Managing Intellectual Property in Universities
Department of Humanities and Social Sciences
Indian Institute of Technology, Madras

Lecture – 25
The Entrepreneurial University

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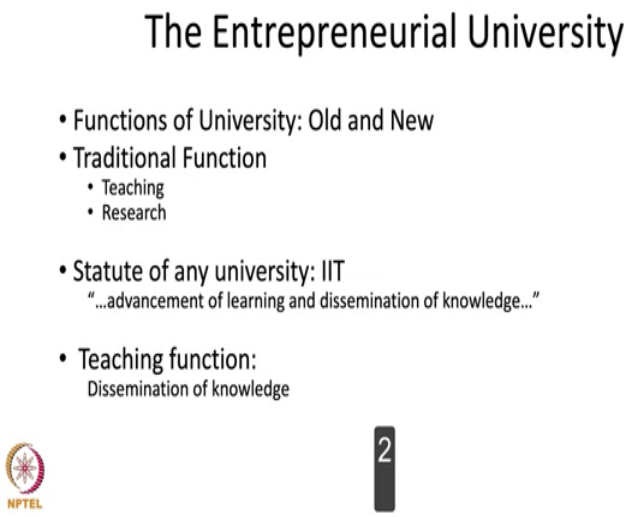

The Entrepreneurial University; universities traditionally started with certain functions. And it is clear for us to understand that the entrepreneurial function of a university or what we call an entrepreneurial university by which we mean university discharging the role of an entrepreneur or the university becoming a source or a ground for entrepreneurial activity was not traditionally there. The traditional functions of the university pertain to teaching and research.

So, if you look at how universities have evolved and when we refer to university, we refers to universities higher educational institutions and colleges as well. If you see how the functions of a university has evolved over a period of time, you can identify some functions which are what we can call or referred to as old or traditional functions and we can also see some new and emerging functions. Now, we will look at why these new functions have come, but first we need to understand what was the purpose of a university or why did we have higher learning institutions in the first place.

The traditional function of a university can be broadly captured under two things that they do, universities teach and they do research. Now, the teaching function started off as a way to spread knowledge and in fact the reason why people enroll in universities is to gain knowledge. Research one can argue, came up as a subsidiary function or as a thing that came up because of the advancements in science and technology.

So, you will see that the statute or the establishing enactment of any university would mentioned the reason, why the university was created. Know if you look at the statute that establishes the Indian Institute of Technologies in India, you will find that it refers to advancement of learning and dissemination of knowledge. So, this is across universities you will find that the Act or the statute or the document that establishes the institution would referred to do these two functions; advancement of learning and dissemination of knowledge.

The teaching function is linked to dissemination of knowledge, because we know that in teaching what a teacher does in a class is disseminate the knowledge. A disseminate the knowledge, we can assume that disseminate the knowledge that is already there. They will be a component of advancement of learning as well, but we would rather for the purpose of this lecture, we would tie the second function to the research function.

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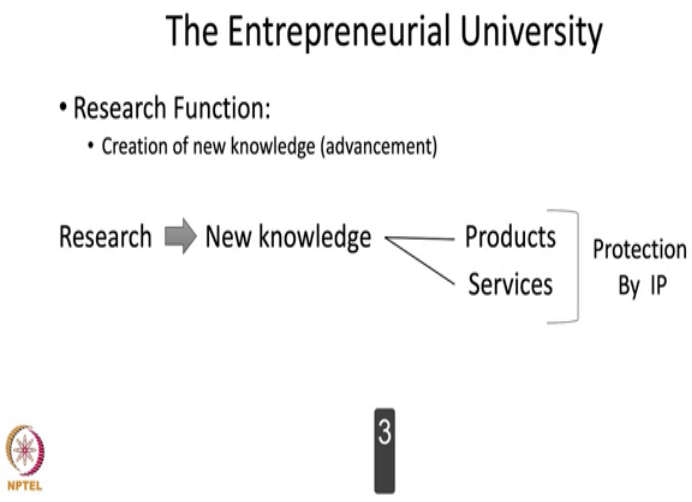

So, in research and we know that research is much different from teaching. In research, there is an endeavor to create new knowledge and when we say there is an endeavor to

create new knowledge, there is an advancement of knowledge through research. So, if you look at advancement of knowledge or advancement of learning, we can broadly tie that to the research function of universities, know there is a reason, we are doing this analysis.

