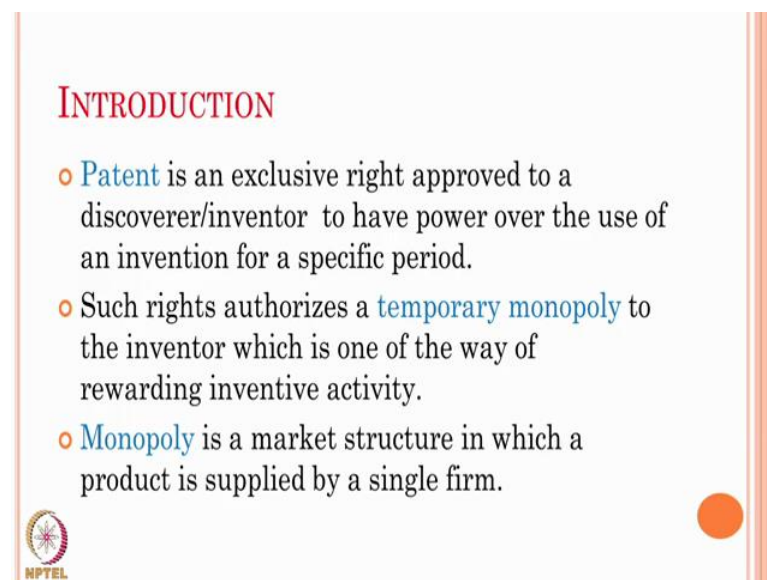


Economics of IPR
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Module - 02
Lecture - 02
Economics of patent


Let me begin the lecture on Economics of Patent as a part of my second lecture on economics of IPR, let me begin this lecture on Economics of patent. So, this lecture is going to discuss various economic trades is involved in patent.

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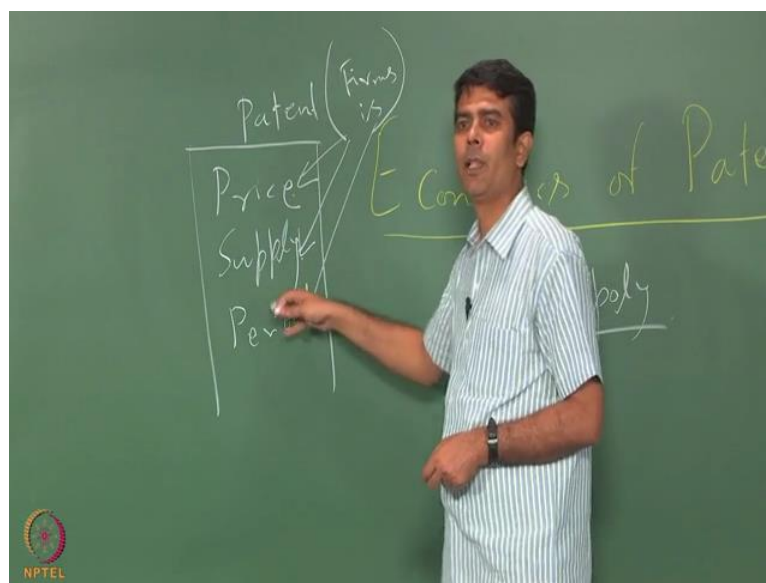
INTRODUCTION

- **Patent** is an exclusive right approved to a discoverer/inventor to have power over the use of an invention for a specific period.
- Such rights authorizes a **temporary monopoly** to the inventor which is one of the way of rewarding inventive activity.
- **Monopoly** is a market structure in which a product is supplied by a single firm.



To begin with when we say patent what comes in our mind basically, patent is an exclusive right approved to an invention to have power over the use of an invention for a specific period. Such rights are basically authorizing a temporary monopoly to the inventor which is one of the ways to rewarding inventive activity. So the point is a patent is providing you a monopoly power.

