

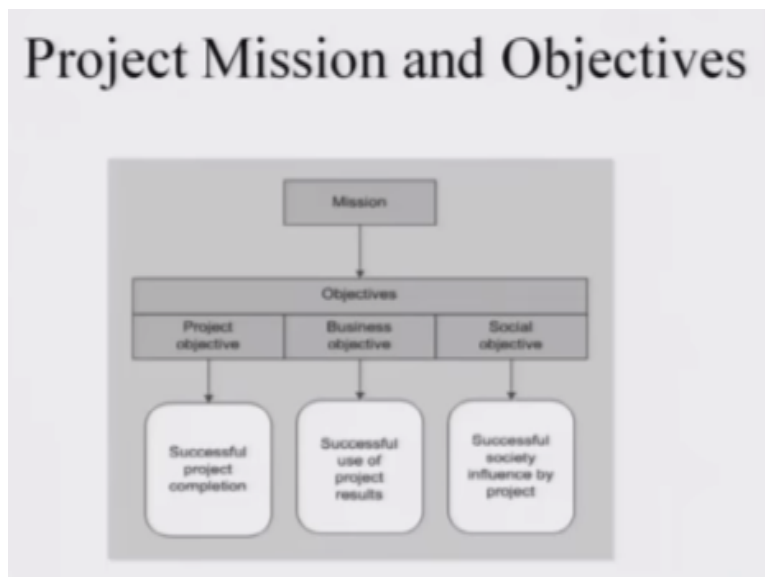
Project Management
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Module No # 1
Lecture No # 04
Project Management Process for a Project – II

Hello everybody and welcome back to this project management course being a part of this NPTEL mooc series of lectures and I am Raghunandhan Sengupta from IIT Kanpur IME department. So you are basically, I am giving a brief preview and going to the depth about the project management as a concept and how the different concepts of PERT and CPM? Obviously we will go into the details later on there and they are used in different type of project management.

Then how the concept of cost then the schedule, then the budget constraints all come into the picture in the qualitative sense. How we do that from quantitative point of view I will come to that in the later classes then we briefly discussed the concept of agile project management and what is the concept it PC will consist everything in a very holistic manner. So if we consider the project management and its objectives.

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So basically it consist of mission so what work which we have to do it can be as I mentioned in different examples it can be trying to basically build up a hostel or trying to basically come up with a marketing plan up for selling a car or trying to build up the bridge or trying to send up the rocket into the moon. So there are different types of projects so it will basically have an objective.

So objective may be for social service for trying to basically increase the bottom line on the company or try to increase the cost it can be also mentioned try to be the reduction of overall risk of the project. So risk and the concept of positive returns would definitely be two different concepts. So you will basically have the project objectives which should definitely match with the business objectives of the company or the organization whether it is government or private or say for example semi-government whatever it is should definitely match.

And so and also they should be a social objective so obviously for any work whether you are trying to build up a house or school or a bridge or a nuclear plant or trying to sell a product whatever it is they should be some social objective which may not be very tangible in general but will try to basically give some quality feelers for that obviously keeping in mind that the project management as a course would deal more on from the quantitative point of view of the PERT CPM and different concepts which we use.

So project objective would be basically for successful project completion, successful use of the project results. So how the results of the projects are utilized in trying to basically have a positive output for the business objective based on which the project was basically planned. So of the big business objective of the business is the overall thing and under that you have different projects. So we will try to basically dovetail how the project objective meets the overall business objectives in general form.

And successful implementation of the project and the business should definitely have a positive effect on the social structure or the social norms. So what are the positive benefits from the social point of view. So all these three points the project, the business and the social should be aligned in such a way that they acute positive benefits to the overall system.

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Project Management Objectives

- There are normally three sets of objectives (project results) derived from the mission for any project and they are:
 - ❖ Project objectives
 - ❖ Business objectives
 - ❖ Social objectives

There are normally three sets of objectives as I just mentioned and they are the project objectives the business objectives and the social objectives. So obviously they may be different but they should not be at loggerheads such that the overall basis are based on which the project management work is being done does not defeats the purpose of the overall business objectives as well as the social objective.