If we look at patent law, where inventions can be protected by way of a exclusive right that is granted by the state for a period of 20 years. Patents are granted only if there is a technical advancement and the technical advancement is made to the prior art or the prior knowledge. So, we can relate this easily with what is happening in research. In research normally there is an advancement of knowledge, which now peaks a new mark or a new peak.

Similarly, patents are granted only when there is an advancement of the existing technology and this is what in patent parlance we refer to as the inventive step, there is a step, there is a you may even call it a leap, there is a substantial advancement of the knowledge for which a patent can be granted. So, now it becomes clear that the research function of the university deals with creation of new knowledge, it also involves looking at old knowledge in with new perspective, but let us for the purpose of this lecture; let us understand that new knowledge is created in universities not through teaching, but through research.

So, the research path could create new knowledge and this new knowledge is what we can tie to the advancement of learning path that we normally find in statutes establishing universities and educational institutions.

Now, so we know that the primary function of a university involves teaching and research of which research has the potential to create new knowledge. And new knowledge intern can create new products and new services, so because research has this potential of creating new knowledge. New knowledge by itself if it is left, it may not result in new products and services, there is something that has to be done.

So, if you understand the new knowledge as a basic knowledge that has to be some applied research that needs to be done for converting the basic knowledge into products and services. Now, when the new knowledge manifest itselfs into products and services, which people would buy and use then we require protection by intellectual property.

So, intellectual property rights protects the products and services that emanates from new knowledge in a university, which you could predominantly find when the institute does research. So, this is how the new function of a university what we call the entrepreneurial function is tied to one of its existing primary functions. The new function that a university has to be entrepreneurial, it has to setup a field for entrepreneurial activity and it can itself engage in entrepreneurial activity. Creation of new products and new services is an entrepreneurial activity or even helping or laying the ground for creation of new products and new services, which people would buy is again an entrepreneurial activity.

So, for the university to concentrate on this newly evolved function, what we call the entrepreneurial function. You can directly relate it to, the fact that products and services can come out of the research, which produces new knowledge. So, if new knowledge is created through research and if that new knowledge is applied into the creation of products and services, the only way you can protect them is by intellectual property rights.

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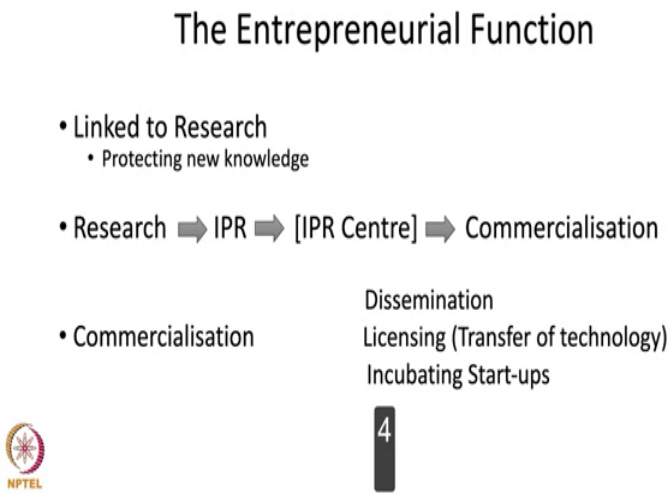

The entrepreneurial function is linked to the primary function of research and the entrepreneurial function makes sense when the new knowledge can be protected. Now, that may raise a concern that should all new knowledge be protected. Now, this is a call that the university needs to take based on its objectives and its mission. If the objective

of the university is only to create new knowledge through research and to disseminated, not for profit.

Then the university could look at disseminating the knowledge that is created without having an entrepreneurial function at all, but if the object of the university is to convert the new knowledge that is created into products and services or facilitate those who want to convert it into products and services. And sometimes this could be mandated by the funders, in some cases a publicly funded research may require you to file patents. So, in such cases you may have to look at how your institution can protect new knowledge.

Now, the production of new knowledge in that case becomes a market necessity. The market otherwise will not touch the new knowledge, if it is not capable of being protected, when it by way of a when a product or a service comes out of it. So, it becomes necessary operating in present conditions that any new knowledge that is created is protected by intellectual property rights, so that they could be parties in the industry who are interested in working with the university and taking it further.

