Innovation, Business Models and Enterpreneurship
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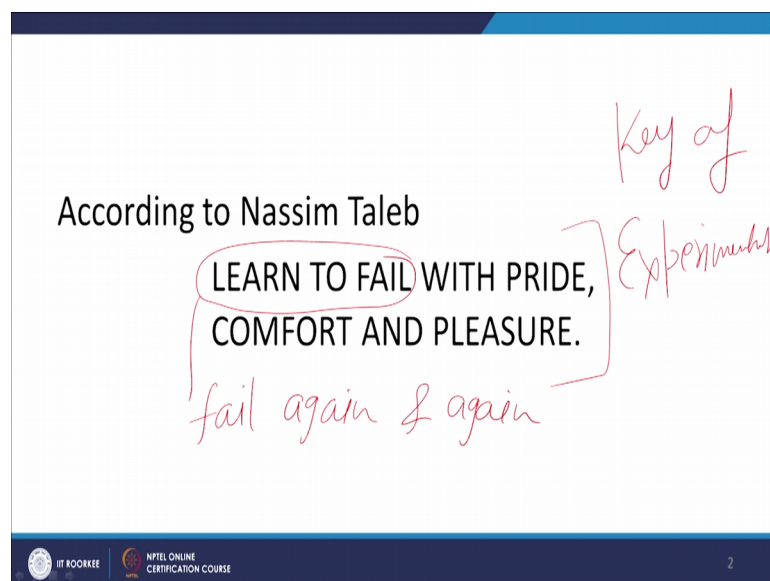**Indian Institute of Technology, Roorkee**

Lecture - 11
Experimentation in Innovation Management

Welcome friends. In this course, we are discussing various steps of innovation management. And in the previous session we discussed about the role of building participation. We need participation of various types of people in the organization for the success of innovation management program, or to have a structured innovation in the organization. Without participation innovation is not possible. It may be possible in the form of some kind of jugaad or ad hoc innovations, but structured innovation will not be possible.

Once you have developed the team, once you have a team where some role models are there, where some mentors are also there, where you have people who are sharing their ideas, who are exchanging their views. And then finally, you also have a system of rewards and recognition that completes the participation process in your organization.

Now, once you have this team available with you, the next stage in the process of innovation management is the stage of experimentation.

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According to one very famous author, Nassim Taleb he mentions that learn to fail with pride comfort and pleasure. And I think this statement of Taleb is very, very important for the innovation management, because this learn to fail, and not only fail once; fail again and again, I am not saying that we only need to fail. Finally, we want to pass also finally, we want to succeed also, but we should not fear from failure.

Swami Vivekananda also mentioned that fall and fall and fall again and again, but you need to rise again and again, till you achieve your objectives. So, therefore, we should not feel sorry, we should not feel in low spirit if we feel. Rather we feel that at least I tried something new, and we should have a feeling of pride when we fail. We need to have a kind of comfort and pleasure you see this is a session on innovation management. But I take you to some very different domain, a different dimension altogether.

The dimension which I feeling very much tempted to share with you all that; if I say that I am a spiritual person, if I say that I am a religious person, now, how do I know that whether I am a spiritual person or I am a religious person ?.

Now the litmus test for that is in this statement of nassim taleb. Even one of the most respected ancient scripture of Hindus; that is Shri Bhagwat Gita, in that also it is mentioned that we need to have a balance of our mind between success and failure. If it is success we should not have a kind of show off, and if it is a failure we should not go into very low spirit. We need to maintain a compose of our balance, we need to have a kind of a balanced approach whether it is failure or it is success, whether it is our respect or disrespect ah, we need to feel a composer, we need to have a comfort level, we need to enjoy both these states failure or success.

So, that is what Nassim Taleb says, and this is one key why I am discussing this statement, because this is key of experimentation. The modern day innovation programs are impossible without experimentation. You need to do lot of experiments that is why I am saying fail again and again.

 So, you need to know that continuously you need to make some kind of changes you need to do experimentation on a very regular basis in all those experimentation, if you are not getting the desired result, this is not to be treated as failure, rather please remember these are to be treated as learning, we never say in experimentation, whether you failed or you succeed, we need to change this orientation of our mindset, that

experimentation tells us about some kind of learning. So, it is more important that we have some learning outcome, out of the experimentation; we need not to think of success or failure of the experiments. And Taleb has very emphatically said this that learn to fail with pride comfort and pleasure.

