Strategic Management for Competitive Advantage
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Lecture 50
Technology Management - I

Welcome to the strategic course management for competitive advantage. Today we will be starting a new module; it is Strategy and Technology. So, for the first lecture, we will cover technology management.

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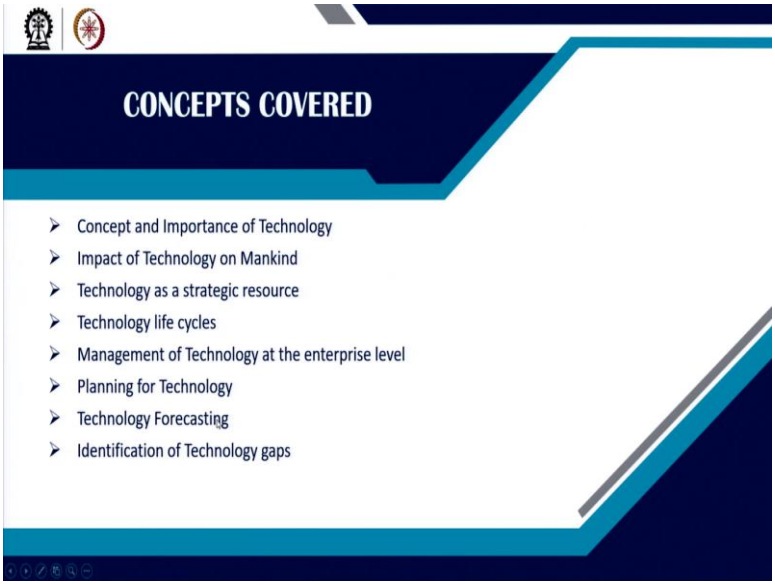

So, the concepts that will be covered in this lecture are the concept and importance of technology, the impact of technology on mankind, then technology as a strategic resource, the technology lifecycle, management of technology at the enterprise level, then planning for technology, technology forecasting and identification of technological gaps. We will try to finish in this session.

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To come to the first point, what do you mean by the concept and importance of technology? How do you define technology? Technology is the know-how to transform the concept into goods and services for the satisfaction of customers, and technology is a strategic element. In this sense, it isn't easy to choose a technology. It is not that you choose a technology just like that. You have to think over what the consequences should be, not only for today but for 10 years later.

So, what should be the market demand? How will your technology give you a competitive advantage over your rivals? All those things have to be kept in mind. So, strategy and its decisions are strategic in nature. And once a decision is taken to acquire or for developing one type of technology, once you have installed it, it isn't easy to reverse because you have invested so much time, effort, skills, and all that. It has been seen in history that many companies went bankrupt because of the choice of the wrong technology.

Suppose you have appropriate technology for your businesses and all. In that case, you can get a competitive advantage over your rivals because technology can give you a cost advantage, it can improve your productivity, and it can give you the differentiations of your product from others. So, this choice of technology is strategic. And for that, take the case of Maruti, The Maruti Suzuki.

Mainly people attribute the success of Maruti is because of choosing the right technology at the right time; their design of the car is fuel and cost-efficient, and it fits the need of the customers and the needs of the people. So, it was a success, and the other, the existing market, it was Hindustan motors and all, they were nowhere, they were left in the lurch. So,

similarly, if you choose the wrong technology, the case is like, you know, in last centuries and all, that Surgical Instruments of India Limited IDPLs and all, that plant went bankrupt, the plant was closed down because of choosing a wrong technology.

So, we can say technology is that decisions are strategic in nature. Then what is the impact of technology on mankind? It has a tremendous impact. All of us know that. Like, technology is the stimulus for change and has helped mankind to progress economically. And also, it has improved the standard of living of the people of mankind. it has improved the productivity of human beings; it has improved the productivity of organisations.

And if you see, it is from ancient times that technology is helping us to improve our standard of living. If you see the unseen time, firstly, it was the discovery of fire. The discovery of the production of cereals and crops, then the wheel, and the invention of the printing press. The invention of oil and minerals exploitations was the steam engine, then automobiles, and then came aeroplanes. These are the quantum jump in the technologies.

Then came the rocket propulsions, then also if you see the transistor radio and electronic radio, you see the medical sciences. You see the integrated circuits, that microprocessors, then you find nowadays that nanotechnology, your artificial intelligence, everything has improved and changed the course of civilisation. Nowadays, you also find it on the internet, then IT technology.