So, the research as we just mentioned the research leads to things that can be protected by Intellectual Property Right IPR. And IPR protection helps in commercialization, so between the IPR that comes out of research and the commercialization that eventually happens when that can happen in multiple ways, the university can have a partnership with somebody, in the industry the university can incubate a company which creates and commercializes the technology, it can happen multiple base.

So, between the IPR and the fact that the research can be commercialized is what you have and what we call an IP centre on an IPR centre. So, the IP center or an IPR centre is a nodal point, which helps the university to capture the new knowledge that comes out of research and protected by way of intellectual property rights and helps in the commercialization of products that come out of research.

So, between research and commercialization you can envisage protection by way of IPR and for that to happen the university will have to have an IP centre or an IPR centre. So, commercialization as we just mentioned could happen by transfer of technology by licensing, the university develops a technology and it licenses said to members in the industry. The commercialization can also happen through dissemination or diffusion of

the knowledge. So, the university develop some knowledge and it disseminated it passed it on and this can happen largely in cases covering basic research.

So, commercialization means in such cases you just disseminate the knowledge, so that other people can build upon it, create products, do applied research and come up with various products and services. So, dissemination is also commercialization. And thirdly it can be buy incubating startups, commercialization of a technology if the university or the institute does not want to license the technology or if it finds that there are entrepreneurs within the university who want to create a startup and take the technology to the market. Then commercialization will come through incubating startups.

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Now, how does transfer of technology, because transfer of technology is the broader thing, whenever we talk about commercialization of research commercialization of research happens through transfer of technology. So, we use these words interchangeably a research if research needs to be commercialized, then the technology developed in the university has to go to the market or to the industry players. So, we call it transfer of technology or commercialization of research.

In fact, in the United States the IP centers are called technology transfer offices or technology licensing offices. So, these words are used interchangeably, but what we need to understand here is how does transfer of technology or commercialization of research help a university.

Now, the objective of transfer of technology or the objective of commercializing research could be first that the fact that when research is commercialized, it could incentivize further research, because once you know that the objects that come or the products and services that could emanate from a research is something that is going to be valuable have commercial potential and something which the market is ready to consume, then that itself can incentivize research. It can bring in revenue by which it can fund further research, so that is another model.

And we have seen this effective in some universities in the United States, where the money that is generated from commercializing research is pulled back into the university for further research. And it could also set the culture for research in an university for instance, there are studies which indicate that if a university takes transfer of technology seriously, then it becomes much better for them to identify higher and retain talent. So, at the end of the day it is the people in the university who are going to do this research. So, it also sets a culture where you can attract good talent and people who joined the university will have a career progression in research as well.

Transfer of technology is also important, because by taking research to market there is a social welfare objective that is discharged by the university, otherwise the product of research could remain in the university itself. So, it helps economic growth, it also helps addressing concerns with regard to distribution of wealth and as well as social welfare.

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So, before the technology can be transferred, a prerequisite is that the university should create the these technology, so that is the prerequisite. So, when whenever we use IP or Intellectual Property Rights IPR as a short form for protecting research, we are assuming that there is research that is happening which can result in quality products and processes that emanate from the research. So, there is an assumption that there is research that is valuable and only if there is research that is valuable, can that be protected by intellectual property rights. Now, for valuable research to happen, there has to be funding in scientific research.

Now, in the United States the major funding happens through government funded research. Now, the united states has the national science foundation or the NSF, which deals with science and technology funding, but it does not fund medical technologies. And for funding medical technologies they have the National Institute of Health - NIH. So, the funding fundamental research and education is something that is done by the government. The NSF which is the national science foundation, supports basic research in universities and colleges.

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US has this culture of funding basic research and education, lastly because of the science policy of the country. Now, soon after the world war it was felt that basic research would lead to creation of new technologies. And the creation of new technologies would lead to

new industries and new industries would lead to new jobs, thereby creation of wealth and eventually US becoming or maintaining its role as a superpower.

So, you will see that this was how the current position of the United States was linked to something as simple as basic research. Now, if you look at the patents Act in India as well, you will find that creation of new industry patent should be granted for the creation of new industry, new industries and they should be transfer of technology. You will find this language in the Indian patents Act as well, but for this to happen especially in a university set up, there has to be funding in scientific research and the funding should predominantly come from the government.

