Concept of Management and Evolution of Management Thought

Prof. K. B. Akhilesh
Department of Management Studies
Indian Institute of Science, Bangalore

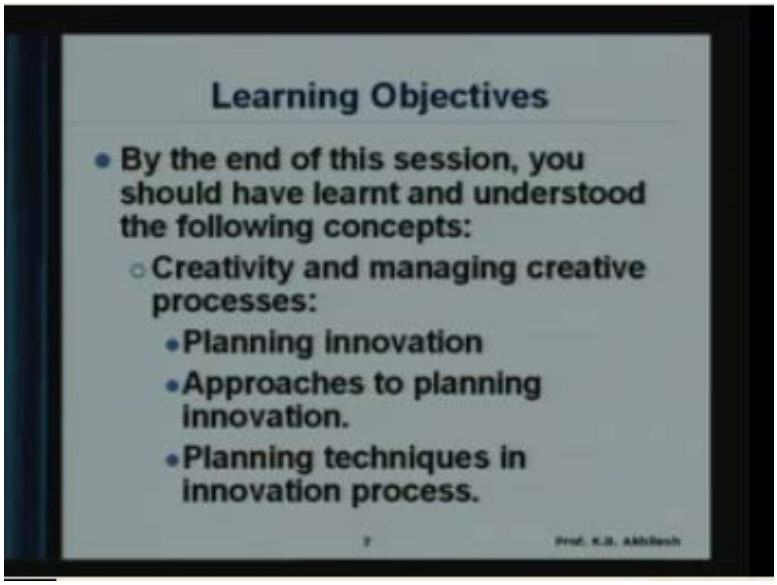
Lecture - 37
Managing Creativity and Innovation

Hello, so far we have discussed about the different dimensions of the organization in terms of the technology, structure, people and processes. We also looked at the drivers affecting the organization and causing this organizational change and we also looked at how organizations cope with these external pressures as well as internal pressures and organization development as a field of managing changes at different levels. We also examined the group and the group behavior and we also saw amongst the various attributes of the group and the group functioning, the conflict and the conflict management as one of the important things.

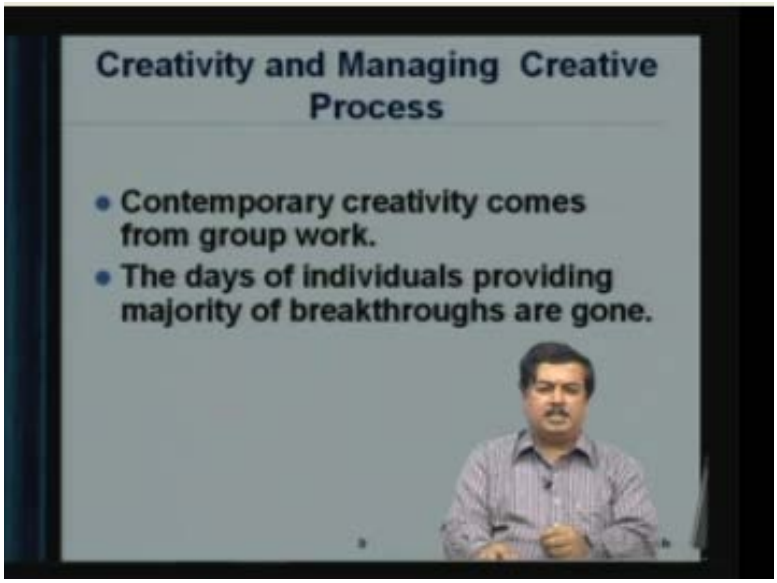
Today, we will focus on the other dimension, the management of creativity and innovation creativity innovation problem solving all of them have become very critical dimensions of the individual and the organizational performance, if you see examine the managerial functions, the managerial activities in any organization always there is one dimension where they have to manage the positive aspects of the work life that is inter-personal relationship, the team work, the leadership, the communication things like that. On the other side they have to manage the negative aspects of the work relationship, managing stress, managing differences, managing conflict things like that.

So the third dimension of this managing is very clearly innovation, creativity and problem solving. So we look at today this creativity and innovation dimension. In this lecture what we intend to what I intend to cover is the following that the end of the session you should have learnt and understood the following concepts, creativity and managing creative processes briefly we will also move into the planning innovation, how innovation itself can be a planned activity and approaches to the planning innovation and planning techniques in innovation process and how different technologies and techniques have been deployed by different organizations to achieve the goals.

(Refer Slide Time: 03:38)



(Refer Slide Time: 04:14)



Towards this if you see what do we understand by this creativity and managing this creative and innovation processes. The question today is the individual versus the group but the contemporary view, contemporary creativity comes what people are talking about is through group work and people are also viewing innovation as an incremental innovation and the days of that individuals providing majority of breakthroughs are gone. In other words, when something new happens there are more number of people who are responsible for such

innovation than one person working exclusively in a corner of the organization. So most of the organization in the work place, most of the organization in its services, in its maintenance of various products, it is all incremental kind of an innovation and such innovations demand creativity and that creative effort is not just an individual effort but it is the collective effort, collective effort means it is typically the group work.

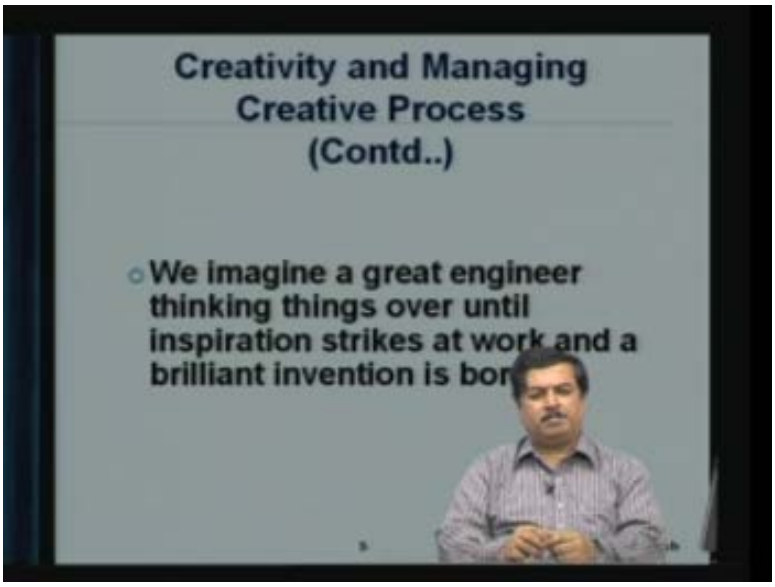
(Refer Slide Time: 05:37)

Let us see this as we have seen what we look at that is the kind of a planning innovation, innovation is associated with very clearly the inspiration, the imagination, originality or the kind of a newness. So how do we get these things in the in the organization. So we can imagine that there is a persons who would do many things that but unless some inspiration comes unless they get that kind of an insight the brilliant innovation is not going to happen. So that is where it is extremely important to see how do people get inspired, how do people get that kind of a thought, how do they get that thoughts to focus on this has been one of the one of the issue.

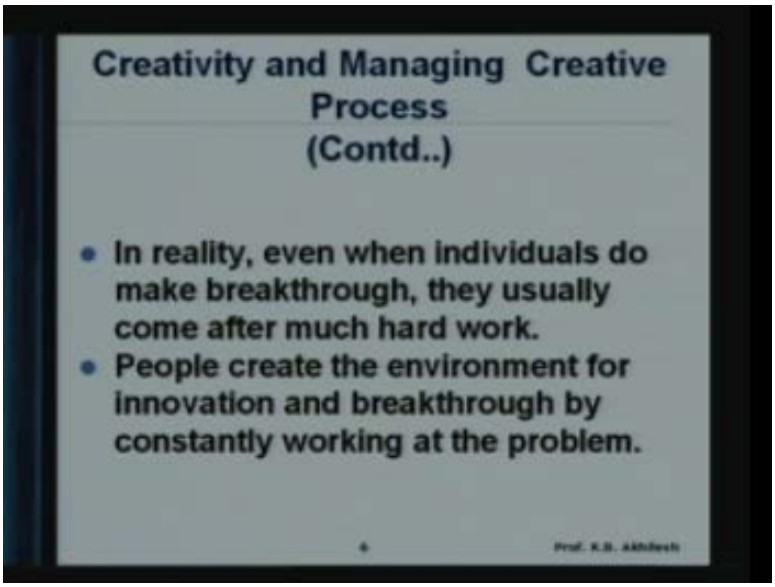
So that means people should get the details of what is happening in the field they must get some both technology trends as well as what are the customer expectations and the demands and the continuous exposure will make the person to look for opportunities, how to provide some new things. So one of the things people are talking about is preparing that kind of a road map, preparing that kind of a knowledge map and then helping people to see what could

be done and in reality even when individuals do make breakthroughs, they usually come after much hard work.