Now, what is experimentation? We discussed about this aspect of experimentation that experimentation is necessary, we need to make experimentation on a very regular basis for innovation program do many experimentation, and experimentation is required. But what is an experimentation? We do lot of experiments. So, we do a lot of practical's in our science classes, we go to physics lab, we go to chemistry lab, in engineering, we go to electrical engineering lab, we go to strength of material lab, we go to refrigeration lab, we go to air conditioning lab, we go to fluid mechanics lab. So, so many labs we visit, and we do a lot of practicals, but what is the meaning of experimentation.

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One key is that this is a planned activity. At the second thing is it validates the assumptions. So, there are 2 things in experimentation. One is it is a planned activity, and the second thing is it validates some of the assumptions; to validate some assumptions. Now it is very interesting that in this session, we understand what do we mean by assumptions. We need to understand, that what do we mean by assumptions and that is important for us that what type of assumptions we need to actually validate in this experimentation process.

Let us see some of the examples of assumptions that what type of assumptions are actually, we are going to validate in this kind of innovation experiments. So, like let us say, I take you to the period of Dadasaheb Phalke, who is known as a father of Indian cinema. And he started making movies in the area of religious or mythological characters.

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So, one of the assumption can be do people like, movies based on mythological characters that can be one assumption, which we need to validate through experimentation. What type of experimentation is required that is our second question. But this is a type of assumption which you can validate.

I am willing to have a company for exit poll; exit poll is a big business in India nowadays. And I want to start a company for making the exit poll. Now one of the assumption can be that if I predict very accurate results, how will I make money? That can be the assumption.

The other kind of example idea which I want to have you all use Google you all use particularly Gmail, you use Yahoo mail, you use Rediffmail, and all these email services are free of cost.

Now, I want to start one email service, where I want to charge users, I want to charge users based on the size of attachments, they are going to put with the email we put

attachments documents pictures data sheets etcetera. So, based on the size of attachment I want to charge my users ah. So, I want to start this type of email service.

So, what will be the assumption? You please try and I am also writing the possible assumption. Do customers like to pay for a chargeable email service? That is the simple assumption. I need to validate, maybe because we all are in habit of free emails from Gmail, Yahoo mail, Rediffmail etcetera so, I may not like at all to have a chargeable email service. But who knows it is quite possible that there may be a group of customer's who may like it.

So, you need to see that what alternative you are providing, what ad one you are providing, in this email service, maybe it is more secured, therefore, people will like to use this type of email service for sending their confidential documents, which people sometimes fear if they use some other email services, because it is quite possible that your email may be hacked by somebody and then your confidential documents will lose their confidentiality.

So, the chargeable email services are possible, but in this particular case, we are just discussing some of the examples of assumptions that what type of assumptions, we need to validate in the process of experimentation.

Now, when we see these examples of assumption so, these examples some of them which we discussed can be classified into 4 important categories. These categories are there are assumptions which are related to need.

So now the assumption which we discussed whether there is a need of paid email service.

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So, this is an assumption which is related to the need of such type of product. When already free email services are available so, at that time your paid email service will be required or not required, you need to see this type of assumption with the help of experiment.

The second assumption, which we need to second type of assumption which we need to validate about the technical requirements do you have enough technical support to produce such type of email service, technical like, because we are developing a paid email service so, the technical thing is because paid it if it is a paid service and I am saying that the paid service is only for the attachments, which you are sending with email; in that case, the technical thing is to have sufficient know how regarding cyber security and hacking.

So, do you have I believe the assumption can be the language of assumption can be that I have sufficient cyber security and hacking knowledge to provide a very secured and safe email service. So, that is the technical assumption which we need to validate in the assume in the experimentation process.

Then the production, the production assumption related to this product can be to have enough servers to commercialize the email service. Because you require servers, where you can store huge amount of data and that server should be extremely safe, then only you can provide this service on the commercial basis. So, that is the production related

activity that your server which is available 24 into 7, and it is absolutely safe and then only you can provide this type of service. So, you need to develop experiment to validate this assumption also about your commercialization of the service.

