated in a human mind. To translate the idea into reality, a single person cannot do it alone. A person utilizes the different resources for translating the idea into the physical form. The process of converting the idea into reality by utilizing the different resources is said to be a project.

New scientific ideas, concepts and thoughts are being discovered every day and have caused a very rapid advancement in the development of new technology. The benefits of these advancements are reaching to people all corners which changed their behaviour and life styles, as a result again creating new demands. The interaction between the increasing demand of the world population and advancement of science and technology have given birth to different types of project. [1]

DEFINITION OF PROJECT

"A project can be defined as a unique task (however large or small) with defined goal, limited in cost and time and giving some benefits to the users after its completion". [1]

"A project is defined as a temporary endeavor undertaken to create a unique products or services". [2]

"A project is a collection of limited activities, carried out in an organized manner with a clearly defined start and finish points, to achieve some specific results that satisfy the needs of an organization as derived from the current business plans." [3]

"A project is a combination of human and non-human resources pulled together in a temporary organizations to achieve a specified purpose" [4]

For Engineering Purpose, the definition of a project can be:

A project is a set of one – time – only activities designed to attain:

- Specific objective within the constraints of time, cost and quality in dynamic environment.
- Through the planning use and control of a variety or resources
- To create a unique product or service in temporary life span.

1.2 RESOURCES OF A PROJECT

Generally Denoted by 5 'M'

