Strategic Management for Competitive Advantage
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Lecture: 52
In house Development of Technology

Welcome to the class Strategic Management for Competitive Advantage. In the last session, we covered module 16, which is Strategy and Technology. Now, in that, we have talked about technology management in the last 2 sessions. Today in the same module, we will discuss the in-house development of technology.

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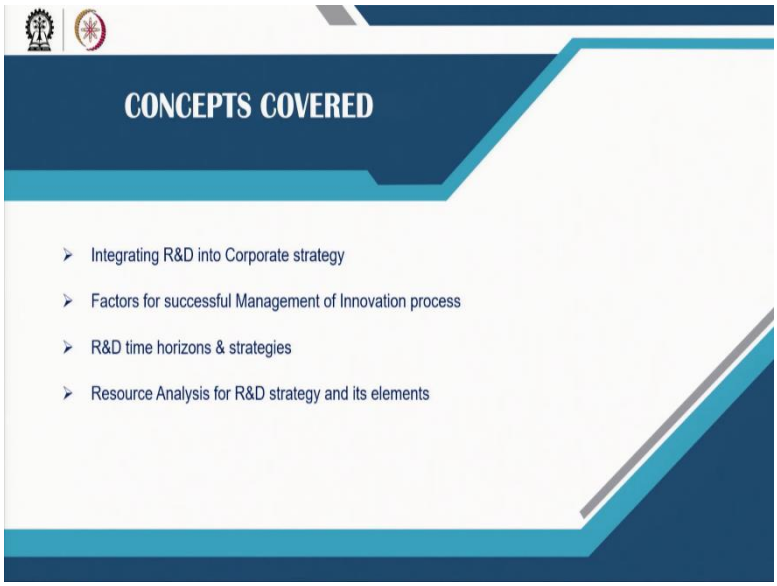

The concepts covered in these lectures are integrating research and development plans into corporate strategy. Then we will talk about factors responsible for the successful management of the innovation process. We will also discuss R&D, time horizon and strategies that should be in an industrial organisation. And lastly, we will talk about resource analysis for R&D strategy, which is an essential element in industrial organisation.

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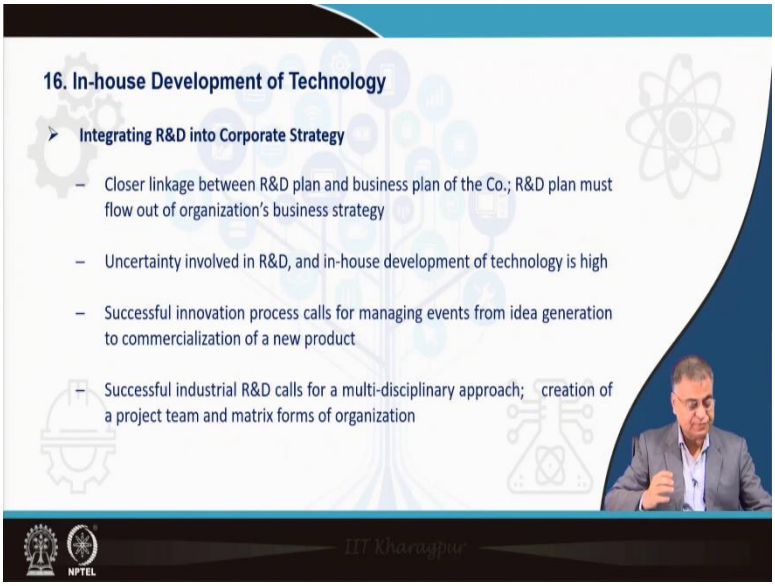

So, to start with, first, we will go for integrating R&D into corporate strategy. Why do you need to integrate R&D into corporate strategy? It is required because there is a closer linkage between the R&D plan and the business plan of the company. After all, R&D Should must flow from the organisation's business strategy, that corporate strategy is a higher-level strategy, and all the functional strategies must align with that corporate strategy, then only those corporate strategies as well as functional strategy will be successful.

What is an R&D strategy? R&D strategy is a functional strategy; it is not an independent strategy; R&D people cannot make any plan out of what is their need; what they perceive is not that way. The R&D plan must follow the corporate strategy and it will help to for to attain the corporate strategy in the organisation.

Therefore, it is it should be closely linked with the corporate strategy. So, all of us know the uncertainty that is involved in R&D and in-house development of technology is high we have discussed in the last session because why it is uncertainty is high because here, for R&D jobs and all your inputs are deterministic, but the output is probabilistic, you do not know whether your inputs will become a fruitful product or fruitful technology or fruitful services or not.

You do not know that it is much like you know mineral explorations and production that sort of thing mineral explorations when you are doing it that you do not know your inputs are deterministic; you do not know whether he will strike the minerals or the oil and gas in that place or not. That discovery is unknown.