And then the commercial assumption, that commercial assumption will be regarding how will you make money, there will be sufficient profits, sufficient revenue or profit in this email service. So, that is your commercial assumption so, in this way if I want to start a paid email service; so, the first thing is whether customers want a paid email service which is highly secured for sending the attachments. The second assumption which is related to technical aspects; that is, to have sufficient know how regarding cyber security and hacking issues.

Then production related to have enough server space for commercialization of this email service. And finally, there will be sufficient revenue or profits when you start this email service.

So, these are the 4 different types of assumptions which we need to validate in this experimentation stage.

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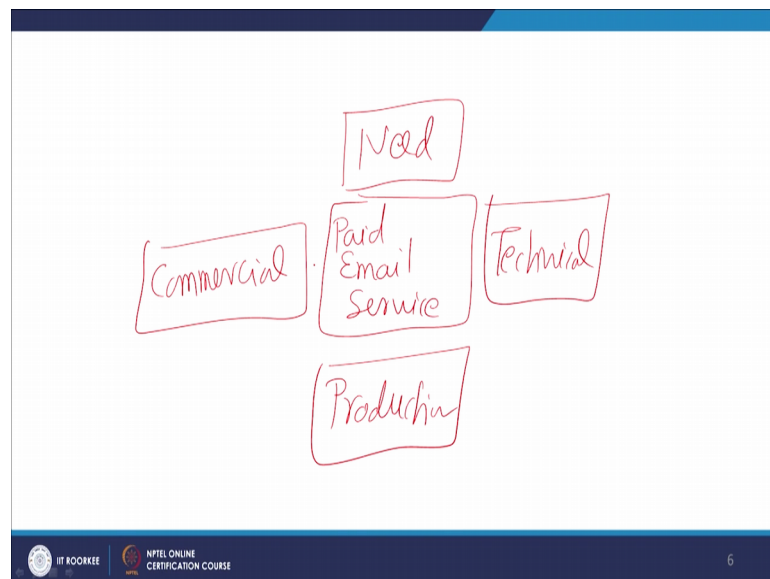
Because if you see the process can be explained in this fashion, that this is your idea of paid, email service, you have one assumption of need the other assumption of technical issues, the other assumption of production issues, and other assumption of commercial

issues and we discussed that what can be the different types of assumptions with respect to need technical production and commercial aspects.

Similarly, we want to develop now, as an exercise I want to suggest to you which you can practice, that we want to have a new idea, and this idea is about how to make I want to start a incentive plan for driving within speed limits, this is my idea.

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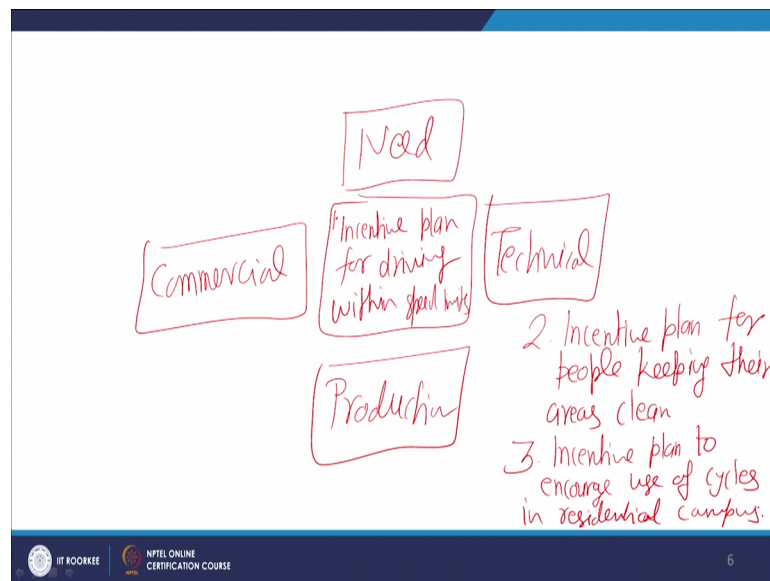
And now your task is to find need related, technical related, production related and commercial related assumptions for this idea that I want to start one incentive plan for driving within the speed limits. So, this is the idea, that there has to be some kind of incentive plan, if you drive within the speed limit, and to develop an experiment for this idea, what will be the different types of assumptions related to need technical production and commercial aspects.