(Refer Slide Time: 05:55)



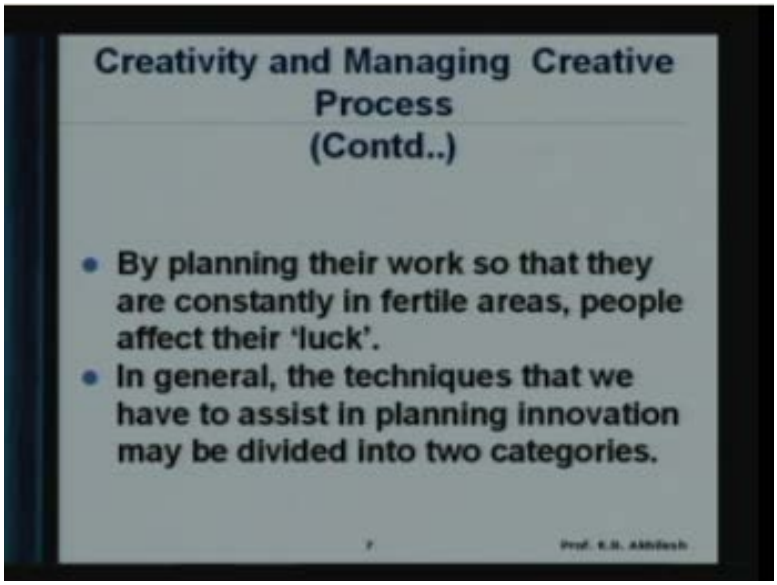
(Refer Slide Time: 07:00)



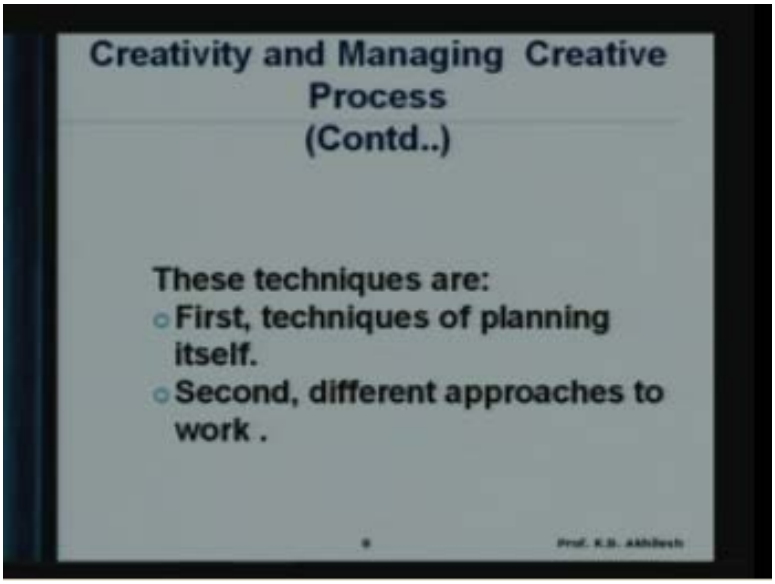
So that means by doing, by applying thoughts, by seeing and manipulating different variables, by continuous experimentation people do get that that kind of a breakthroughs. In other words, people create the environment for innovation and breakthrough by constantly

working at the problem. So continuous exposure to the problem, continuous exposure to the to the dynamics of the situation, continuous exposure to the realities of the application of the knowledge must be provided to the engineers as so that they can come up with appropriate solutions and by planning their work so that what we are talking about is that they are constantly in fertile a fertile areas. So that the it will create that kind of a luck opportunity and so that they can come up with some significant ideas.

(Refer Slide Time: 07:55)

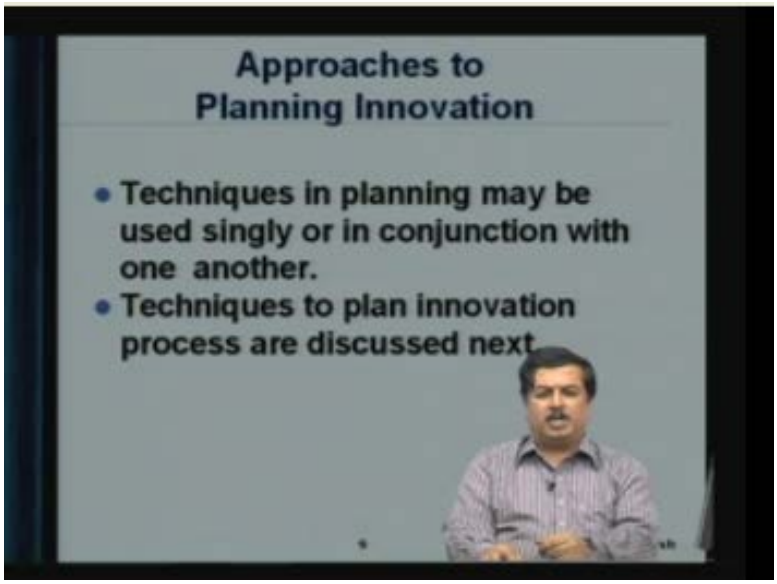


(Refer Slide Time: 08:27)



So in general the techniques that we have to assist in planning innovation maybe divided into two categories: the one what we can really talk about is the techniques of planning itself and then another could be that different approaches to the work and that work would generate that creative thoughts innovative, innovation, innovativeness, capacity. So that they can create opportunities for the organization through their new inventions, new improvements and providing different order of services to the customers.

(Refer Slide Time: 09:00)

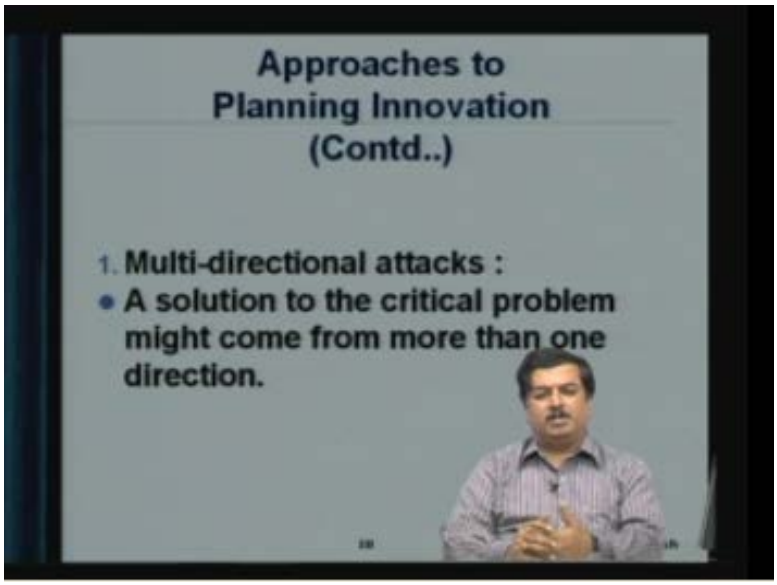


So when you are seeing this planning innovation we must see the techniques in planning they may be used in singly or in conjunction with one another. So that means these are not kind of a very pure techniques but it can be clubbed with different alternatives and different approaches. So when you see this the how one can club this or how one can do this together we will see one by one, one of the things could be thought as the kind of a multidirectional attacks. So that means there is a solution to the critical problem but then it might come from more than one direction, so people are asked to explore but come up with a with a solution. So when different groups work together.

So it could be you know the solution then can come as a very simplistic or sometimes it is technology for example, in one of the one of the experiments of the one of the examples given is that something to be done about the lift because when about seven floors it used to

go up and come down the people inside they were getting really a feeling that it is taking too much of a time. So the too much of a time demanded that getting speed has to be increased.

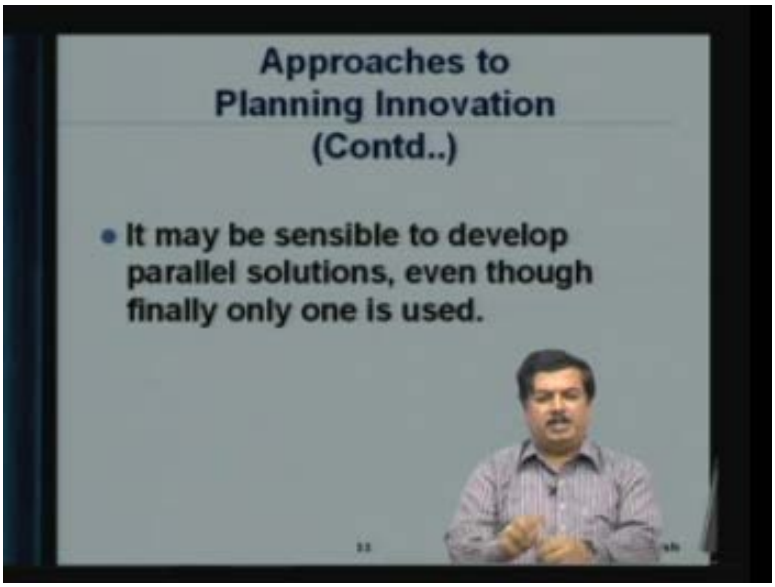
(Refer Slide Time: 09:28)