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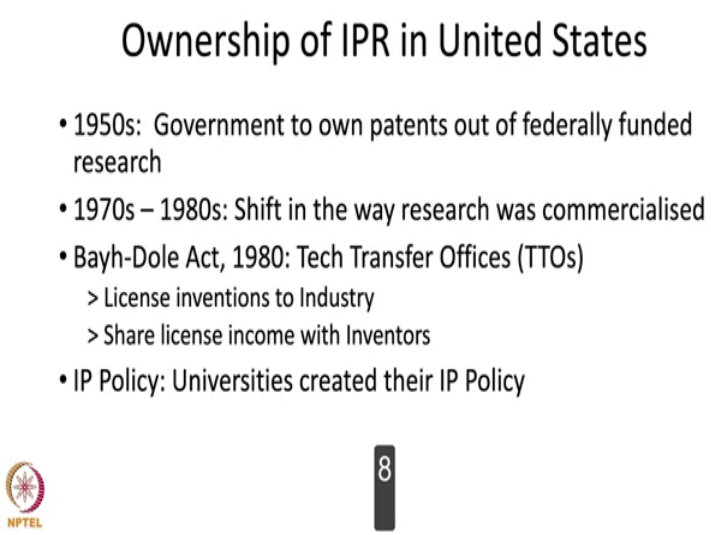

Now, since the government was the biggest funding organization for publicly funded research. The ownership of IPR in the United States was also a concern in the 1950s it was the government, which owns the patents that came out of federally funded research, but in the 1970s and the 80s there was a shift in the way in which research was commercialized.

Now, this was largely due to a legislation called the Bayh-Dole Act which created the culture of setting up tech transfer offices in United States, so, the this was the Act that necessitated it. In India currently we find that various regulators like the UGC, AICTE and some ranking frameworks like the NIRF.

Now, want institutions to have IP centres or to have a culture of promoting patents. So, though it is done by different regulators, in the US it was done by a statute a Act. There was an attempt to pass a similar Act in the last decade, but that did not materialize in India. So, the tech transfer offices did two new things which was not done before, first the Bayh-Dole Act required the universities to license inventions to the industry. So, this was a way in which the universities research was presented or pushed to the universe industry, so that the industry could take it develop it and commercialize it.

So, the link between universities and industry which was already there, but it was it got strengthened through this Act that so that was the first contribution. In the second contribution was the Act brought in a provision to share the license income with the inventors. So, the universities were required to share the income that comes out of licensing these inventions, what we called royalty. It was required to share it with the professors and the researchers who worked on those research projects.

Now, to do these two things; now, you can it is a simple case that there is an Act which required the university to license the inventions to industry and also to have some sharing between the people who contributed to the creation of that new technology. This require them to have an IP centre and the IP centre in the United States is what is called that technology transfer office.

So, the technology transfer office or the culture of having technology transfer offices came up with a requirement a statutory requirement the by Bayh-Dole Act, which required universities to have tech transfer offices. So, the intellectual property policy was also embedded in the mission statements of these universities and some universities also created their own intellectual property policy.

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So, now what we see is the fact that the universities Act as entrepreneurs or the they discharge a new function call the entrepreneurial function, but if you just take a step back and see the fact that a major funding in scientific research is actually done by the government itself, then you will be able to see that the state itself sometimes performs the entrepreneurial function.

So, it is not hard for us to look at the way in which research is funded and the fact that the research can now be commercialized with tie ups with the industry and also by sharing the revenues that come out by way of royalty with the inventors who could be professors and researchers in a university with this the culture of entrepreneurship is actually set by the state itself when the state Acts as an entrepreneur.

So, there is an entrepreneurial state. And we have some research done on that there is a book called the entrepreneurial state debunking public versus private sector myths, this is a book written by professor Mariana Mazzucato, who is a faculty in the university college London. She has also recently written another book called the value of everything making and taking in the global economy, which is been shortlisted and which has won various awards last year.

Now, the theme of professor Mariana Mazzucatos research is that the state itself is an entrepreneurial state and the state predominantly does this function without many office realizing it. So, every time the state undertakes a risky activity, wherein it could suffer

losses and it could also make gains the state is actually getting into or discharging its entrepreneurial function.