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Project Management Objectives

- The objectives would normally include a precise definition of the scope of work, the schedule and a budget.
- *Successfully completion of project*: How successful is the project with respect to the end user.
- *Successful use of project results*: Whether the results/experience obtained/gained can be emulated in future.
- *Successful influence of project on society*: How beneficial is the project for the society in the long run. Remember this is different from successful completion and its positive effect to the end user.

The objectives would normally include a precise definition of the scope of the work on all the three points both for the projects as well for the project objective point from the business objective point and from social objective point also. Successfully completion of the project

would mean how successful if project with respect to the end user. So whoever the end user customer is for whom you have basically have started the project that should give the maximum benefit of the best benefit to the end user.

Trying to basically start a school should mean that the students of the locality get the benefit trying to start up say for example a bridge means the people in the locality should be able to utilize that. Trying to start a health program means the people in the village or the locality or the district or the city should be basically or the state should get the benefit of utilizing the hospital or the health benefits which have been started as a project.

Successful use of the project results should basically be used in such a way that they give us or the people who are running the project the maximum experience, the maximum knowledge such that in any future when you again start a similar or different type of project the overall benefit show HQ in such a way that it gives us the maximum positive output means either what am mentioning about the output means either if you are profit motive.

So called profit motive or this profit concept is important it should basically come out it in such a way that at the same time it is meeting the project benefit, the business benefit the objective what we are talking about and the social benefits or the objectives. Success influence of a project on society should be such that in the long run the uses of the project as I mentioned few examples just few minutes back gives the maximum social benefit of the social objectives are met to the maximum possible extent.

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Classification of Projects

- Small, large and mega.
- ICT, construction, research.
- Engineering & construction, research & development

So classifications of project can be of different time they can be small or large projects or can be mega projects they can be construction projects they can be research projects they can be related to health sciences they can be relate to build a civil engineering they can be related to mechanical engineering they can be related to government policies whatever it is.

Say for examples the government wants to start the adhaar card. So in that case it will be required that the government does the work in such a way that it is taken up as project and gives the maximum benefit accordingly now in the area of engineering and construction it can or the research development can be say for example Toyota is trying to build up a car.

So in that case the design and functioning of car and trying to basically implement that car into the industry such that it is basically can be floated into the market can be taken up of the project and obviously it should mean that it has all the benefits from the social point from the business point as well as the project point of view.

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Classification of Projects

- Engineering & construction
 - ❖ No uncertainty as to whether the project objectives can be technically met or not.
 - ❖ Uncertainty connected to resource consumption, schedule, scope of work, etc.
- Research & development
 - ❖ Can be broken down into product development, systems development, organizational development, and new knowledge development.

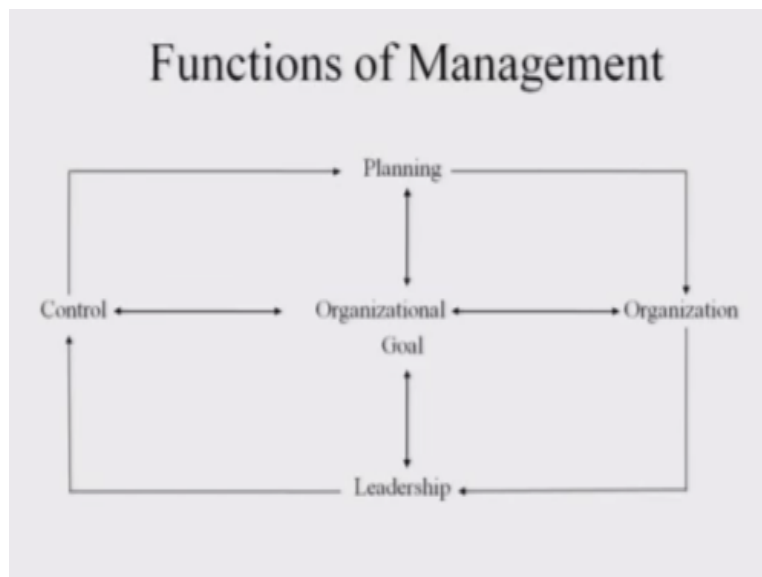
Classification of projects from the engineering and the construction can be and the important point should be no uncertainty as whether the project optic objectives can be technically met or not. So they should not be any uncertainty or ambiguity so if the engineering focus is the main point of the project then the points are the technical specifications and other should be mentioned in such a way so that there should not be any tacit of me in that.