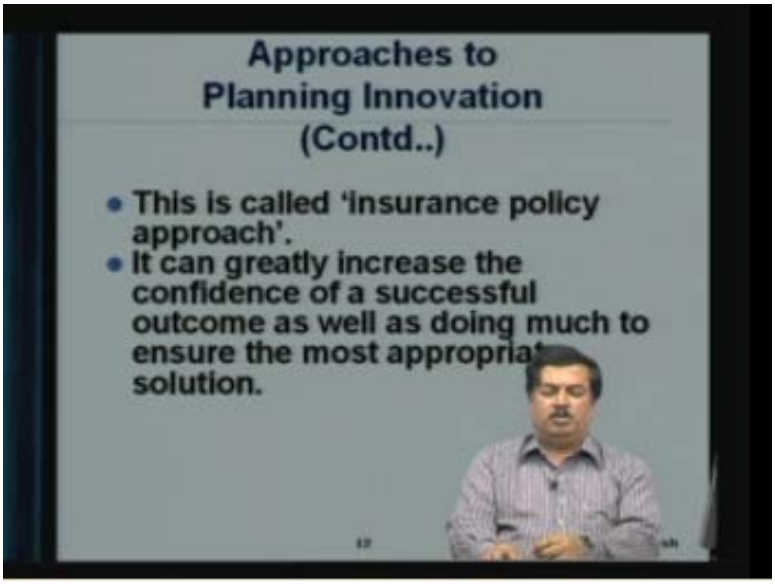
So that means you know when people studied this I think some focused that how can we increase how can we make this faster the this whole lift. So that it can go up and this elevator can come down but other one also came up with a solution that you put a mirror inside the elevator. So that the you know everybody would like to see their face and adjust themselves and usually by the time they do the they may not feel much about the time it has taken to go up in you know, in fact they would like to have little more or some more or the wish that this you know the elevator could go little more slower or so that they will have a little more opportunity to look into themselves.

So in a multidirectional attacks the problem is known but people can approach from different directions. So it may be sensible to develop parallel solutions even though finally we only one is used. So at the end of the day yes, it is what works best and what is cost effective those things are used but the question is one can always approach the problem from different prospective one can also call this as an insurance policy approach. So then you know the it can greatly increase the confidence of a successful outcome as well as doing much to ensure that the people get the most appropriate solution.

(Refer Slide Time: 11:26)



(Refer Slide Time: 11:48)

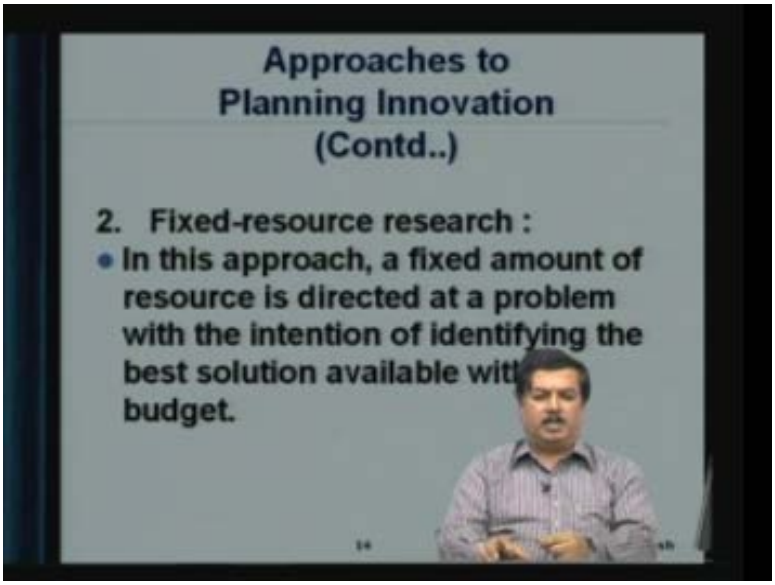


So in other words you have a one strategy otherwise then you have a backup strategy or a backup solution and that is possible through this multidirectional thing. So this approach is particularly prevalent in the kind of a you know placement of contracts based you know you will give one but you also throw up one more thought, one more ideas to one more group. So built some of those kind of a capacities but the end of the day whatever you want to use that depends upon the specific outcomes, specific applications and specific needs of the group but

there are some parallel work, some buffer is created. So that if one may or may not work at least someone something else is available for to implement.

(Refer Slide Time: 12:18)

(Refer Slide Time: 12:59)

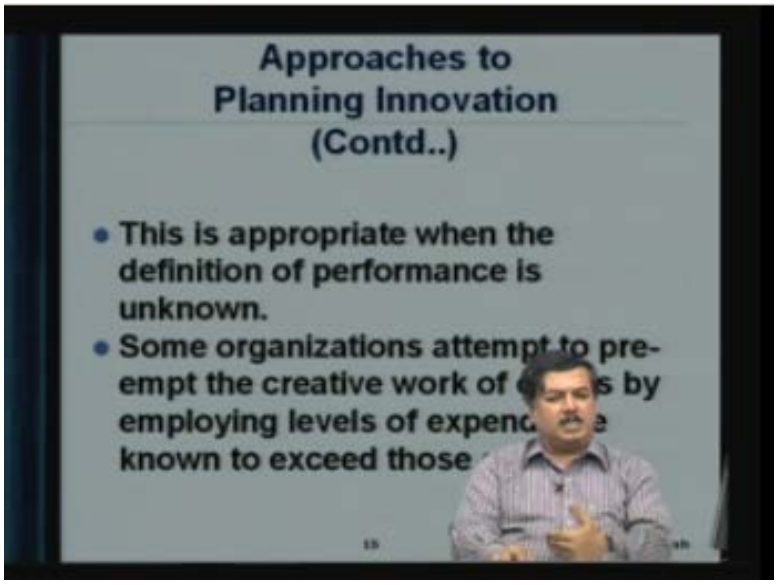


The second kind of an approach can be called as the kind of a free resource research sorry this fixed-resource research. So in a fixed-resource research what happens is that a fixed amount of resource is directed at a problem. So with the intention what of identifying the best

solution available within the budget. So that means they are given some money and then they have to work through and create whatever and then within that they have to come up with the best possible solutions. So it is the in a fixed research resource, research it is very clear, the proposals are accepted and the funding is made and the money is committed but what you expect is within that they have to come up with solution.

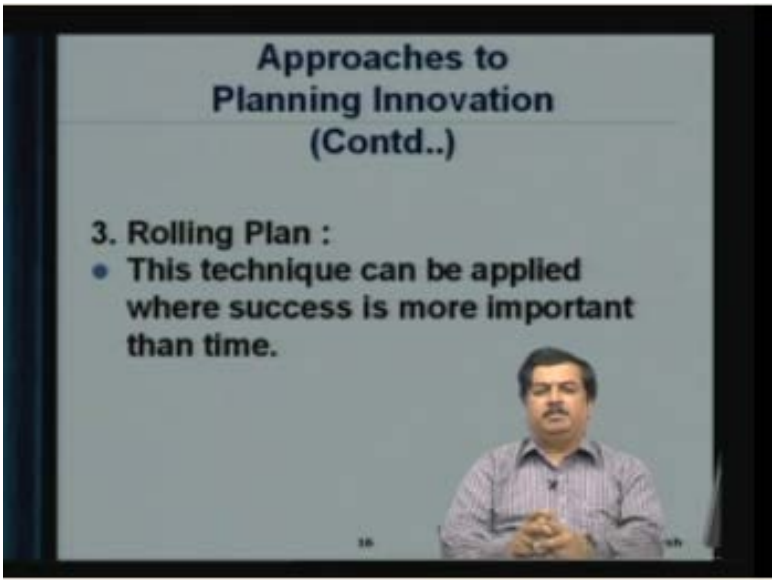
So it is always possible in this kind of a fixed-resource research, some additional cost overruns. So that means an additional 10 to 15 percent increase is possible but the fixed-resource or research always you know what you can get with the allocated money and this is appropriate when the definition of performance is unknown and some organizations attempt to pre-empt that creative work of others by employing levels of expenditure known and to exceed the those of rivals. So it is best is to allocate some money and try and get that kind of a output.

(Refer Slide Time: 14:16)



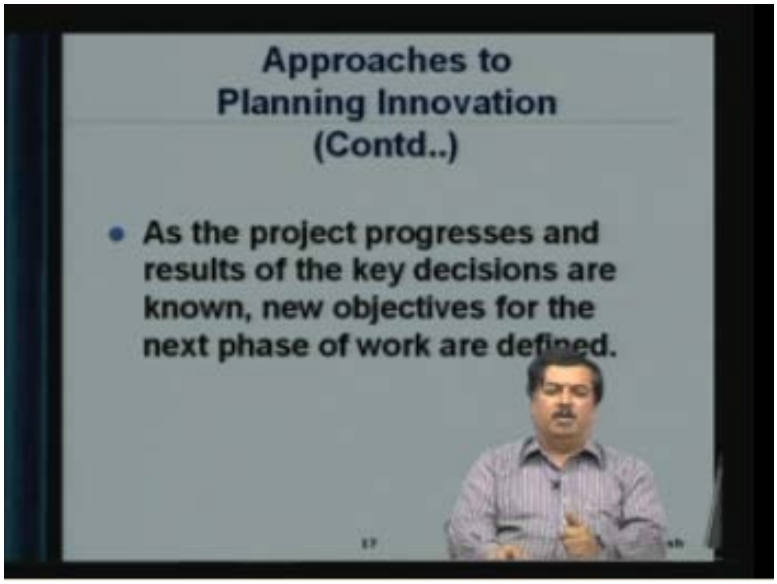
So in a fixed-research mode the thought is that the fixed-research approach mode is basically you get within the allocated money, one you can think in terms of the rolling plan, rolling plan approach. So this technique is fine can be applied when third you know success is more important than the time, you have seen in the space research in many of the defense research what is important is to get that success.