So, the chances are very low. It is similar to that, that whether you do not know whether the market will accept product your product or the technology or not, this that is why the easy the uncertainty involved is very high. The successful innovation process calls for managing events from idea generation to commercialising new products.

It is this innovation process when you are doing it in-house. You have to look at the entire chain of events from the idea generations to the commercialisation phase of your new product or new technology it has to be the is a comprehensive plan and comprehensive activity by not only the R&D team, its teams actually cross-functional team, will discuss it a little later.

Successful industrial R&D calls for a multidisciplinary approach. As I told you in the last point, like the R&D is not the job of only the R&D people not only the scientists and technologists; in the organisations, scientists and technologists' viewpoints are only confined to the technological things, but they may develop some technology and all but that technology, and the product has to be accepted by the market has to be appreciated by the customer, that must satisfy the need of the customers, then only it will be a successful R&D. Otherwise, if it cannot generate enough revenue, if it is not a commercial success, that your product or technology will not be that successful work.

So, that is why it is required that a multidisciplinary approach like you need to take the people from the marketing team because marketing they are close to the customer what is the specific needs of the customers they can give those inputs; you have to take your engineering team, your finance team, your supply chain management team, then they maybe say product development team. So, all these team members can give their valuable inputs and then only your R&D efforts will be fruitful for developing a technology or a product.

So, you need a project team dedicated and this project team may have many types of forms in the forms of organisation that we have discussed in the previous module, which forms are best in which type of work and environment like we have already discussed functional form of organisations, product division form of organisations, matrix divisions.

So here, the project team generally should have a project matrix team strong project matrix structure, but a strong project management team is short of a thing. Then only the R&D is more likely to be successful. So, these are the requirements that you integrate your R&D plan into the corporate strategy of the entire organisation.

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So then, we will be discussing the factors for successful management of the innovation process; what are the factors that are responsible for the development of your new technology or new product? One first and foremost, is customer focus; what does it mean that an R&D project must focus on that customer's specific need if they should not develop a product or they should not develop a technology just for what they want it or the organisation wanted? The if the R&D projects are focused on customer-specific needs, a chance that the R&D project will be successful or more.

So, it has been empirically found that so, you should take up R&D projects which are customer focused and that satisfy the customer's need. Then speed up the execution of the R&D project like the speed in this world is very important. Because if your competitors if they come up with another product or another technology very in the nick of time and you lag, you lose that market share. So, the speed of execution for satisfying the customer's need is an essential factor for the success of the R&D projects. So, it would be best if you kept it in mind.

Then that climate of change, you know, that the research and the creativity, creativity is and all these are dependent on the organisational climate. So, an innovative environment fosters creativity and innovation in the organisation. So, companies environment culture, then your structure style management style all should be conducive to promoting this creativity and environment, and this innovation is not the job of only R&D people; you must keep in mind that innovation is the job of everybody in the organisation's why it is so because everybody

can contribute every group can contribute and come up with ideas, this is and if you create such a climate or environment in the organisations, chances are higher that your R&D projects or the innovations will succeed.

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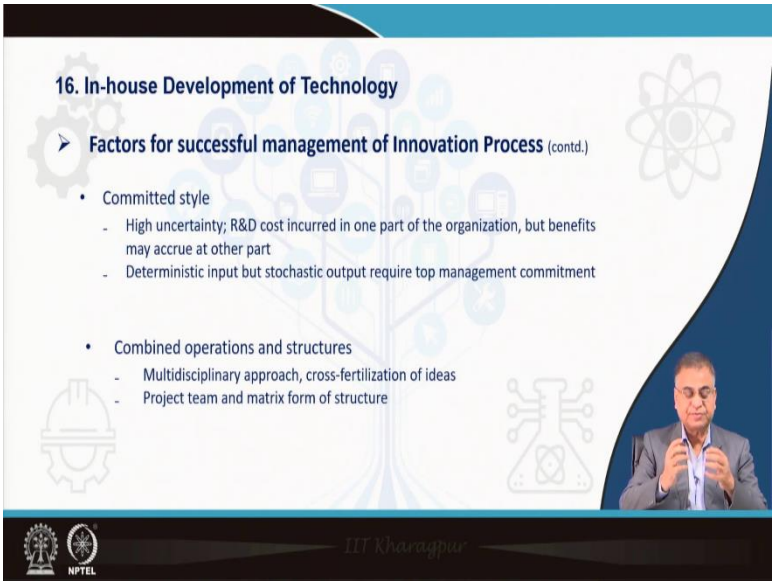

Then further, there is the commitment style; what does it mean that, as we have already talked about, there is high uncertainty in R&D, especially the in-house R&D development? So, R&D cost also is incurred in one part of the organisation, but it benefits if it may accrue at the other parts. So, these have to be kept in mind by the top management, and as I have already told you, that input in R&D is deterministic in nature, but the output is stochastic or probabilistic.