Uncertainty connected to resource consumption schedule scope of the work will do what the work? How the work should be completed? What is the plan of the work which is to be done? What are the engineering specifications? What material should be used everything should be used specific to the point for the engineering project? Because any change in that would be basically mean that in the overall plan of the things your project implementation would be different because say for example if you want to start off a bridge and in the specification of the cement is not up to the standard.

So obviously it will have an effect in the overall long duration life of the base so all so these are many of the different issues related to the engineering project a person should definitely remember. For research and development one they should be broken they can be broken down product development, system development, organization development and new knowledge development because research is totally different from an existing engineering project being floated.

Because research would mean that you are basically venturing into an unknown area and uncharted area. So how will basically try to utilize the knowledge the organization development how is taking place and the system development as you are trying to do that work should be taken into account such that any incremental knowledge or incremental information which comes should be utilized in such a way that the overall project business and the social societal benefits and the objectives are met to the maximum possible extent.

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So if you see the and then the chart it has basically the organization goals whatever the goals are you have the organization basically giving its feedback to meet the organization goal and apart from that you are the planning the control and the leadership which basically all this food for foreheads or subheads.

Whatever you say the planning the organizational leadership and the control should be done in such a way that point number one they are independent of each other. But at the same time try to basically infants the other in the positive sense as that the overall benefit for the organization goal based on which you have planned a project should give the maximum benefit.

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Characteristics of Project Management

- A person heads the project and the cross functional, goal oriented view point embodies the characteristics of the project
- The focal point of the project management is the project manager
- Due to its multi functional work the cross functional areas reflect the work focus as desired in the project

Characteristic of project management are generally a person heads the project and the cross functional and the work is such that it goal-oriented there is a viewpoint that there is a certain goal which has to be made. It embodies the characteristics of the project based on which the overall team under the leadership of the person who is heading that works.

The focal point of the project management is basically the project manager so which means that the business entity for whom the project is working may be different from the project manager. But the interrelationship between these two persons if it is not good or if it is not definitely up to the mark based on which you are trying to work for the project it means the overall benefit for the project output and objective with respect to the business output or the objective basically does not mean the overall plan based on which the project has been taken.

Due to his multi-functional work the cross functional areas reflect the work focus as desired in the project. So say for example the HR person the DM say for example the design person who is working both for the company as well or for the department as well as for the project should do the work in such a way that there is no dichotomy in the overall perspective based on which the project has been taken.

So the overall functioning can be both vertical and horizontal for the overall organizational structure but the relationship between the project manager the actually the business manager and

the persons who are working in the different fields in the project as well as in the business should be such that they give the maximum output which is positive in the overall thing.

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Characteristics of Project Management

- The project manager is responsible for integrating the whole work
- The project manager negotiates with the functional managers
- The project manager focuses on delivering a particular product/service at a certain time

The project management is responsible for integrating the whole work the project manager negotiates with the functional managers in order to bring the output of the project in line or in tandem with the business output or the objective such that the business objective which is there should also meet the social output.