(Refer Slide Time: 14:51)



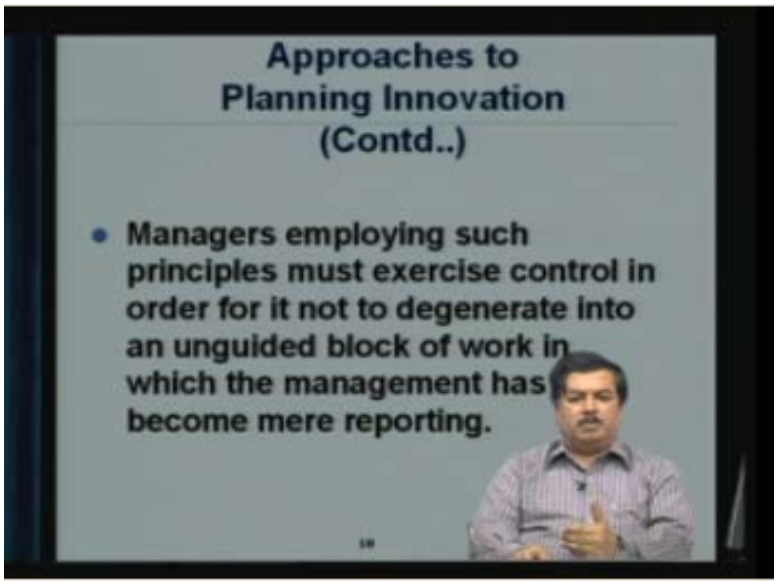
So it may take little more time or it may take more effort, so does not matter as long as they are able to deliver even with some delays it is fine because getting success is more important, failures are part of this innovation that is how it is viewed as. So that means a set of people continuously work on and come up with many challenges in the organization is to reduce the weight of the product or do a miniaturization or deploy more technologies in the small machine.

(Refer Slide Time: 16:10)



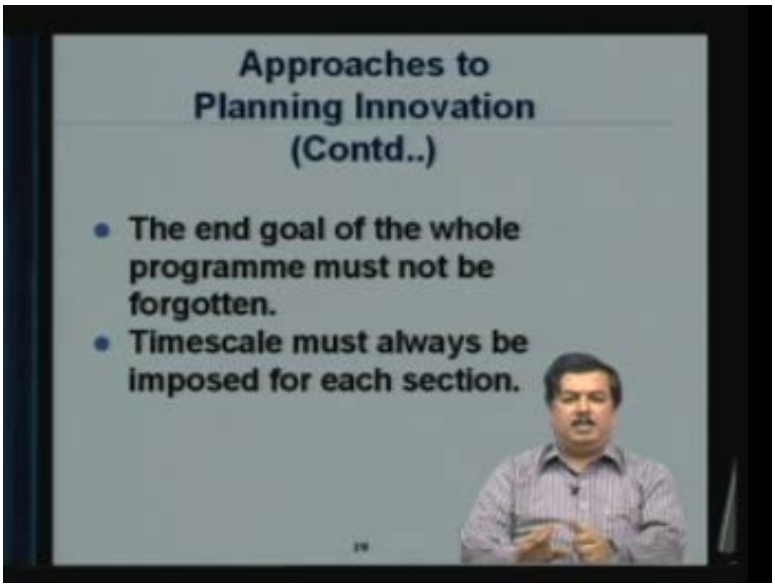
So many of these things demand that continuously people have to work and they have to work over a period of time as long as they achieve the desired output that is fine but what is lesser important is the kind of a time, so the so that project progresses and the results of the key decisions are known find the new objectives for the next phase of work are defined. So that it can evolve, so the product and the features can evolve, managers employing such principles must exercise control in order for it not to degenerate into an very unguided kind of a block of work you know in which so the management has been become very very nearly a reporting thing I think that is the danger where you are not really bothered about the bothered about the time but it becomes much more open-ended where people take their own sweet time you really do not know what people are up to and then you may lose all the control, people also may tell you where things are happening. So the research becomes a kind of a black box and it is, so the management has no capacity to intervene and find out.

(Refer Slide Time: 16:24)



So it is possible that such approaches can fail miserably at the end of the day you know that time has gone, lot of money has been wasted lot of resources has been committed but the end result has not come the way you wanted it. So in this one need to understand the capacity the comfort level what you have with the kind of people who are involved in this and also the past experience could guide you into take or taking those risks where you are allowing them to work in an open and a free manner.

(Refer Slide Time: 17:50)

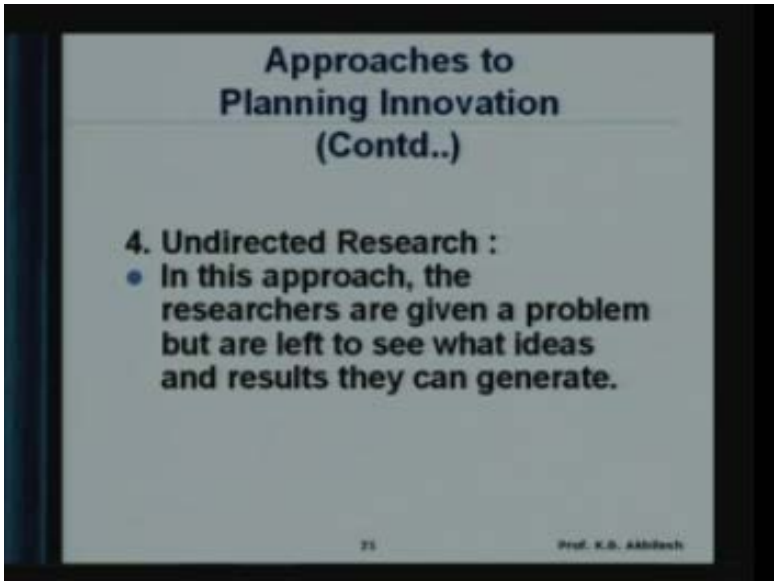


The end goal of the whole program must not be forgotten sometimes what people do is that whatever they have done they may show it and prove it as the best you know then you know you are running into the issue. So the time scale must always be imposed for of each of the section that means best is to modularize the program, break into different phases, so it could be a simple exploration phase to a kind of a feasibility to a prototype and to a kind of a transfer of the technology.

(Refer Slide Time: 18:52)

So many of these things can be put as in different time scale so that some at least can be you know could be measured or some definite part of the output of the end result should be stated. So that it becomes more meaningful and then you do not lose time and resources or feel totally disappointed at the end of the program. So this technique is appropriate for projects in which the future part is completely dependent on results. So that means you have to indicate what can be done or what is to be achieved in between so unless the organizations work towards this unless organization develop some of the techniques and the practices then innovation may not be very very useful. Another important thing is the undirected research.

(Refer Slide Time: 19:17)

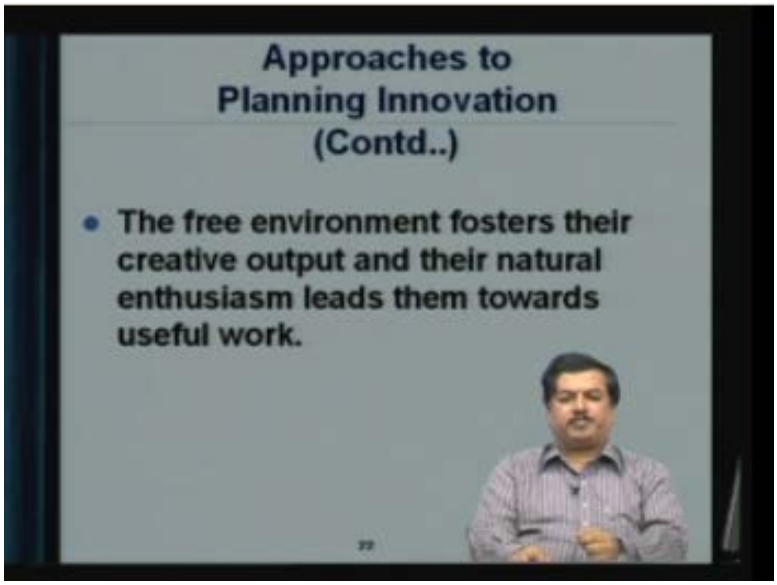


So in this approach what is happening is researchers are given a problem but are left to see what ideas or what results they can generate. So in other word they have to go through the detail, they have to come up with the solutions but then you know funds are made available.
So it is basically a kind of both the exploration as well as understanding many of the variables involved in the problem and as we are seeing it could be the it could be left to the individual initiative but the research funds are made available.