Similarly, you can think of just for the assignment purpose, I am giving you more ideas, and you can develop assumptions on your own, and again I request you that in the forum you can post your assumptions related to ideas which I am sharing here, and in that we will be discussing that whether your assumptions are correct or what type of modifications are possible in those assumptions.

So, like the other idea, this is idea number 1, another idea is incentive plan for people keeping their areas clean. So now, what can be the different types of assumptions for

developing this idea? The other idea is related to I want to have; I want to increase the use of bicycle in the residential campuses. So, the idea is again related to incentive plan to encourage use of cycles in residential campus.

So, these are some of the ideas, we have discussed and I request you to develop assumptions for these ideas so that you can have hands on experience about using ideas and developing experiments around these 4 types of assumptions need technical production and commercial.

Now, the important thing is that, what is the outcome of this experiment? We developed assumptions; we try to validate those assumptions. So, what is the outcome of an experiment? We have on this board 3 points, one is success another is failure and third is learning.

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So, my dear friends success and failures these 2 are not outcome of an experiment. The only outcome of an experiment is learning, that is the only outcome of the experiment. We whether the results are as per our expectations or not as per our expectations, but the outcome of an experiment both these things, whether it is as per our expectations or not as per our expectations, the outcome is that you learn something out of that experiment.

This thing can be done in this way, and this thing cannot be done in this way that is also a learning. So, we never say that or we need to change this mindset that the outcome of an experiment is success or failure. The outcome of an experiment is actually the learning.

So, whether your experiment is giving desired result or not giving desired result, but you should say that the outcome of the experiment is actually the learning. So, in the experimentation process; when we are validating, the different types of assumptions the key for success with respect to all the assumptions is to design a low cost experiment.

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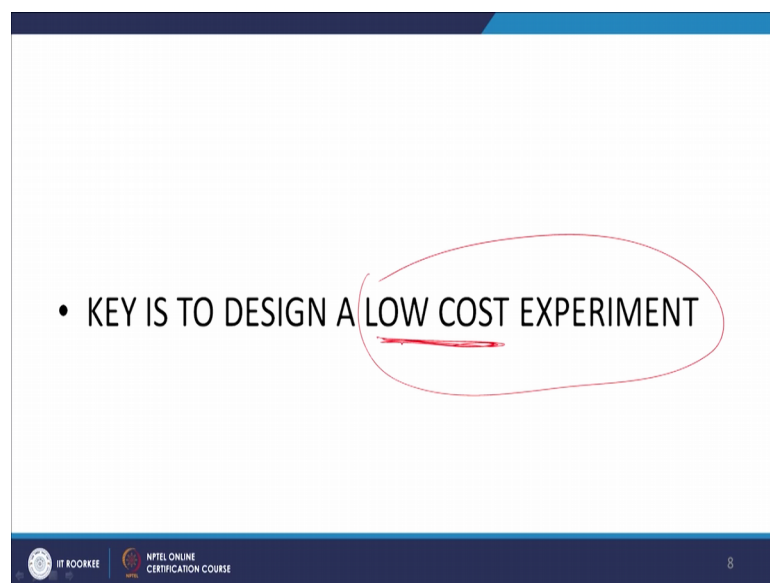
And this low cost experiment is required because you need to do experiments again and again. And as we come to know from literature, that faraday did more than thousand experiments for getting electricity, and then he mentions that now I know that in how many ways electricity cannot be produced from the magnetic field.

So, if you do not do this low cost experimentation, your cost of failure will be very high. And it is a time of marketing, it is a time of cost competitiveness, and you develop some innovation which is a result of a high cost of failure, you will lose; however, good innovation it may be, but if it is not cost competitive. You will not find enough impact of that innovation in the market.

Because impact is a very much integral part of innovation, you need to have a component of or you can you need to have a check, on the cost related issues of

innovation. And therefore, this low cost word is very, very important double or such type of experiment, where cost of failure is not very high. And when cost of failure will not be high, you will remain motivated to make multiple experiments, you can make again and again experiments, if your failure cost is high, it may create a kind of barrier, it will be an impediment for making new experiments.