Now, when the state has a budget for scientific research and that budget is given to various universities asking them to do research and then telling these universities or incentivizing these universities to file patterns. The state is actually becoming an entrepreneur, the state is giving them funds to do research and what could come out of this the state is allowing the universities to commercialize them and to share it with the industry. So, this function what we called an entrepreneurial function of the university, actually came out from the entrepreneurial function of the state itself.

So, the entrepreneurial state must create long term growths strategies which is a part of the entrepreneurial function and it should also embrace failures. So, giving fund for research it need not in all cases result in commercially viable technology. So, the state understands that and that is where the risk is involved. So, the state by its funding takes the risk that they could be nothing that comes out of this, but at the same time the state sets the culture of embracing failure.

So, when the state invests and takes the risk, the state professor Marianna argues the state should also be able to receive the profits back. Now, she gives an instance of many of the technology is used in an iPhone where developed by the government of the United States, right from the touch screen to various the use of the internet to various other technologies and she argues that though apple as a company was able to make supranormal profits. There is not much that is gone back to the state to as a rate in recognition of the technologies on which apple was able to build a world class best selling product.

So, she argues that there has to be some profit has to come back, now this is something universities can also look at. Now, what happens to the profit that is going to be made by commercializing research, is there a component that is going back to the state or is it coming back to the university for further research or is it being shared with the researchers and the professors who came up with the technology, so that is the that is something that the IP policy will dictate of a university.

And secondly, to cover the loss it incurs when it failed. So, this is required the in every successful project or in every successful commercialization of research if there is a

contribution that is made back to the state, then the state will be able to cover its losses whenever some of its endeavors fail. So, it kinds of subsidizes the it is like the successful technology subsidizing the ones that do not become successful.

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If you see the functions of the state, there are clear risk reward relationships. So, apart from when the state discharges its entrepreneurial function apart from earning revenue it also tends to get support from the public, because the state is now making the lives of the people better, because every time the university technology is commercialized and it reaches the market, then that also sends a good signal to the market and it gets support from the public.

Now, traditionally the state is seen as a minimal state. They say that you know the state will not interfere in the markets, the market should self regulate themselves and only in extreme cases where there is a market failure will the state interfere. Now, the state can apart from being a funder or giving the fund for basic research, the state could also regulate the different roles of different creators in the entrepreneurial set up.

For instance, the policy that it has on SME's or on startups and the policies it has on venture capitalist or the policies the state has on universities and the entrepreneurial activity there, these can also play a role on how innovation happens in a country. And this is again a part of the entrepreneurial function of the state.

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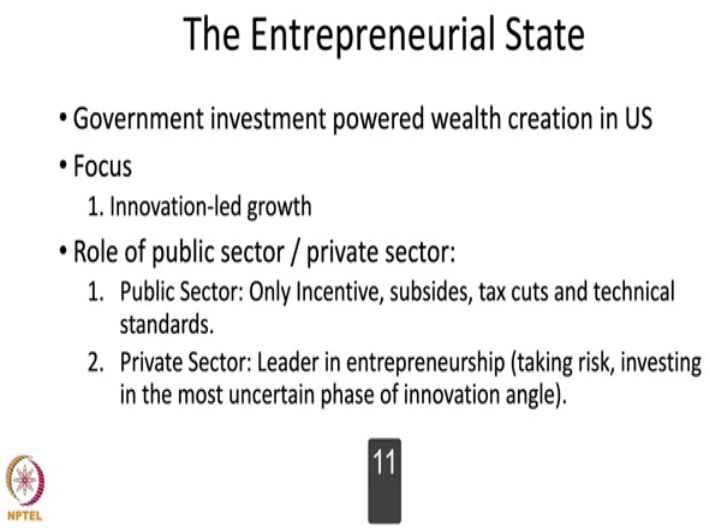

Now, the government investment powered wealth creation in the US and we had seen that how investment in basic research was seen as something that contributes to the US becoming an staying a superpower. Now, the focus of the entrepreneurial activity of the state should be on innovation led growth.