So the free environment fosters they their creative output because they start saying what is best and what is to be done and there is a natural enthusiasm also leads them towards the useful work so they start perceiving through interaction about what needs to be done. So the technique can be very effective in providing those with creative skills and opportunity to

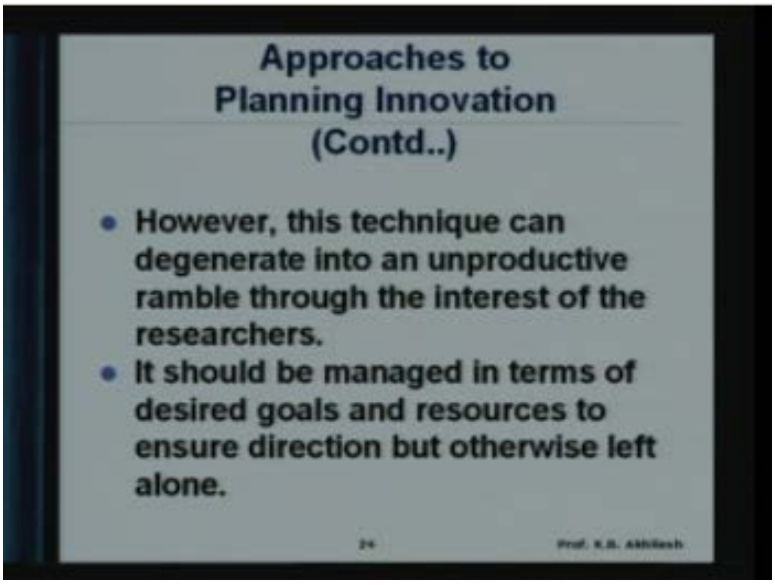
make best use of their skills but we leave it to them. So that you state a problems of the organization so that the kind of work what they do can benefit the organization. So when you see this kind of an approach the real challenge is what so this can degenerate this particular technique degenerate into an unproductive ramble, unproductive ramble is people do lots of things tones of things but they will do their own through the interest of the researchers.

(Refer Slide Time: 20:02)



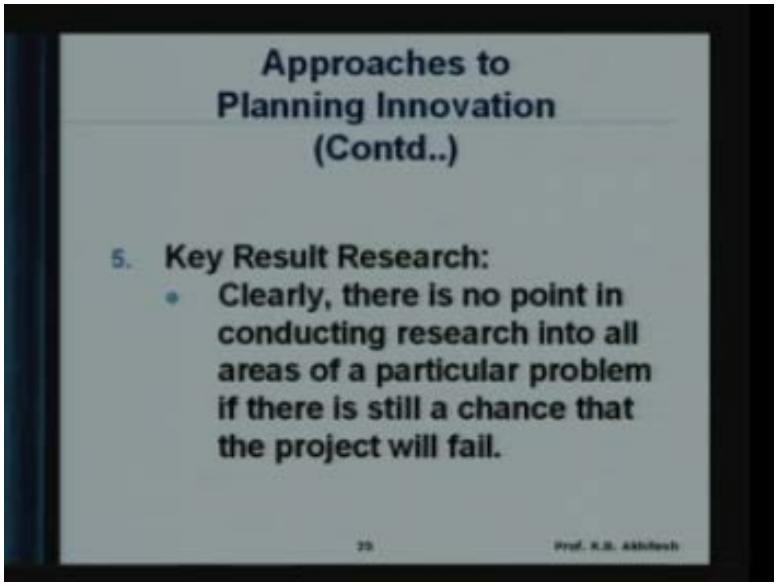
(Refer Slide Time: 20:23)

(Refer Slide Time: 20:47)



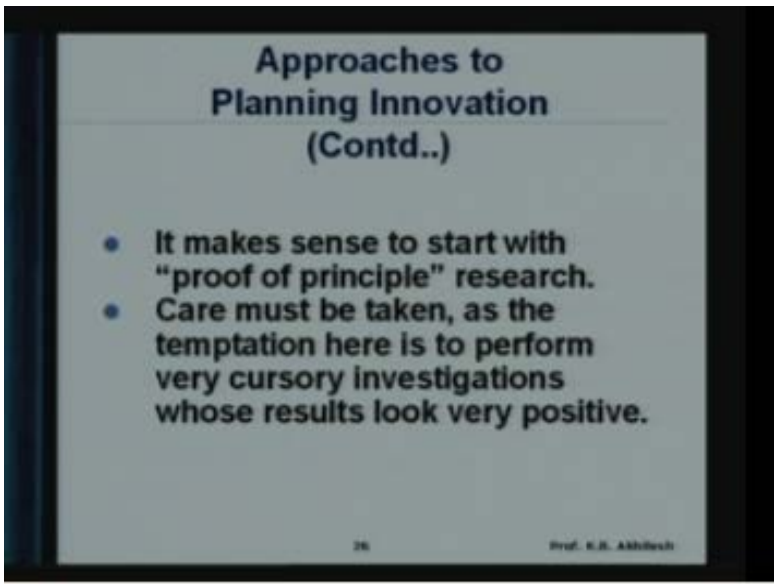
So they will do whatever they want but at the end of the day that organization may not get much out of the efforts of the people. So it should be managed in terms of desired goals and resources to ensure that there is direction and there is a focus otherwise, you know if you leave it you may or may not get what you want the other improvement of this could be that key result research.

(Refer Slide Time: 21:32)



So clearly there is no point in conducting research into all areas of a particular problem. So that means you want to focus you want to focus on an identified thing so the budgets and other things get generated. So that means there is a small you know chance that the project will fail but largely you want to make sure that they understand the problem, they focus their effort to get to the roots of the problem and come up with the solution.

(Refer Slide Time: 22:12)

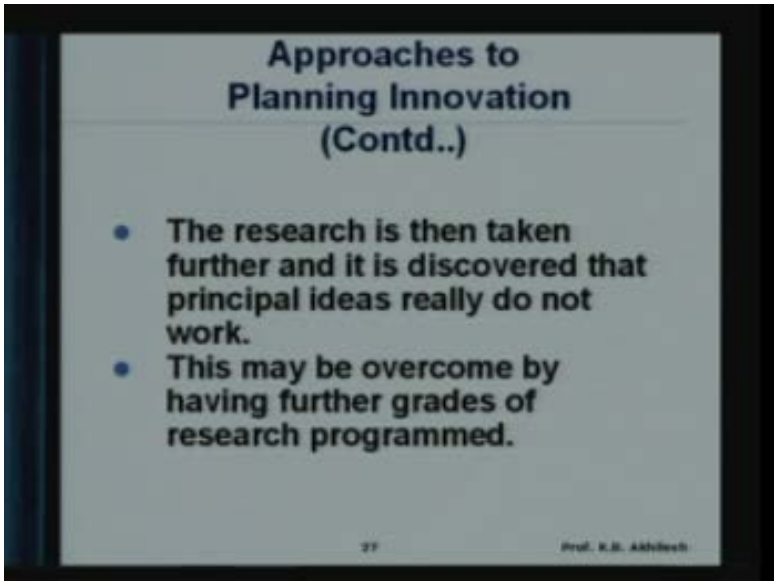


So in a key result approach is it makes sense to start with the proof of the concept or proof of principle research. So that means you do lot of work a priory in terms of the literature in the critical review of the literature in terms of what is what has been done and what is available you also go through the profiles of the people of what is that they have done in the past, so the you look into the individual variables you also see the past projects, what has been done in the organization and then the you know the idea of that what could be done. So that what could be done if you you will see yes, can this be done through or with what money and what resources.

So you look what is known as a proof of concept, so you get to a kind of a theoretical and empirical analysis of the of the resources of the effort of the contribution and of the output and the relevance out to the output. The care must be taken, care must be taken as the temptation here is to perform right very cursory investigations whose the results look very positive.

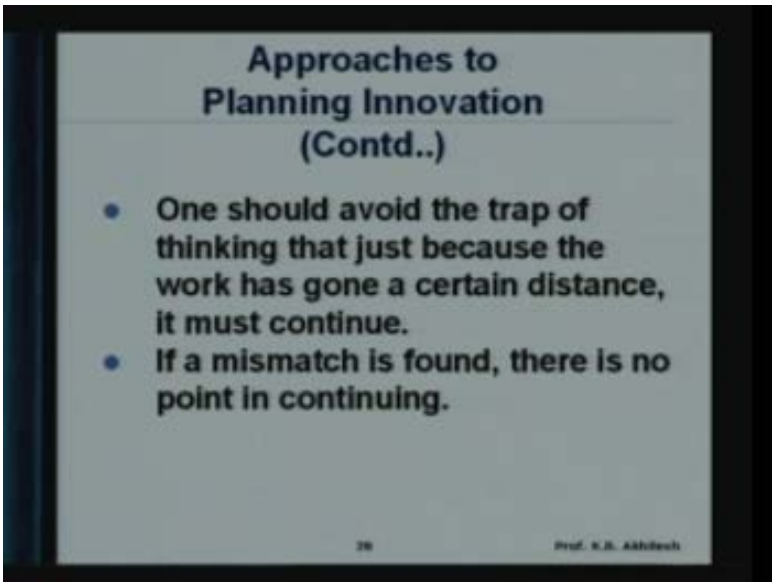
So people may take whatever advantages to them or they want to go through a kind of a quick wick solution without much consideration to its cost, its repetitiveness, its productionization and things like that and so they may take up some something which may be of value with some excitements but may not be long lasting or way one organization can sustain such kind of technologies or such kind of an innovation through deploying the same thing in actual production processes that is how the lab level work to the to the project level working where what they do one, one at a time to a continuous working and making it happen in a production mode there is always a big differences.