Then your telecommunications and all, it has the revolutionised, computing power has increased, you have seen that supply chain management, you have seen the internet-enabled businesses, web-enabled marketplaces. So, it has all changed the face of business, the face of mankind; everyone says WhatsApp and Facebook; it has also changed the social fabrics, it has brought people closer, and people have also become glued to those Facebook apps, then the social media and WhatsApp. So, it has changed not only the business world, the way of doing business has changed.

Previously, see the banking sector, now computers and all, no one visits a bank nowadays. So, even the transaction B2B and B2C has changed. So, the impact of technology on mankind is huge. So, all of us know that. So, what does this technology do? That we have already told. It is technology since ancient times, and we have seen it helps us the country for economic progress, and it has helped to improve the living standards of the human being.

Then if you see the developed and developing countries, the difference is because of the intensive use of technology by the former, those developed countries compared to the developing countries. Some studies show that the GDP of developed countries has increased by 40 to 50 per cent due to the use of technology, and their productivity also high due to the technology compared to the developing countries because are not, developing countries are not that intensively technology-driven societies.

So, these are the impact of technology on mankind. Technology as a strategic resource. You know that if you see that dominant global player, that dominant global player, that powers, they are what? USA, Russia, and other advanced countries. Why are they dominant in the world? Because of technology. They have the know-how and know-why of that part of the technology. So, technology has made them superpowers and all.

So, suppose you see the enterprise level, in the businesses and all. In that case, the companies which have carved a niche in the world market are the technology-driven company and those companies that excelled in their domain. For example, General Electric, IBM, then if you say Apple, Google, Microsoft, then HP- Hewlett Packard, then other others also, Siemens, the Toyota, if you all see, they have achieved excellence in their respective technological domain, and that is as a strategic resource.

With that strategic resource, they are taking the competitive advantage over the others, their rivals, dominating the world, seeing market share and all. So, we can say technology is a strategic resource, both at the enterprise level and also the country as a whole, that makes the mighty countries are having higher technologies and all. So, we can say that technology is a strategic resource.

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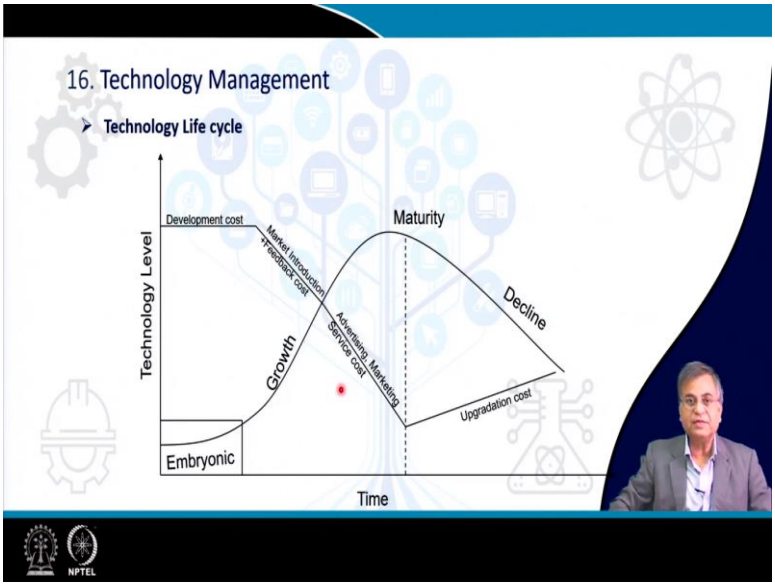

Now, we will be going for this technology lifecycle; what does it look like? If you see that, if you see, this is the technology level in the y-axis, and it is the time. Just like the product lifecycle or the business life cycle, the technology lifecycle also follow a similar curve. That any technology when you are developing it, that is the R&D stage, that is called the embryonic stage, there what you need? It would be best if you had time and huge resources.

So, your development cost is huge because you have to put all your resources, equipment, laboratories, and all, so your cost is high. Still, the technology level and performance level of the technology is low and predictable because you are growing it; you are developing it. Then from the laboratory, when it comes to the market, that is the growth stage. Here you see that your cost decreases sharply because at the growing stage, what do you need?