So your main focus would be the business obviously if your main if you are working from the point of view of the company and if you working from the point of view of the government so obviously the societal impact positive impact which you want to give to the society depending on what project you take up or the government accepts definitely should be maximum. So the interrelationship between the project management team the project objective the business management team or the business objective and the so called social objective should match to the maximum possible extent.

The project manager focuses on delivering a particular product or service at a certain time using resources of the business environment or the business and a whom the overall project is being developed such that the overall benefit of completing the project on time considering the cost the

time schedule are everything is taken into consideration should basically give the maximum benefit to the organization of the business.

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Characteristics of Project Management

- The project manager has two chain of command
- Responsibility, awards, etc., are shared amongst members of the project management team
- Projects can originate at different places but the goal is the same
- Project management sets into motion different other functions not directly related to project management

In generally if we go into the deep we will try to see that the project management has two chain of commands basically the two chains of command would be on. Say for example on a vertical and horizontal space the vertical would be that under the project management all the people who are involved in the project would be involved.

And the horizontal one would be the project management would be liaison with the business team as such in order to understand what is the focus of the business? Such that the project management concept is dovetail into the business concept to give us the maximum benefit.

The responsibility awards etc are shared among the members of the project management team. So whatever the responsibility that is passed on from the project manager on to his or her team such that everybody takes the equal proportions of the shares of the responsibility as well as try to basically get the benefit when the project basically gives the output which is desired in the business environment.

Projects can originate at different places but the goal is the same so say for example my project would be to build up a car which exactly runs on almost hundred percent of the time on

electricity. So obviously my main focus would be on trying to build up the transmission system and the electrical generation system such that it meets the requirement of the vehicle industry.

So but if am considering from the point of view of how the tire should be built how the body should be built or all those works may have been done earlier based on say for example the diesel in the petrol car.

So obviously the work based on the different components of the car would or can start a different point of time but the overall end result is to have a complete electrically driven car such that the end motive for all the people who are working in the project is only one. Project management sets into motion different other functions not directly related to the project management.

So it can be say for example trying to procure different items for the project which has to be done through the business environment or the business organization it can be trying to basically take different amount of resources, it can be different type of financial resources it can be different type of material resources it can be different type of buying out different software try to get the expert opinion. So all these things can be done by the project management team to complete the project work.

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When to use Project Management

- Unfamiliarity
- Magnitude of the effort
- Changing environment
- Interrelatedness
- Reputation of the organization

When we meet we use project management few important things should be remembered they should be unfamiliarity. But unfamiliarity should not be to that extent where there is total uncertainty in the total whole project. So if am trying to basically build up a car which only runs on electricity and say for example this plan was being taken up into say for example nineteen thirties with respect to the plan of building up an electricity car electric car in say for example two thousand twenties.

So that time scale and both these cases leave aside the technology leave aside the development which is already taken place in the science. Science and engineering but the overall plan of trying to build up a car in the nineteen thirties would not make any sense because there the development of the car industry was being based on the premise that the availability of the petrol or crude was for in the future was for very long time.

And obviously the cost of petrol and diesel world are very less so hence trying to build up a electric car was economically not viable. So obviously taking care of the environment was not that prime important cost factor for electrical car was definitely very high. So all these things basically were in such a way that taking up a project to build our electric car was not at all suitable.

But if you try to basically place this example in two thousand twenty twenty or twenty thirty then it definitely make sense because their the overall environment based on which one would try to build up a electrical car has totally changed. Point one the cost of crude and petroleum has increased tremendously the overall concept of pollution and the environment integration has come up in such a big way that is that is the main issue.

The third point is the availability of crude even if the cost can be brought down to the maximum possible extent is not unlimited. So either today or tomorrow for hundred years down the line the usage of petroleum would definitely dwindled down to almost zero because it will be exhausted. So if you try to understand the unfamiliarity charter or the regions based on which the same type of project what taking the two different times you will understand the unfamiliarity based on which the environment.