(Refer Slide Time: 24:26)



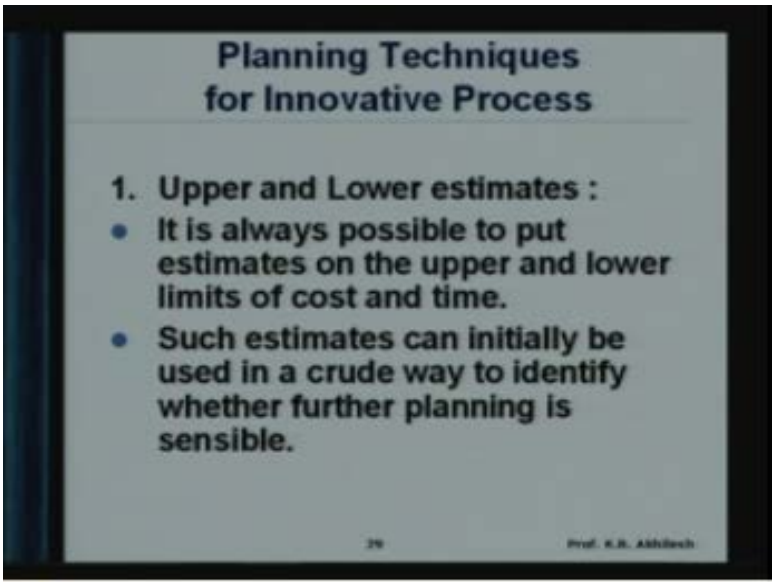
So one need to see that research whatever is taken further and it is discovered that principal ideas really do work or do not work. So this may be overcome by having further grades of research programmed. So systematically you you specify the stages cares and things like that, so one should avoid the trap of thinking that just because the work has gone a certain distance it must continue. So this is called you know people describe it different ways but it is like waiting for a bus. So when you are waiting for a bus or you have invested sometime you have invested sometime already so you hope that in next one minute or next two minutes the bus should come and more you spend time. So next ten minutes again you will wait but then you will you know relook at it, so you have already spent about 30 minutes.

(Refer Slide Time: 24:47)



Now having set spent 30 minutes you expect that yes but should come now and now then another 10 minutes will go then we have spent much more time. So but since you have invested more time you your tendency to expect the bus in any moment also increases. So it is always a difficult for any manager having invested resources having invested the time having created a process went to went to stop it so it is a if it is a mismatch found.

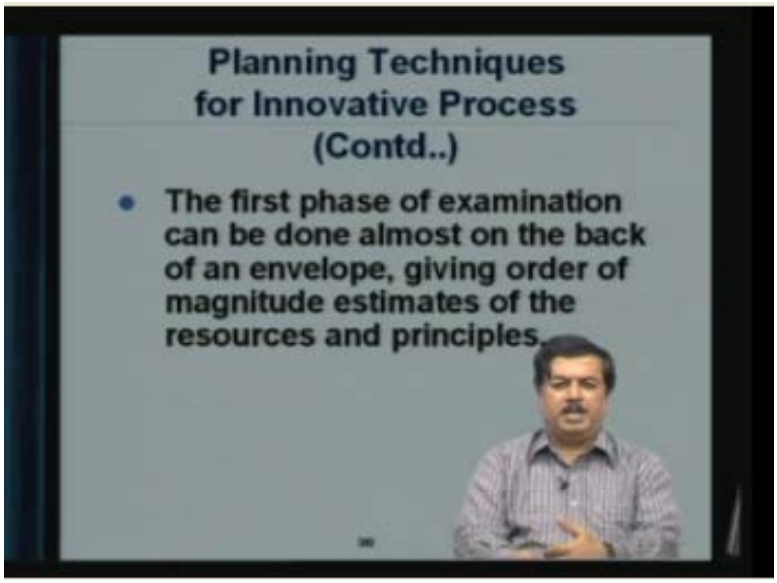
(Refer Slide Time: 26:16)



So there is no point in continuing it is obvious it is known but still we one would run into these issues of when to stop and that becomes an important judgment in this innovation process. Let us look at how to make this planning techniques and planning techniques in innovation process. So the for the innovation process no doubt that there could be they have many approaches but one can see. So can we do something more important and more rigorous one of the ways to do is this could be the put on upper and lower estimates.

So you put some limits, so it is always possible to put some kind of an estimate on the upper and lower limits both in terms of the cost and the time. So that means you are saying that I am prepared to look at a plus or minus 5 percent, so it is fine so one can see this is the estimate and then you expect the group to deliver within that kind of a cost. So if it increases by a factor you want to question them similarly in terms of the time. So but then you know these are these are only the estimates it can be initially be used as a crude way to identify like whether the planning is sensible.

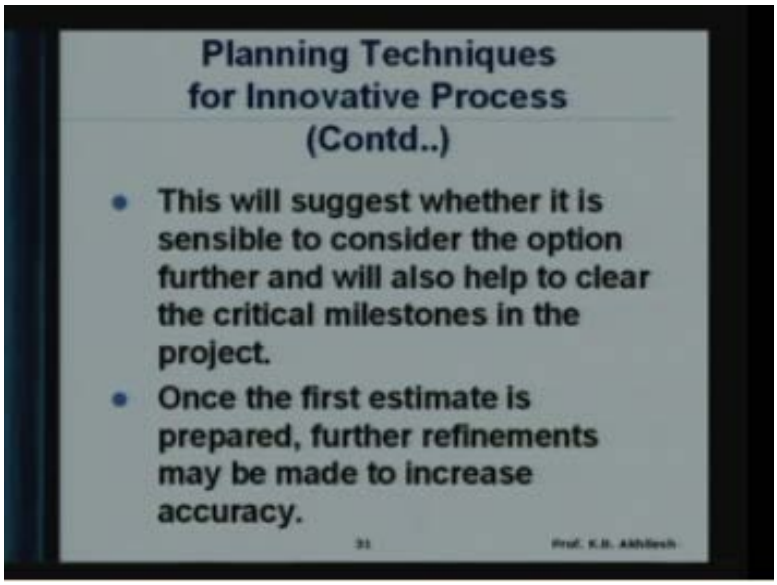
(Refer Slide Time: 27:42)



So that means you know that within these limits you will be in a position to do all the necessary things and you can face it out so that you get the kind of a results. But the point is the first phase of this examination can be done almost on the back of an envelope that means you can sit and do a quick calculation, you can relate all the different activities what is involved and then you can always get into the get detailed estimates and the detailed

resources and the kind of effort and the expected outcome but however about an a priory decision has to be made to spend that kind of a time and the resources.

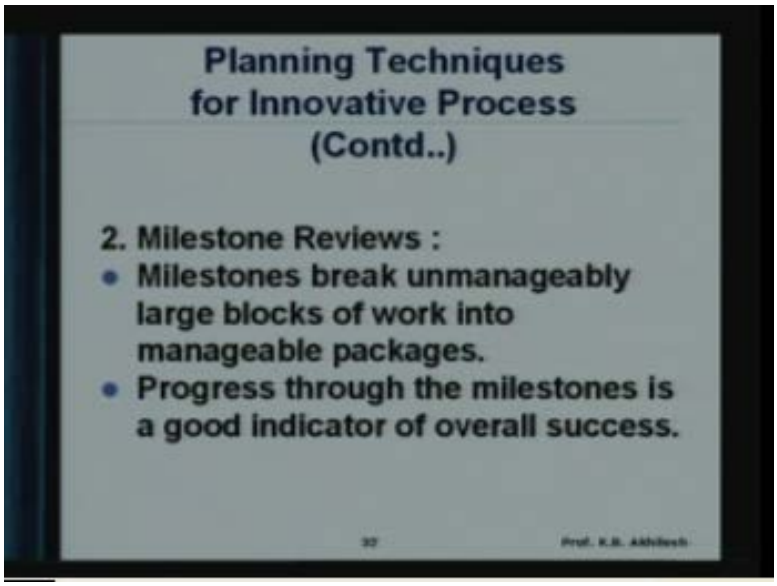
(Refer Slide Time: 28:11)



So that means you know the first calculation you will know it is sensible to consider the option further. So unless it is convinced you cannot move to the next level it will also help to clear that critical milestones in the project, so that means when can you see it as completion of part of the story so the part of the story can be seen as a kind of a milestone. So that means they are going to decide when will you acquire all the material when will you acquire the equipment what kind of people will do the work how long it is going to take when can we see the first experiment or the first result, when can we see the prototypes, when can we transfer the technology, when will the documents get completed. So one can keep on asking such questions and put that kind of a required milestones.

So along that the once the estimate is prepared then one can always get into the refinements you can change these things you can improve upon and it can be made as accurate as possible. So the first step is with respect to the expectation one need to order the activities and then also one need to evaluate every of these activities in terms of the milestone, milestone means where you can stop at take a look at whatever has been done in the past. So a kind of a you can develop some high insights and then also you can look into the you know you can think of the future a kind of a foresight.