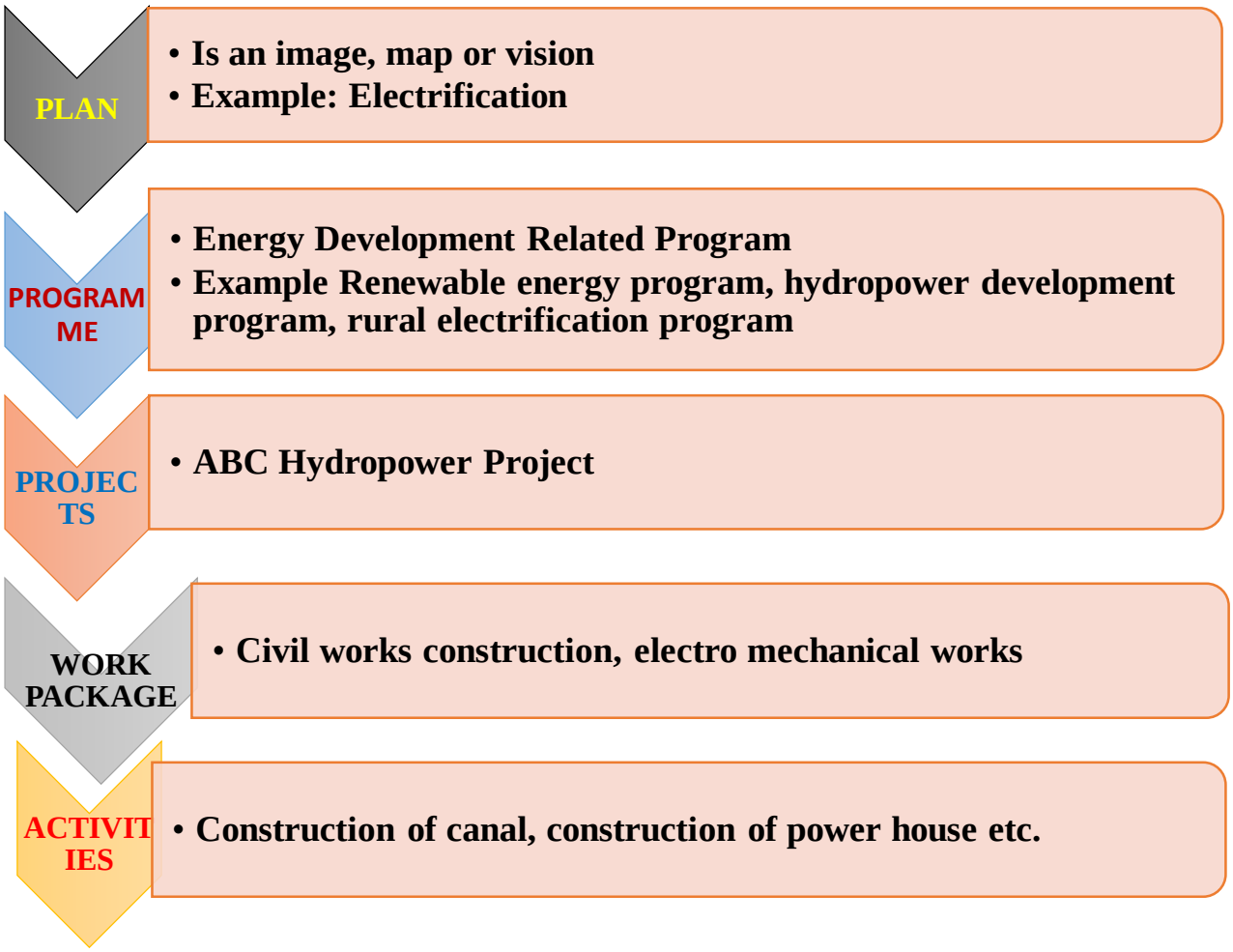
- Money
- Manpower
- Material

- Machine
- Minute/ Management

Management of the above listed 5 ‘M’s relies on core function of project management

From where project originates?

Projects generally originates from Policy prior to Plan (Policy: reduction in load shedding)



A good project is that which is:

- Technically feasible
- Economically viable
- Socially acceptable
- Politically suitable &
- Environmentally friendly

Because projects are considered as cutting edge of any development

EXAMPLES OF PROJECT

- Construction project (building, road, hydropower, etc.)
- Research and development project (Nuclear energy, medicine, etc.)
- Introducing new products in market
- Developing new or modified information system
- Running a campaign for political office.
- Producing movie or serial.
- Implementing new business procedure or process.
- Writing a book, thesis, novel etc.

1.3 CHARACTERISTICS OF A PROJECT

Any task or job or work can be said as a project if it meets the certain characteristics.

1. A Defined Goal/ Objective

Clearly defined goals are essential so that each stakeholder understands the purpose and vision of the project team. A project has clearly defined specific objectives or mission. It is focused on end results. It ceases to exist when the goal have been achieved. For Example: The goal of a construction project is to build an infrastructure or facility.

2. Unique

No two projects are absolutely similar to each other. Project involves doing something which has not been done before and therefore it is unique. [2] The plants and machinery used may be similar or identical, but one project is different from another due to its cost, time, design, geographical location, set of people etc.

3. Specific task not routinely performed

No works are repeated again and again in a project. One type of task is performed only once. For example: foundation work is performed only once in a building project.

4. Temporary (Life Span)

A project cannot go forever. Once its declared objectives are met, project ceases. Project starts with the definite certain date and ends in the definite certain date. The duration or life of the project depends upon its nature or scope. [5] Therefore project has a fixed time span and is temporary.

5. Team Work

In a project, there are number of people involved and participating, generally called as stakeholders. Projects work through team work. A project consists of multi-functional

team. Team members are temporarily assigned from other functional departments. They come from various disciplines with varied experiences. The key stakeholders in a project are:

Project manager: the individual responsible for managing the overall project.

Customer: the individual or organization that will use the project's product or services.

Performing organization: the enterprise whose employees are most directly involved in doing the work of the project.

Sponsor: the individual or group that provides the financial resources in cash or in kind, for the project.

Client: the individual or group which specifies the requirements.

6. Resource being consumed

Project consumes tremendous quantities of resources, all of which are paid for by the owner. 5M-Money, Material, Manpower, Machine and Minute are examples of the kinds of resources that are managed and controlled by the project team. The project team has to perform the task on limited resources. Efficiently managed projects minimize, balance and forecast resource consumption for the owner.