So, it requires top management's commitment to see that the R&D project, even if it is long-term and all it succeeds for that, that project requires support and encouragement from the top management. So that is why it requires a committed style by the senior management of the organisations.

Then combined operations and structure, as I told you already in the previous slide, R&D projects require a multidisciplinary approach because it encourages the cross-fertilisation of ideas from different groups. So, you develop a project team with a matrix structure in that this is structure, this sort of organisational structure for developing an R&D technology and pro or product is the success rate will be very high. Most companies follow this sort of structure.

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Next, is further to continue is the creative and communications skill. Management of the innovations process requires creative skills and rewards for risk-taking; it is not that if someone fails, you cut him, cut them nip in the bud; it is not that you will be that way you are stifling the creativity.

So, every organisation should have some degree of that failure rate should be should not be discouraged. Some degree of that risk should be taken as an organisation policy, and there is also required to reverse the mental blocks may we most people have some mental blocks for these innovations and all. So, we have to remove that from the organisation's culture from the people.

Then, it is also important to communicate effectively across various functions and disciplines. Because unless you communicate these R&D strategies and goals, all people will be a will not be knowing it, and they look at it in, you know, a suspicious way or they form their impressions, or they interpret it in their way. So, these effective communications will dispel all those ambiguities and help contribute to the new technology development and R&D work.

Then control systems, control systems generally stifle the creativity that we know. Still, the if there should be some control because all R&D projects and all must be completed within a specific time and within a specific budget; it cannot be open-ended, you know, it must be somewhere, but the control and monitoring may not be that stringent as you do it in production and operations and all.

So, there must be some balance, where you are giving freedom of innovations to the scientists and technologists and also the control of R&D projects within the broader timeframe of a specific time and the cost that has to be there; it is a delicate job, it has to be balanced, because it you know, those you know, DRDO and our defense and all you must have heard before those origin tanks and all these while going on for years after years, it cannot be open-ended it must be within a specified time and cost. So, that has to be done because this control system is a delicate issue here.

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Then now, I will ask you a question How many companies are successful in developing new technology and product, yet they fail to secure a competitive advantage in the market? Why? What is the what are the reasons? Similar things have been seen in the previous module, like innovations and entrepreneurship, that you must have gone through that Henderson Clark module that was similar to shorter questions. So, here are the reasons behind this, most of which I have discussed just in the course of this session discussion.

So, one thing is that there is a lack of marketing focus in R&D activities; you are doing the R&D work, but if all you are doing for that company may come up with their own need come up the company make R&D People have planner that is satisfying the company needs or companies what they want, but a detached from the market say customer's need may be different. So, it got to be focused on the customer’s needs. So, that may be one of the reasons for this failure that is the topmost reason then it may happen.

So, the organisation's distribution systems may not be adequate for the service level required for the new product, new product or technology you have brought out that requires a distribution system. Still, your company has your old distribution system that may not match or may not be adequate.

So, or that may not have been adapted that that is why you are unable to capture the market for the new product. The production systems adapted from the earlier production may not have changed even though competitive conditions for the new products are different. These are the most likely reasons you can find.

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Then to further continue. There may be an inability or lack of willingness to effect changes required for the new products within the organisations. So, people are not willing to accept the changes. So, it requires serious change management issues; the company must look at it; it is just not that a new product you are launching in place of the old product. Then strategies in response to change may have been followed piecemeal; when you are taking this change, this change management has to be a holistic one, it has to be all-encompassing throughout the organisations and to the market integrated, it should not be done in piecemeal.

Then lastly, they should be a cohesive competitive strategy. That means, in this, when you are launching a new product, you must involve all functional groups with it, the marketing and HR. Finance, engineering, production, then your operations, supply chain management, and quality control, every group has to be involved. Only you're this product development

and all marketing and all will be successful. So, it is as I told you, it will be at all encompassing efforts.

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Next, we will discuss the R&D time horizon; what should be the time horizon for the R&D plan? Your corporate strategy must have a long time horizon to assess R&D impact like R&D or of many types you know; there are basic research and development there are applied research and development, and they take basic research and development, and it takes a longer time applied research and development also depending on your technology or the product you wanted to develop, whether it is a minor change minor or a major change in technology or the product depending on that your timeframe also stretches or dependent on that.

Suppose it may be it is not necessary that every time you do R&D means, you are entirely coming up with a different product and a new product; it is not many times what do we do the same technology you use incremental improvement, maybe quality improvement, price decrease that shot up the R&D also you do that may not be required that much of timeframe. So, it depends, but for major product development or technology development, at least 10 years should be there or more because your corporate strategy must have that time horizon given to study the R&D impact, that is, for the types of this.