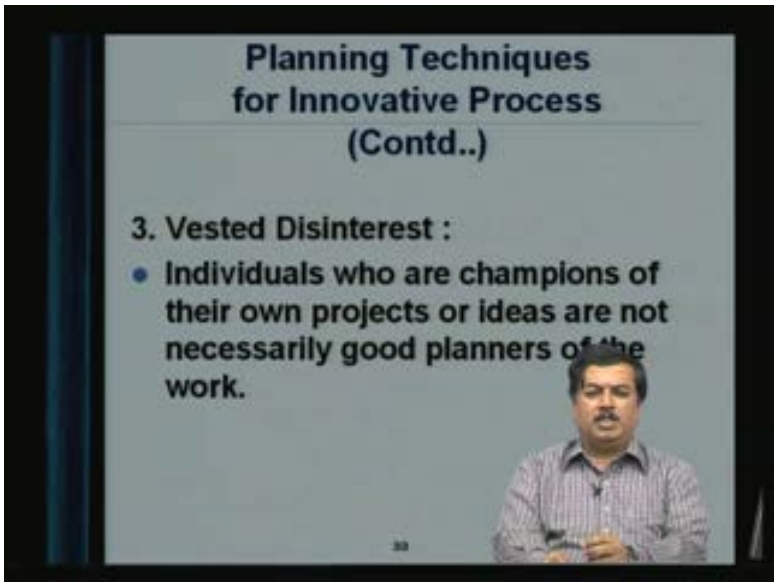
(Refer Slide Time: 29:58)



So a combination of high insight and the foresight activities are required as a part of the milestone review and then you can move on to the to the next step of this where the review reviews are done. So milestones you know break unmanageably large blocks of work into manageable packages. So that means you are getting into a kind of a set of activities and then within that you take a review. So that means you will say have you collected all the relevant material then have you put our thoughts and raise appropriate question and then have you looked at the task and then so one can see the different steps involved in the whole process and then make it manageable packages and within that now you know what are the indicators should have happened and progress through this milestone helps in a in a way where at least you do not continue to put in more and more effort just because you have spent some initial time.

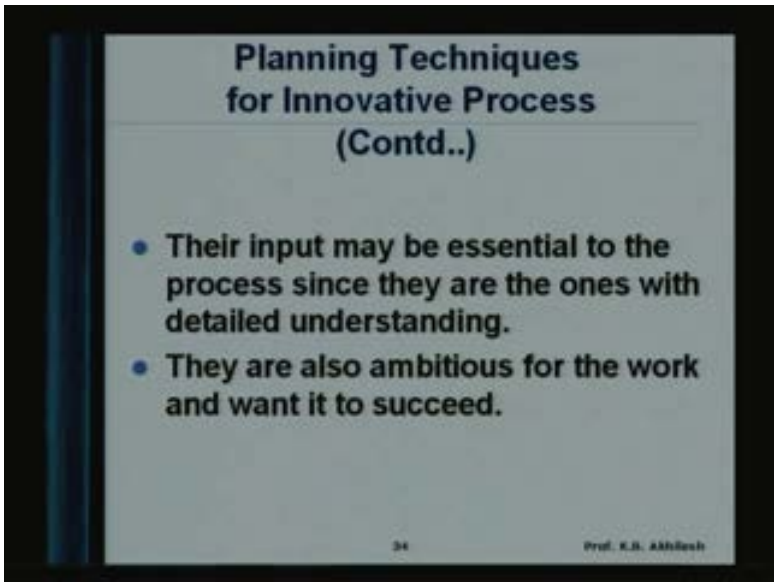
So you know that feasibility or practicability or durability offer idea at the same time you will also push the thoughts into the next level based on the systematic approach to the problem.
So the indicators are important with respect to the overall success and around that when you are working, you have a control over time control over resources and you can also create accountability within the group.

(Refer Slide Time: 31:26)

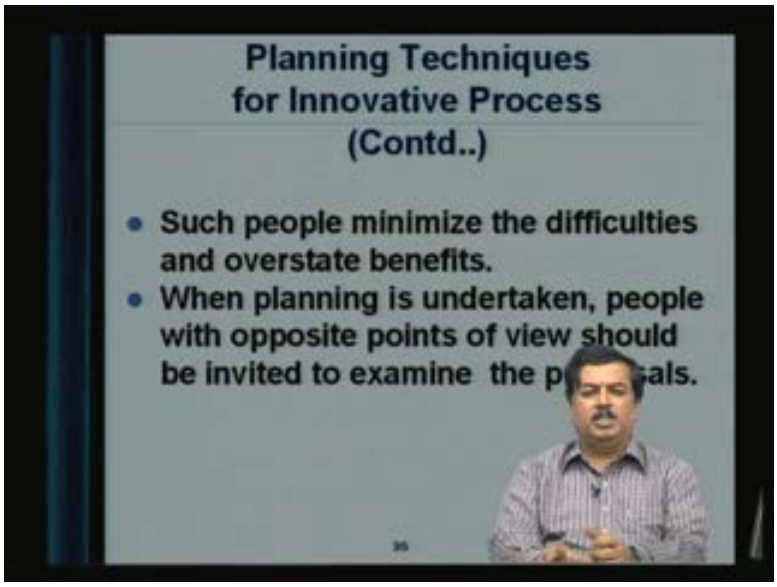


So the milestone resources also you know to see this vested disinterest. So that means you know the individuals who are champions of their own projects or ideas are not necessarily good planners of the work. So it is the you know you can always think about it as you through the projects and sometimes it is not get into that kind of a planning and review allow them to work.

(Refer Slide Time: 31:51)

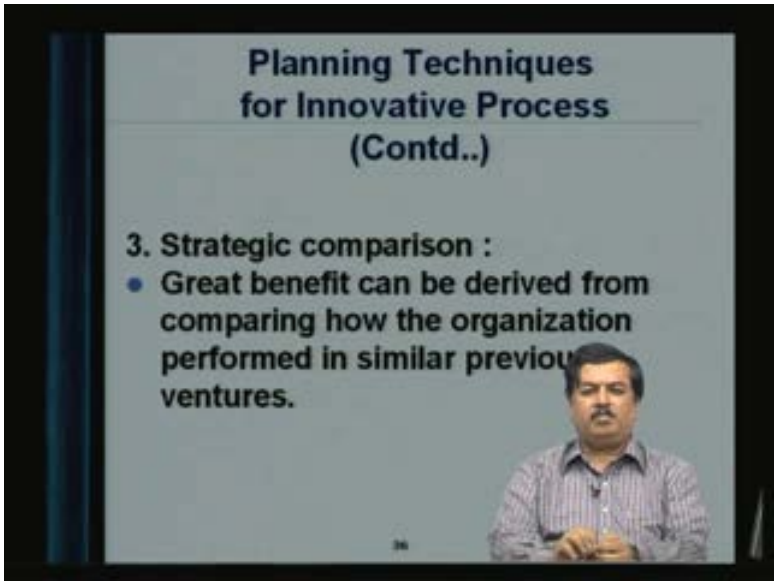


(Refer Slide Time: 32:13)



So that means their input may be essential to the process, so in that the once with detailed understanding, so the people who would do the work, so but they are also ambitious the for the work and they want it to be succeed. So everybody wants that innovation to be happening the question is so such people minimize the difficulties and overstate the benefits. So when planning is undertaken people with opposite points of view should be invited to examine the proposals, so people do call it as them as the devils advocates.

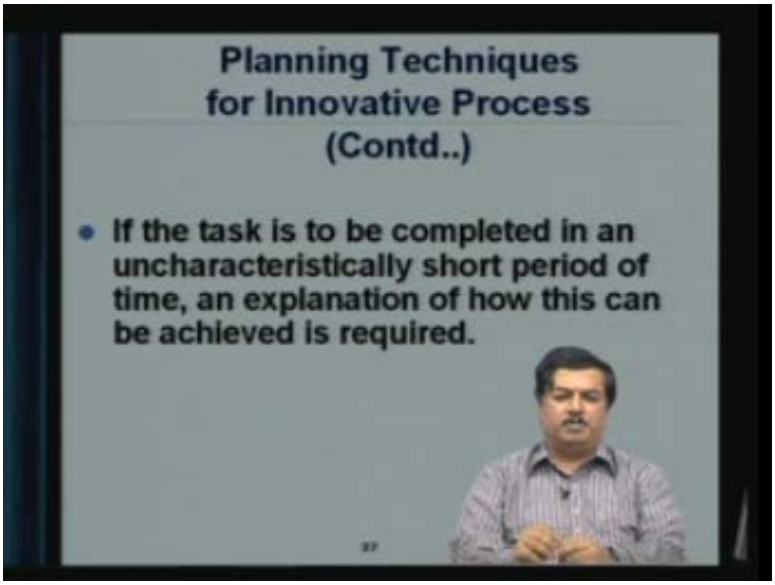
(Refer Slide Time: 32:58)



So the devils advocates, the question rip opened every of the over convincing kind of a thing and when people talk about yes, it is easy it will be done it will be done much well ahead of the time and things like that. So there are one or two in the group would question all the assumptions approaches and alternatives and come up with what best can be done then one can also do the strategic comparison. So this is the kind of a typically the bench marking kind of an approach. So the great benefit can be derived from comparing how the organization performed in terms of in smaller previous ventures.

So you can look into that the how you did it is the past, how have you utilized the time, how have you spent that kind of a money allocated but what others are doing and what others are doing with what speed in with what comfort. So things like that so when strategy comparisons are attempted you do get you do get to see what you are doing is very liberal or you have to do some more. So that you are creating a much more tight and aligned approaches to the innovation.