7. Risk and Uncertainties

Risk and uncertainty go hand in hand with project. Even if a project appears to be risk free, it only means that the risk element is not apparently visible on the surface and it will be hidden underneath. The risk factor will come to surface when conditions become conducive to it. On the other hand, risk gets managed as the project phase's proceeds.

8. Planning and Control

Projects work to a plan. A project requires effective and efficient planning and control systems. Standards are set for project activities through planning. They serve as yardsticks for measuring project performance. [6] Actual performance is compared with standards to find out deviations. Corrective actions are taken to control deviations.

9. Constraints

All projects have constraints. A project operates within the constraints of time, cost and quality performance. It has a time schedule for various activities and a completion date as deadline. It has its own budget to control costs. It has clearly laid down quality specifications. The scope and boundaries of a project are clearly described. Project schedule sets deadlines.

10. Contracting and subcontracting

Most projects are contract-based. The project work is characterized by high level of contracting and subcontracting. [7] Complexity increases the need for subcontracting. Contracts can be of

various types, such as lump- sum contract, unit price contract, negotiated cost plus fixed fee contract and turnkey contract. Proper contract planning and management is the key to effective project management. [6]

11. Progressive Elaboration

This characteristics integrates the concepts of temporary and unique. The product of each project is unique, the characteristics that distinguish the product or service must progressively elaborated. Progressive means "proceeding in steps; continuing steadily by increments" and elaboration means "worked out with care and detail: thoroughly developed". [2]

12. Life cycle

To translate an idea into reality, project has to undergo through the different well defined phases which is the life cycle of a project.

13. Defined Deliverables

The owners specifies the requirement of the task before its initiation. Therefore it is clearly known beforehand what the outcome of the project will be.

1.4 DIFFERENCE BETWEEN PROJECT AND PROGRAM

S.N.	Point of Differences	Project	Program
1	**Nature**	It involves one time set of activities.	It involves group of small and large projects.
2	**Scope**	Involves single undertakings, well defined objective, scope and timeframe.	Involves multiple undertaking, boundaries, scope and objective may differ for various project.
3	**Objective**	Specific objective for each project depending upon nature and size.	Overall sectoral objectives for the program as a whole.
4	**Life Span**	It has fixed life span. Specific beginning and end points. It ends with the accomplishment of objectives.	It has flexible life span. Program spread over various plans. Objectives can be achieved over a long period of time.
5	**Tailor-made**	It is customized or tailor-made to customer specifications or benefits a particular group.	It is for the benefit of different target groups at different time periods. It benefits the overall society.
6	**Responsibility**	It is entrusted to one project manager and has its own budget.	It is entrusted to program managers with program budgets.

7	**Coverage**	It is the part of the overall program.	It is an integral part of a national development or corporate plan.
8	**Rules and Regulations**	It is governed by the set of flexible rules and regulations.	It is governed by the rigid rules and regulations guided by overall governmental directives.

Table Source: [5]

1.5 INTRODUCTION TO PROJECT MANAGEMENT

Management is the art of getting things done through and with people in formally organized groups. [8] Management increases the productivity through technological innovation taking into account human factors involved in these advances. [9] Project management is the creation of something that did not previously exist on ad-hoc basis, so that the project meets cost, schedule and scope objectives. [7]

Principles of general management apply to project management. It is new approach of thinking about achieving objectives within stipulated time, allocated budget and performance standards. Project management is highly specialised job, to achieve the objective of a project. Project management involves planning, scheduling and controlling of activities. Planning and Scheduling are accomplished before the actual project, and controlling phase is to recognize the difficulties during the execution. [9]

It is a new way of thinking about management. It manages complexity and change in a dynamic environment. It makes efficient use of resources for better client satisfaction. Project management is a system approach for efficient and effective achievement of project objectives through:

- Assignment of total project responsibility and accountability to a single person i.e. project manager
- Coordination across and with the stakeholders
- Proper utilization of planning and control tools for better resource use within constraints of time, cost and quality