Then as I told you, the strategy of applied R&D, you know, basic R&D, is time-consuming, as I told you. Still, the applied R&D, you can do it in-house like, say, take the case of Japan, Japan, what is there they acquired the basic technology from abroad, like the US and the

Western European countries from 1951 to 1984. Japan collaborated, and they came up with had agreements technology agreements, around 42,000 agreements; these 42,000 agreements are dependent on what are they Japanese experts from the industry, technological experts and all universities and those industries and all they painstakingly scrutinise and found that these are the basic technologies they should acquire.

And based on those basic techniques, they got it, and they have done in-house those R&D extensively for the, for those applied research and technology to improve their quality to improve their performance to reduce the cost, price and all costs. So, they came up with superior technology and ruled over the world in the 1980s and onwards, and you can see, but the if they had to do the basic technology by themselves, it would have taken much time and labour costs all those things.

So, for a developing country like India and many others, it is better you get the basic technology, and you do in-house development and all and carry out your bring out your technology or the product and all. That is not to reinvent the wheel, but what you do you make the wheel run faster in the specific conditions of the country in which you are operating or in which you are in. So, this is the strategy one should follow.

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Then furthermore, what will be needing that resource analysis for R&D strategy, is also very important. So, resource analysis for developing or producing marketable products must include the following points to examine as I told you, there is no need to reinvent the wheel; what is needed is to make the wheel run faster for the specific conditions of the country or the

whatever is needed, what is suitable for you. So, for these, you must examine the resources required for in-house technology development.

First, you find out the available skills and resources in the organisations you have; if you have adequate resources and skills, you go for the in-house thing. If you do not have what you do, you try to see whether you can acquire those skill sets experience from hiring from the market or from developing your in-house employees; you look at it. Then if also you find out the technological capabilities available within the country, because if you do not have in-house, but within the country, it is available. So, it would be best if you also took note of that.

Then, one must look at that timeframe to bridge the technology gap, what it is that timeframe like it is very important; you cannot keep it if the technology gap is, say, narrow, then you may require less time, but if the technology gap is high, but the timeframe also depends on different industry to industry in different industries, different timeframe, high tech consumer, high tech industries, consumer electronics and all you know that computer, IT there the obsolescence of technology is very fast. So, the timeframe to bridge the gap has to be very small.

So, whether you can do it in-house, develop it within that timeframe or not in some other industries, that timeframe may be quite large. So, you have you look at all those analyse and then you decide whether to go for in-house or not. Then R&D costs for developing a marketable product along with the timeframe.

You must also consider what are the R&D costs if you are if you go to acquire technology from the market with you see. If the cost difference is not much, then you may go for the in-house, and if the cost is very prohibitive, then you have in-house this thing, so this time and cost are also important determining factors for the resource analysis for R&D strategy.

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Then, there are some essential elements for R&D to have an impact on corporate strategy; you must consider these also while you are making your plan. What are these essential elements like corporate strategy with sufficient scope and timeframe, as I told you earlier, that must give sufficient time and scope to see the impact of the R&D strategy? Then corporate strategy should be based on a sound technological forecast; that technological forecast should be done to know what is the opportunities available and what the threats are. So, all these things should be embedded in those whenever you do this forecast.

These forecasts and all our not be the assumptions or premises it must be on sound footing; even if you do premises or assumptions, you take a very, very rigorous approach to arrive at that. The technical strategy should be realistically linked with the business strategy. This is all you should understand. The top technical person must be part of that top management team or a board member because this R&D strategy has to be that impressive to the R&D is high uncertainty and all but should be impressed on the board. Top management must have commensurate short-up thinking and viewpoint.

Then CEO and that top management must be involved, and CEO must support those innovation processes it is a prerequisite for any successful R&D strategy; it must win the support of the top management then only the success of the R&D strategy will be higher.

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So, in this session, we will sum up what we have discussed so far is that in-house development of technology is time-consuming and is associated with uncertainty. To maximise the success of in-house R&D company's R&D plan must be integrated with corporate strategy and be closely supervised by the top management this we have discussed. The innovation process is influenced by the organisation's cultural style, structure, control system, customers' needs and many other factors.

In-house technology development also requires cross-functional participation of various groups like product design, engineering, marketing operations, R&D, finance and others. So, this will be a project team type. So, with a matrix form of structure, where the cross-fertilisation of ideas and all flourishes, these will ensure the success of the organisations in the strategy.

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So, these are some of the references you should go through. And these will enhance your further knowledge on this. So, thank you very much for attending today's lecture.