The project can be taken up is very important based on which a particular person or a group of person would talk or work for a project. Magnitude of the effort would be definitely be not very high because consider you want to build up a fusion machine or say for example you want to basically tap some type of rare earth materials to get some very precious diamond or titanium or whatever it is and considering the overall cost is very high.

So obviously it does not mean that you are going to invest your whole amount of money to build up a project for which the cost initial shun cost or initial working capital based on which you are going to work would be very high. So obviously you to mean that it would not be take up that project. The changing environment is also an issue like coming back to the first example they are the issues of environment.

Environment means the general the mother nature the environment based on which it was working was not at all the lobby based on which they had to basically least change in the concept of trying to build up a car on an electrical motor that become the lobby becomes the very strong. So if the environment or the overall atmosphere based on which you are trying to build up a machine or some concepts for which the resistance was very high.

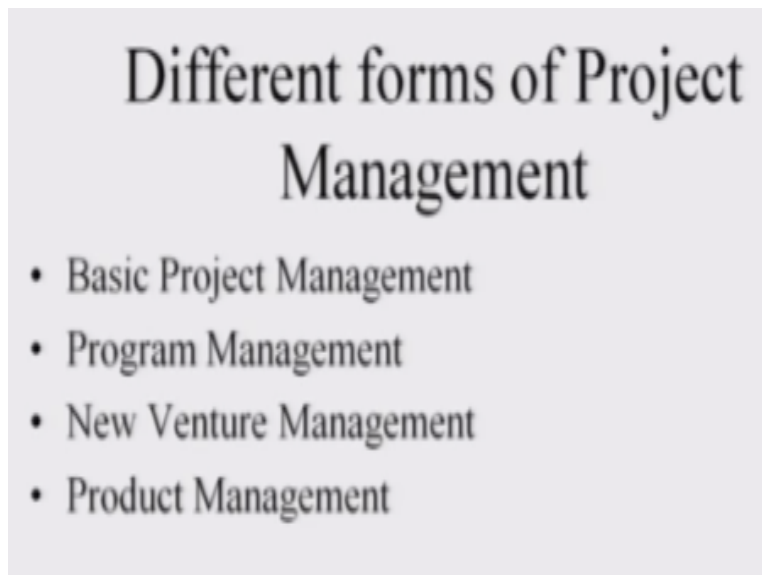
Obviously you would not build up that system or if the resistance to push for that project or for that concept was very low obviously would not work for that. So obviously changing environment has a huge implication for trying to build up or take up a project as such. Interrelatedness is an issue like as if you consider them we know always that the prices of electronic chip with respect the computers or any electrical devices is basically decreasing exponentially.

So obviously if there is a market for computers obviously it will mean that there is huge incentive to build up very fast processing machines or fast processing chips which would basically give a boost to computers or computing processing machines which will in turn basically have a positive effect on trying to basically develop technology and engineering concept in trying to build up the fastest processing chips.

Reputation of our organization is also important when the company is going to take up project as such because if company which has a very bad history or it has not been able to implement some projects to its fullest utilization without giving the general benefits. As I talk with respect to a company which has been successful and which is known to basically to deliver their projects to give the maximum benefits.

Obviously people or group of people or the society would be more inclined to take a positive note on those projects which are being taken up by organizations which are much positive in there working concept and their reputation of how they basically implement their projects

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Different forms of project management would be basic project management concepts using the PERT, the CPM, the GERT, the Q-GERT, the precision diagram being the concept of slacks and so on and so henceforth would be considered then we have the program management or new venture management concept which I will very briefly discuss not to go into detail and then we will try to basically consider concept of product management, project management from the point of view of different type of product.

Whether in the industrial sector or whether in the service sector or whether in the government sector using different simple concept of the cases for which obviously I will discuss the basic or

the salient point of the cases after I give the cases and then I will basically discuss that how those type of project or the learning process which we get from this cases can be utilized for the concept of project management.