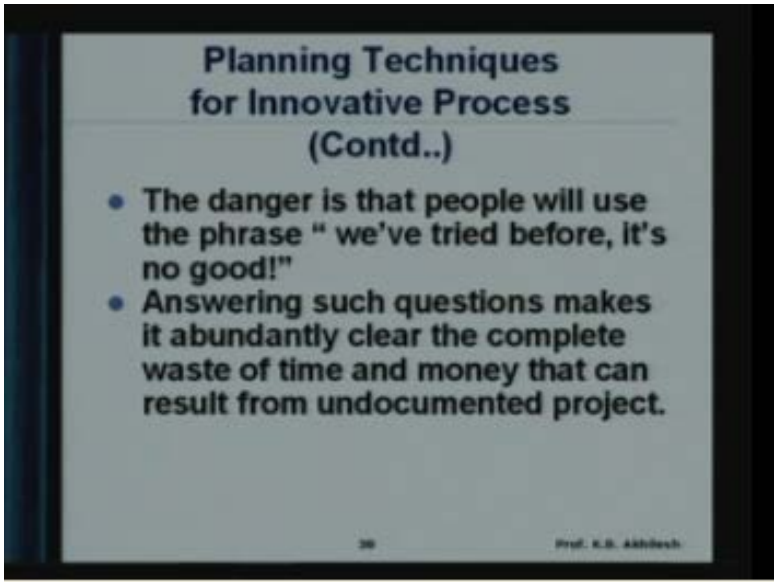
(Refer Slide Time: 33:51)



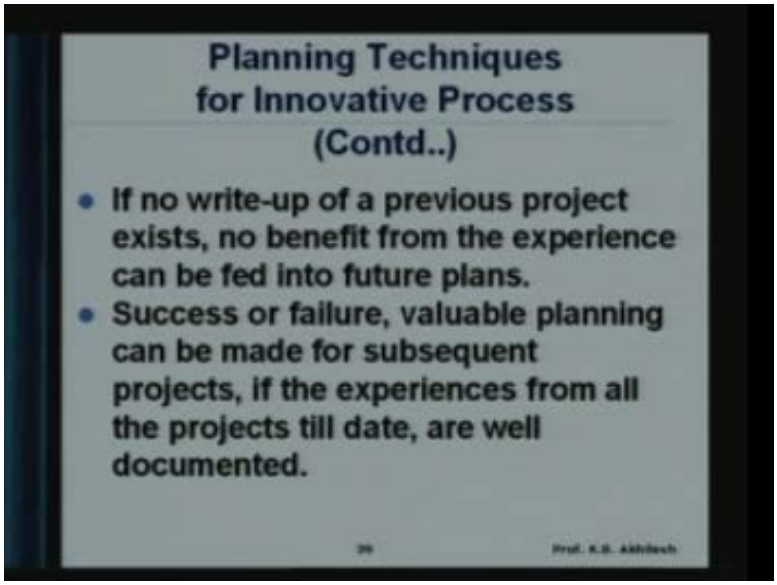
So the task is to be completed in an in an uncharacteristically short period of time and probably an explanation of how this can be achieved is required means the strategic comparisons becomes very useful. So one can see look how others have done how they have completed the whole process, so you would get into that kind of a reasonable and comparable activities of the other groups and then such insights to provide a kind of a motivation for

people to approach and deliver but the difficulty or the danger is that people will use these phrase right we have tried before it is no good or we are saying that okay you know we have also done similar things in the past, it is not going to happen. So answering such questions makes it very abundantly clear that that complete waste of time and money then that can result from an undocumented project.

(Refer Slide Time: 34:24)



(Refer Slide Time: 35:11)



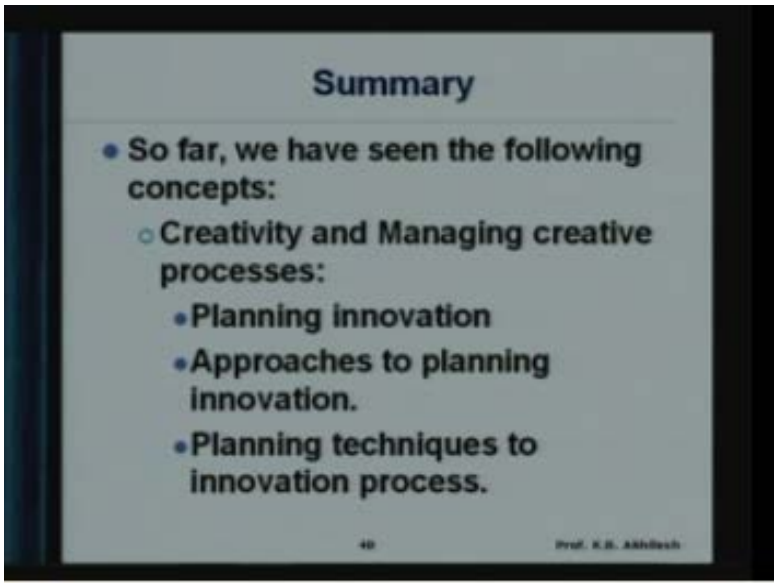
So a documentation understanding and reviewing of the past activities we will always help people to rework prioritize and see what more can be done. So as we are seeing this the innovation process organizations very clearly trying to see that documentation writing all the steps and learnings form that becomes very critical, if no write-up of a previous projects exist one cannot use this no benefit from the experience can be fed into the future plans and that is how today people are talking about the knowledge transfers.

So the knowledge transfer exercises where having completed the or having gone through an experience. So people would like to know so briefing sessions are held people talk about their stories of where they who are very successful and where they could not really go with the existing people or practices or the resources. So they also try and help you to do better planning, so once it is done, so then you can deploy those things to the subsequent projects lessons learnt card becomes very useful. So the experiences from all the projects till date are well documented and it is also used frequently for reviews, corrections, improvements, do result in more tighter kind of a working as well as it can also create that new innovations which are required for the organization.

So as you are trying to see that project reviews, project gates not only help for delivering and completing the task but also it comes back as a learning point. So the group members can reflect and learn at each of the point without wasting resources and time just because they have spent already some sometime. So the project reviews, project gates, project related activities particularly documenting of the past experiences always should be seen as very critical activity towards innovation. So what is this innovation we are talking about is it involves problem solving it involves some newness it involves experimentation it involves risk taking.

So the problem solving, innovation, risk taking all would demand a kind of a group working group working and understanding and then creating that kind of an opportunities for the organization. So in the in this kind of a process what we have to see is the you know we have seen the following concepts, creating, a creativity and managing this, the processes would necessarily they should result in the planning and planning this innovation itself and then approaches to the different planning activities and also deploying and putting the required techniques and now, I want to illustrate some of the differences between the innovation and the innovativeness.

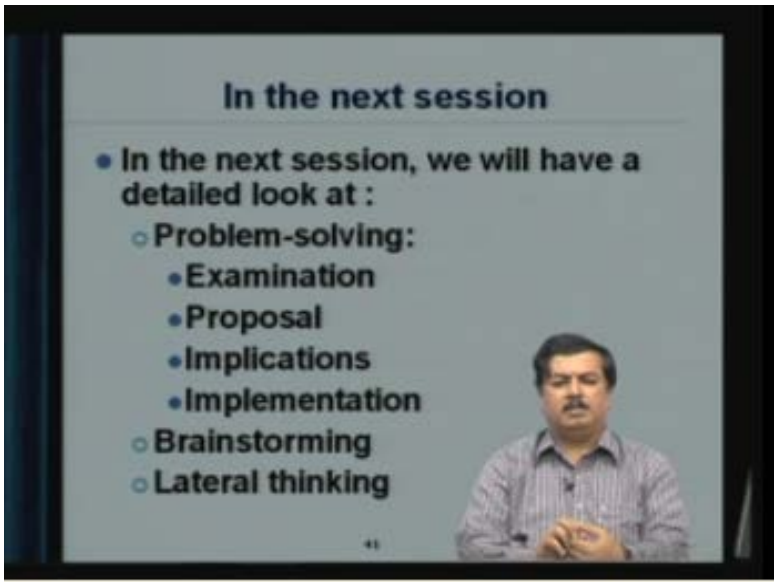
(Refer Slide Time: 37:41)



So the organizations as you are trying to see use these words creativity, innovation and the innovativeness. So when we are looking into the managing the a innovation means it includes all of these things. So creativity is seen as more of an individual and our individual effort and then individual set of activities but people are also using the word a group linked creative. activity and creative processes. On the other side we are talking about innovation as the output, so that is getting the output.

So output linked kind of an approaches but today we are also using the word innovativeness, innovativeness means you are building that tendency that approach those practices the culture of the organization which is more towards problem solving, which is more towards idea generation, which is more towards risk taking, which is also getting to the experimentation and when these things are combined what we get would be the kind of a challenges? The challenges of linking the end result of the organization to the individual effort I think understanding of this requires that one to see how can we promote, how can we use these outputs of this innovation process to the good of the organization.

(Refer Slide Time: 39:57)



As we go long, we will see in the next session the following things and we will have a detail look at the problem solving, the problem solving in terms of the examination, the examination of various alternatives coming up with the proposal then implications of this and also how to go about this implementation. We will also talk about the brainstorming as well as the lateral thinking.