It would be best if you only had market introduction, the cost of market introduction. At the growth stage, you need feedback from the consumers, from the customers to give you whether your technology is working perfectly or it needs changes. This is the feedback cost. Over time, when it grows, then it attains a maturity level just like the product lifecycle. So, at the maturity level, your cost comes down sharply because here you are generating your revenue now, and there is no cost; the cost is only for your advertising and marketing costs and also your service cost and all.

So, you see, the cost comes down sharply in the maturity stage. Then in the maturity stage, you try to elongate and lengthen it as far as you can. Then, it comes to the decline and decline stages; what is the cost involved? Cost is you try to upgrade the technology, upgrading,

incremental improvement, and all. So, this is only cost again increases for the upgradation cost a little bit. So, this is the technology lifecycle it follows, similar to your business or product lifecycle.

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Next, we will be going for technology management at the enterprise level. At the company level, how do you manage the technology? What are the things you want it to do? So, the strategic role of technology, the degree of technology that a company adopts, that varies from one company to another company, depending on their resource capability, depending on their skill sets, and so, then market requirement and environment, all those things.

So, that technology's role varies from company to company. Then the technology influences the entire gamut of business operations. If you put a new technology, technology is such a resource that it has the deepest impact and the farthest impact, and it goes very far. And so, technology for an organisation, if you have a new technology, it will impact all the operations-be, its production, engineering, logistics, supply chain, HR, Finance, and quality control. so all functions will be impacted, and this is being done due to the shorter life cycle of Technology.

Day by day, technological life is becoming shorter, especially in high-technology areas, because of technological obsolescence. We all know that technological obsolescence in certain sectors is very fast. Previously product used to be said 10-20 years. Nowadays, products maybe change every year because of the shorter life cycles. Then also increased competition and globalisation of the market. This means that competition has increased

manifold nowadays compared to the yesteryears, and this is also because of the globalisation of the market.

The market is not confined to one country or region, and now your competitors are coming across the world. So, this also shows that technology has a great role in it. Then increasing technologically driven business, nowadays, businesses are more and more technology-driven than market-driven. So, it is increasing day by day, and you can see it. With the internet, with the web-enabled marketplace, with your higher computing power and all, the business model scenarios are changing.

Then rise in technology trade, the trade in technology, those countries who are the users of high technology are also the consumers of high-cost technologies, and the technology trade in the world nowadays has increased many folds compared to past years and all. So, this is also one of the reasons you have to keep in mind for the enterprise level. Then improved and faster communication networks and IT technologies and all it has fueled the requirements of the technology at the enterprise level. No one can ignore it; if you ignore the will be out of the market.

Then there is the nowadays lower and lesser time between innovations and commercialisation. So, coming from the lab and quickly going for the commercialisation, that period is compressing, and it is because the people know that if you delay your product by 6 months, you will be losing 35 per cent of your market share. No company will be willing to lose its market share.

So, they have to develop it very fast. Then lastly, R&D is becoming more capital and skill intensive because technological levels are also going higher and higher. So, these are the management of technology at the enterprise level.

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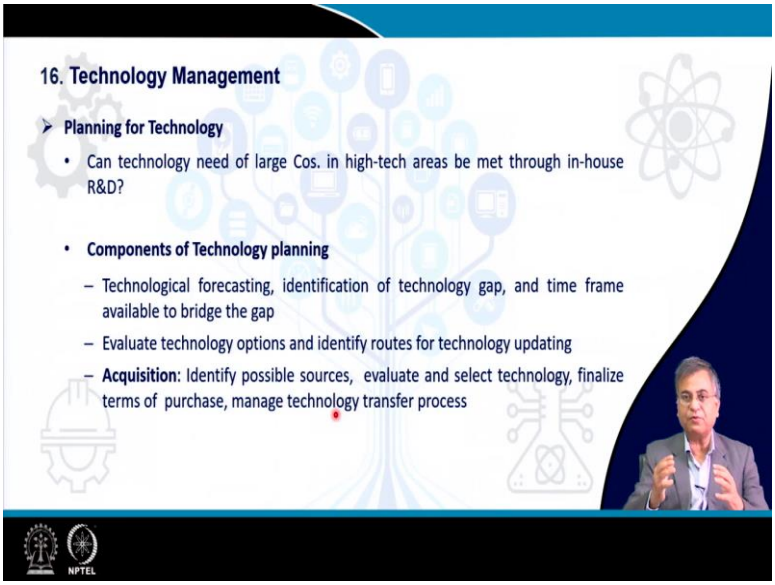