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Characteristics of Project Management

- Attributes
- Environment and boundary
- Objectives
- Structure of the system
- Inputs, Processes and Outputs
- Constraints and conflicts

Characters of the projects would be the attributes or the characteristics of the main variables based on which you are trying to basically understand how the project is working the environment of the boundary and under which the project is working or the scope based on which the project will work and what are the limitations for that the scope.

What are its positive points negative points those would be considered what are the objectives so is are the objectives to increase the profit, are the objectives you have to give maximum social benefit, are the duties to have a bridge in a particular section of the river which joining two cities or are the object is basically to give free drinking water to one district in India. So whatever the objective is the project would basically be utilized or plan in such a way that the objectives are met as per the norms based on which the project was started.

The structure of the system who are the project management manager who are what is the organization? What is the philosophy? What are the cost implications? They definitely those should be considered the inputs and the processes in the output should be considered in depth. So

inputs can be man, can be machine, can be amount of money, can be resources, can be building or land whatever it is?

They should be analyzed in the proper sense and whether you need designers whether you good engineers or whether some extra amount of information is needed whether you have to hire experts from different industries. So that have to be looked into what are the processes based on which the project would be implemented if it is a mechanical engineering project with electrical engineering project where the government initiative.

So what are the processes involved is does it involve engineering concept building a bridge. So all these things have to be noted down very carefully and based on the inputs and the processes the main outputs would be analyzed such that the output based with the objectives which are to be make sense.

So out wounds if they are in rupees and you want to base and in the end it becomes only the profit making project where at the end of the day you are main motive is basically provide free drinking water in one district in India. So if that cost become very high so obviously it does not make sense to have the objective and the outputs which are totally at loggerheads to each other.

The constraint on the country should be taken into consideration like say for example if I am trying to build up a dam in a area where the rain water or the flow of water through the river is very low or many minimal or it dries up. Then obviously does not make sense for us to build up a dam because the overall structure or over the cost based on which the government would be planning to build up dam and would not be basically give the benefit because the water is not there in the river.

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Stages of Project Management

- Systems concept
- System Definition and Preliminary design
- Detailed design and development
- System production and fabrication
- Detailed design and development
- System operation and support

The stages of project management are the system concepts should be considered the system definition and preliminary design should be done the detailed design and development of the project should be analyzed in such a way that it make sense with respect to the project objective which is there. The system production and fabrication should be done in such a way that all the inputs and all the processes are in line such that they meet the overall output and the objective based on which the project is working.

The detailed design and development of each and every (()) (26:32) is of the processes should now be analyzed one though once the overall macro idea is fixed and the system operations and the support system should be done in such a way that it meets the overall guidelines of the project based on which the work is being done.

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Project Management Development Cycle

- Project life cycle
- Managing the project life cycle
- System Development Cycle
 - Conception phase
 - Definition phase
 - Execution phase
 - Operation Phase

So project management development cycle basically consist of the project life cycle. So project life cycle can have basically in the initial phase which is on a upper trend then they would be a temporary phase where the demand of the project or demand if the product or the demand of the service basically slowly tapes down or is constant and after its utility life is over the life of the project of the life of the product based on which the project what developed basically starts decreasing.

So our main motive would be to manage the product life cycle in such a way that it make sense to build up at the project on those line. The system development cycle should be such that the conception phase, the definition phase, the execution phase in the operation phase are in tandem with the overall project life based on which the project can be decided. So with this I will end the fourth class and then we will when we start of the fifth lecture I will just give a very brief preview of whatever you are covered in the last four lectures.

And then continue with our fifth sixth and so on and so lectures before we start actually solving a problem. So I hope the my students are have started getting a feel of what we mean by project management it is basically conglomeration of using the quantitative technique as well as the qualitative technique even though I am for the time being going into the qualitative technique.

Still I will request my students to please have a look at the books which I have referred try to read them, understand them and then when I go into the quantitative techniques go into the PERT, CPM. I am sure they will be able to appreciate the concepts which I have gone through in the initial part in a much better way thank you very much.