So, we need to see that how to develop a experiment with minimum expenditure. And probably, probably I feel that nowadays the rapid prototyping, nowadays the 3D manufacturing, additive manufacturing these types of facilities and lot of simulation activities are also available which can help us in developing the low cost experimentation.

The other important point which I want to highlight in this experimentation discussion that is the failure fallacy.

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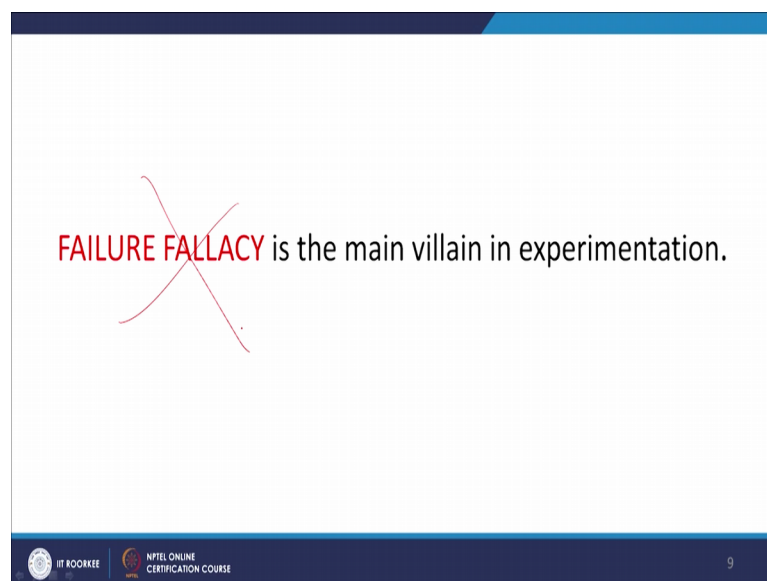
This is considered to be the chief villain of the process of experimentation. Because since beginning of this course we are discussing that fear of failure, we do not love failures, we had see failures as Tamu, we consider failures as not desirable, we go for a low spirit in case of failure. And for all these reasons we only want to succeed. And when I am creating experiments, it is very much possible that experiments do not give results as per my thinking. I want to start a paid email service, but when I checked the assumption,

when I discussed this idea with my 100 students in a class, all 100 students rejected my idea.

So, I can say that to some extent my assumption is not accepted by the target audience. But it does not mean that I stopped thinking, I may come with a new idea, I may rework on my idea of paid email service, ok. Customers will not like to give me money just for sending a plain message.

Unless until there is a confidential message they will not like to use paid email service it is like that when you are sending an envelope through post office. You just put a stamp of 5 rupees, but when you see some important document is there, you want to send some DD to a place, you use either a speed post or registered post, and you pay much higher price for sending the registry or for sending the speed post.

Now, it is that kind of difference, if I want to send a plain message without any kind of confidentiality, you can use free email service. But when I want to send some confidential document, when I want to send some important document maybe I can use email. The simple example is your book post or the postcard.

The message is open anybody can read that message of book post or postcard, but as I feel the importance of message, as I feel the confidentiality of message secrecy of message, I have different types of price slaps. Same idea I want to implement for email, but it is not necessary that people will like or people give positive or negative. And depending upon the feedback, depending upon the learnings, I will improve my idea, and after 4, after 5, after 6, after 7 iteration it is quite possible that my assumption gets accepted. I get approval of my assumption, but it is a very iterative process.

In the beginning itself we have discussed that innovation is iterative process, and therefore, I need not to worry about failure fallacy. I need to go ahead; I need to see that how I can improve the process of learning from the experimentation. Each experiment gives me some kind of learning.

And for that purpose I need to learn the art of developing experiments at low cost so that the cost of failure is not high, I remain cost competitive also and with this idea, the experimentation becomes one of the important step in the process of innovation management, and at organizational level I proposed or we need to propose that the

organization should facilitate the development of or the facility for the experimentation of my new ideas. So, that is all in this session.

Thank you very much.