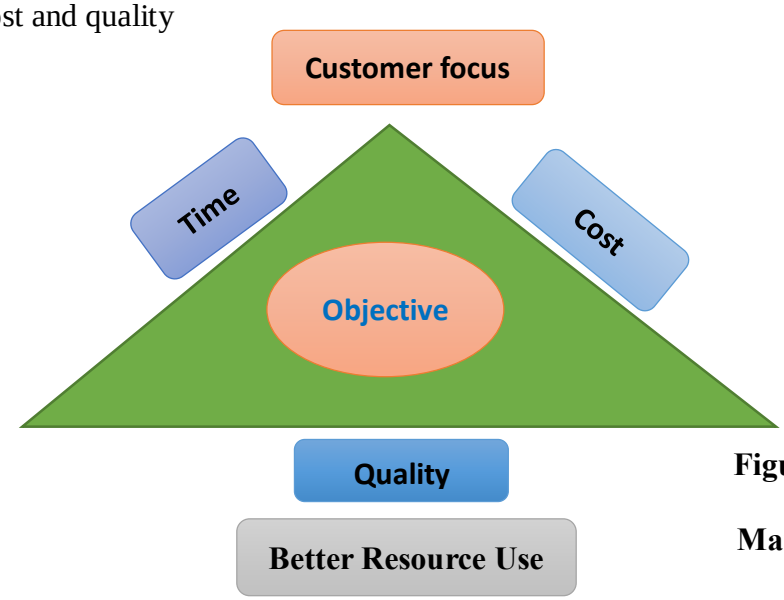


Figure: Model of Project Management [7]

DEFINITION OF PROJECT MANAGEMENT

- "Project Management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements." [2]
- Project management is accomplished through the use of processes such as initiating, planning, executing, controlling and closing. [2]
- Project management is a "series of activities embodied in a process of getting things done by working with the members of the project team and with other people in order to reach the project schedule, cost and technical performance activities". [10]

PROJECT MANAGEMENT CONCEPT

- All work is a process and processes combine to create a phase
- Various phases with well-defined milestone make up a project.
- Uncertainty and risk is inevitable in each phase.
- Inability to measure and manage uncertainty is worst enemy of a project.
- By using specific tools and systematic application, project can be effectively managed.

Basically nine managerial functions are involved in managing the project. [2]

- Project Integration Management (plan development)
- Project Scope Management
- Project Time Management
- Project Cost Management
- Project Risk Management
- Project Human Resource Management
- Project Quality Management
- Project Communication Management
- Project Procurement Management

REFERENCES

[1] *Fundamentals of PERT/CPM and Project Management*: S.K.Bhattacharjee, Second Edition, Khanna Publishers, New Delhi, India, 2002.

[2] *A Guide to the Project Management Body of Knowledge (PMBOK)*: 2000 Edition, Project Management institute, Newton Square, Pennsylvania, USA.

[3] Planning Projects: Trevor L. Young, Sterling Publishers (P) Limited, New Delhi, India, 1996.

[4] *System Analysis and Project management* : Cleland David and D.W. King. McGraw Hill, New York, USA, 1967.

[5] *Project Management, Planning, Analysis and Control*: Bhakti P. Sharma, First Edition, Ekta Books Distributors Pvt. Ltd, Kathmandu, Nepal, 2006.

[6] *Project Management in Nepal*: Dr. Govind Ram Agarwal, M.K. Publishers and Distributors, Kathmandu, Nepal, 2006.

[7] *Project Management* : Dhurba P. Rizal, First Edition, Ratna Pustak Bhandar, Kathmandu, Nepal, 2001.

[8] http://articles-junction.blogspot.com/2017/04/definition-of-management.html.

[9] *Project Planning and Control with PERT and CPM*: Dr. B.C. Punmia and K.K.Khandelwal, Third Edition, Laxmi Publications (P) Ltd, New Delhi, Inida, 1987.

[10] Project management: Strategic Design and Implementation, Cleland David, New York: McGraw Hill, 1995.