Now, we will discuss planning for technology; how will you plan for technology? So, I will pose a problem to you. Can the technology need of large companies in high-tech areas and this competitive world be met through in-house R&D? You all know that because of the role of technology in the organisation, in the business, in getting a competitive advantage. People have their in-house R&D, and its role is very important, but can the in-house R&D meet the challenges of this competition by your competitors, especially in high-tech areas?

The answer is no because we have come to such a level of technology that it is one technology that requires the main supporting technology. One organisation can't handle all parts. So, what do they do? You have to say outsource some part of the technology, or you have to buy, get support from somewhere, some companies to look after some part of the technology. So, nowadays, you need both support from outside and your R&D team to manage all your technological aspects.

Then, we will be discussing what the components of technology planning are. There are the components we will be discussing one by one. Like technology planning, the first thing you have to do- is your technological forecasting. So, how the technologies are moving, with the help of the past trends and all, you forecast the future, technological need and all. Then you find out the identifications of the technology gap between your as-it-is, existing state of affairs, or state of the system to what is the forecasted one; you find out that, identify the gap.

And you also determine the timeframe available to you to bridge this gap because if you prolong it and all, what happens? Your competitors capture the market. So, what is the

timeframe available to you within which you will develop that technology and come at par with the market? That industry level is what is available in the world, then?

Then, next point, you have to evaluate your technology options. What options are available to you, and do you have to identify the routes for updating that technology? What are the routes you will adopt? Whether you will go for the technology acquisition route or enhanced technology development. These are the two routes available to you. So, you decide.

Then suppose you decide you will go for technology acquisition. In technology acquisition, what do you do? you have to identify the likely sources of your suppliers; you have to find out who is developing this technology. then you evaluate and select the technology and see the pros and cons of each technology given by different vendors.

Now, which is more suitable for your requirement to evaluate and select? Then after that, you finalise your terms of purchase because when you are buying technology, you may need their support for a considerable time if anything goes wrong. So, finalising the terms of purchase is a very important thing. Then you manage the technology transfer process because you have to train your people, you have to develop the skill sets, and you have to run the technology by yourself. So, the transfer processes and training are very important. This is the acquisition.

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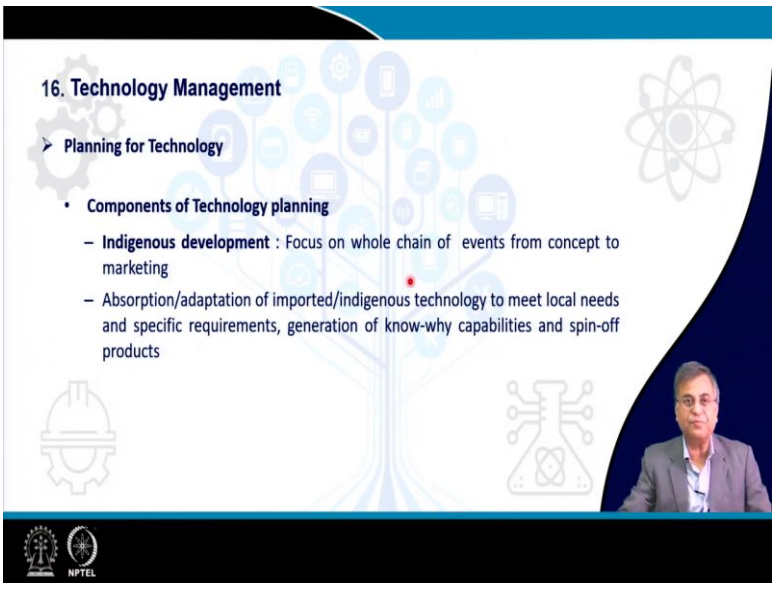

Then if you choose the route for indigenous development, that is house development or buying it from your domestic market. then what do you do? you have to focus on the whole chain of events, from concept to marketing. Suppose you are developing indigenously,

developing within the company. so you have to involve all the groups and focus on the whole chain of these events. So, these are that indigenous development.