So, when the state is investing in basic research or the state is investing in education. It is actually making an investment into technological growth or innovation led growth and the state can actually now see that the public sector has a role that is different and distinct from the private sector. The public sector incentivizes entrepreneurship and innovation through subsides, tax cuts and setting technical standards, but it also pushes a research in publicly funded institutions by giving funds for research. Whereas, the private sector is seen as a leader in entrepreneurship, because of their taking risk and investing in the a investing in technologies, when they are at an uncertain stage of innovation.

So, these function the function the entrepreneurial function of the market is something that is done by the private sector on a case to case basis assessing the risk. And they will be industries or technologies with the private sector will not even want to venture into, so that is where the states push can be critical. Now, this kind of tells us the current research that is coming out on the entrepreneurial function of the state tells us that there has to be a much stronger and substantial investment into research, into basic research and basic education by the state.

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Only if that investment is made will universities be doing research and quality research of by which they could be new knowledge that comes out of that research, which could be protected by intellectual property rights.

So, a prerequisite for setting up an IP centre and the university becoming an entrepreneurial university is that the state should look at its function as an entrepreneurial state. And the state should facilitate various things coming together, now the US is a classic case of an entrepreneurial state facilitating various technologies to come up and also helping these technologies to diffuse. So, when they came up with the Act, they allowed university technology to be diffused into and taken up by the industry.

So, if the university engages in research and the research and the products of the research can be protected by IP, then the university requires an IP centre. Now, the role of the IP centre is that it partners with the industry, the IP centre becomes a nodal point where the university can have partnerships with the industry and this works in two ways.

One it attracts the university or what we call the pull mechanism by which the university the industry wants to come and set up a joint ventures in the university and work with the university. It also acts by way of the push mechanism, where the university approaches various industry players to see that whether they will be interested in the work that is happening. So, whenever a pattern this file if the industry is informed about a technology

developed by the university, then that is a instance of a push mechanism there is a pattern filed. And the pattern is offered to the university on for on licensing terms.

And the pull mechanism is when the university has a particular centre for doing a particular or shows excellence in a particular field of technology, then it automatically attracts industry players to come and team up with the university. So, this even before the IP centre came into the picture was done through consultancy. And we had centres for consultancy in the major universities in and higher technical institutions in India.

Now, this could also happen by showcasing research and the technology that has come out of the university. So, the role of the IP centre largely covers managing intellectual property, intellectual property that comes out of the university what we called at the IP by the academia.

Now, this managing IP involves multiple functions. For instance, you need to identify the IP, they could be intellectual property in research thesis's, they could be in some project in a university, they could be potential IP even in papers that are published. So, identifying is something that the IP centre needs to do, then the IP centre needs to screen the IP, look at the intellectual property, what kind of protection is required for it, whether it can be protected, what is the best way to do it.

Then after screening, it needs to protect the IP itself, because most intellectual property rights require registration, so that needs the IP centre needs to contact a third party service provider and take the process of registration forward. And finally, the IP centre also needs to maintain the IP, once IP is registered and it is granted, it comes for renewal, there is they could be enforcement issues with it and licensing and transfer of technology issues as well.

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Now, incubating startup is also a function that could come out of the entrepreneurial function of the university. And we saw that just by setting the IP centre IP centre, the university we will now be interacting with the industry and in cases where; in cases where an invention has to be licensed, then that will be done through the IP centre.

Now, in cases where the invention is not licensed to an industry rather there are group of people probably a team of professors and researchers, who now want to set up their own company and then take it to the market. Now, there are various technologies way incubating startups makes much more sense, especially in biotechnology and if you see the pattern in biotechnology, we have been seeing smaller firms developing new technologies and later on bigger firms acquiring them and taking the product to the market. So, where the big investment comes that is the point at which the bigger pharmaceutical firms will come and take over or merge or acquire a smaller company.

So, in certain fields of technology incubating startups could be much preferred way than licensing the technology to the industry. So, yes some universities have E-cells, where they council entrepreneurs, so that could be a place where such activity can start and the counseling pertains to aspects of business and as well as legal aspects, because to setting up a startup involves a business advice without doubt, but it also involves quite a lot of legal and compliance and regulatory issues as well.

So, when a university incubates a startup, it owns the IP in the startup that is one way to do it or the university will own equity stakes in the startup. You in bigger universities, they could also be incubation cell and they could also be research park like the Indian Institute of Technology, Madras has a research park which helps companies to set up an incubate as well.