The absorption and adaption of imported, indigenous technology to meet the local needs and specific requirements that you have to adapt that you have to develop, both for your technology acquisition or for your in-house development of technology. And also, you have to do that generation of know-why capabilities and spin-off products because something from the main product, something may come out as a bonus or as an added value. So, these are the components of technology planning.

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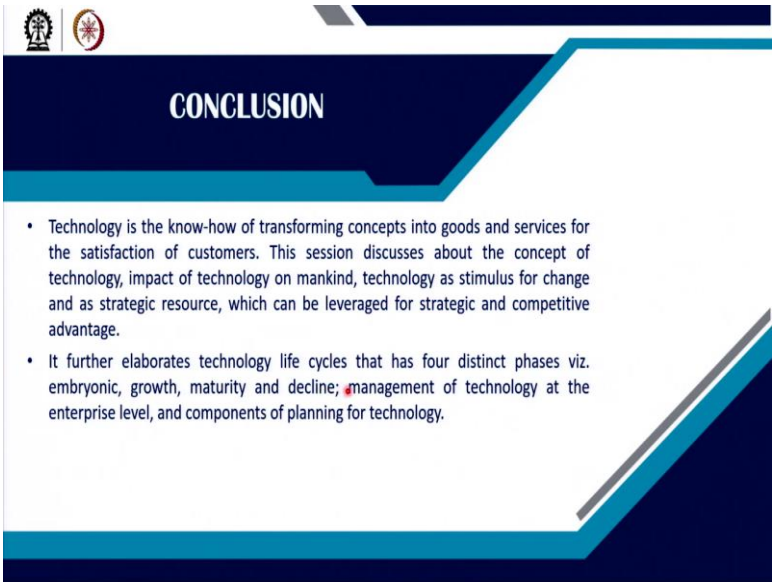

So, to summarise, what have we done in this session? we can tell that technology is the know-how for transforming concepts into goods and services for the satisfaction of customers. This session discusses the concept of technology, the impact of technology on mankind, technology as a stimulus for change, and as a strategic resource which can be leveraged for strategic and competitive advantage. We have further elaborated the technology lifecycle that has four distinct phases-namely embryonic phases, a growth phase, a maturity phase, and a decline phase. Then also we discussed the management of technology at the enterprise level and the components of planning for technology.

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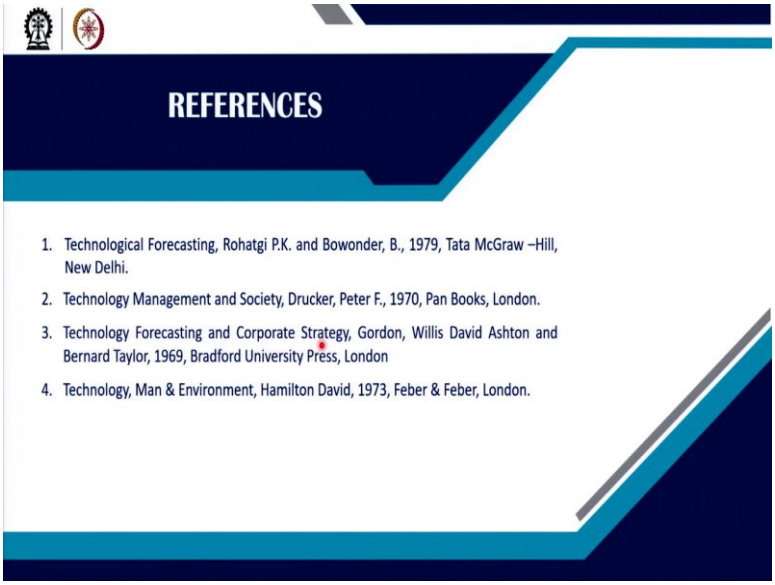

So, this we have discussed at length in this lecture. So, these are some of the reference books you can refer to and enrich further. The first is technological forecasting by Rohatgi and Bowonder. Technology Management and Society by Peter Drucker, then Technology Forecasting and Corporate Strategy by Gordon, Willis David Ashton, and Bernard Taylor, and Technology, Man & Environment, it is by Hamilton David. So, Thank you very much for attending this lecture.