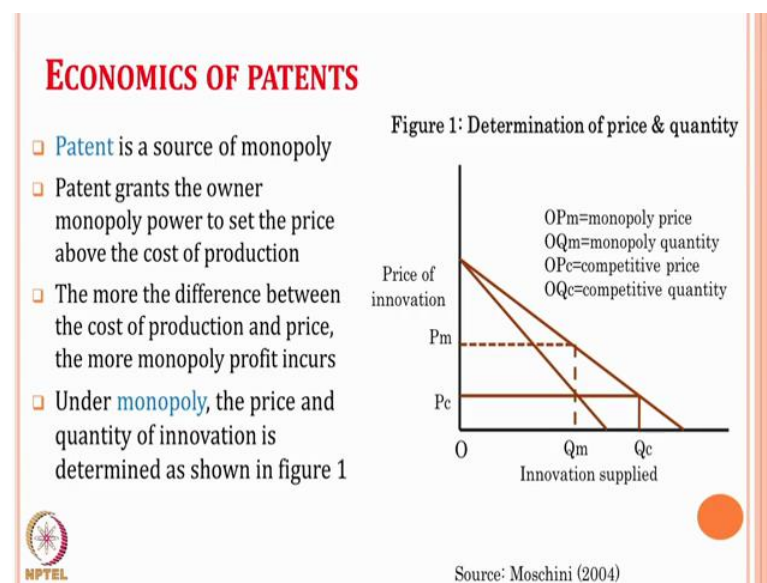
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So, what is basically Monopoly in Economics? So, mono means single and poly means market. Single market, when we have a single market for an inventor due to in exclusive rights approved by some of authority in a country that is the patent because those exclusive guides are basically on the discovery or invention by some individual and that right is valid for some specific years. So, monopoly is a market structure in which a product supplied by a single firm. Single firm is having the capacity to supply the product for the entire world and if the world is inter connected, inter dependent it means that a firm is able to supply the product from domestic market to the international market.

So, through patent, through patent rights which are very important and exclusive rights in today a firm is having the capacity to supply the product, to own the product, to hold the entire power of distribution of their product and price determination of that product, for many years. So, one important point is the price, the second important point is the supply, third important point is the period. So, through patent, through patent a firm is able to control the price a firm is not only able to control the price, but having the monopoly to control the price, a firm is having the monopoly to control the supply and firm is having the monopoly to have these 2 price and supply for a specific period and that specific period in years.

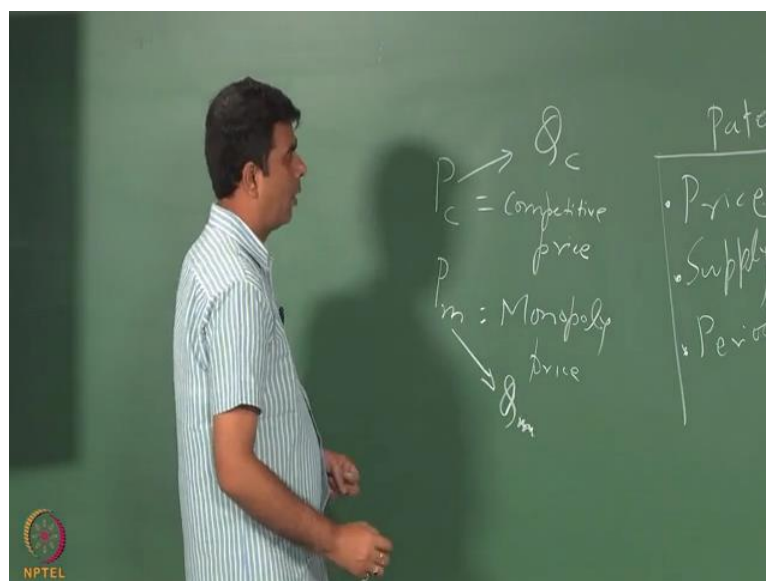
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So, patent is a really a source of monopoly with these this points. Point number one that is price point number two that is supply point number three that is period. So, with all those points as we find that a patent owner or a firm which have the patent is having the monopoly on the price and not only the price, but also on the supply of the product whether the firm is able to supply the product in a particular economy or not that the season will be taken by the patent owner. And whether the firm will allow someone to reproduce the product through a license or not that will be again a subject matter for the patent owner.

So, the more the difference between the costs of production price the more monopoly profit incurs. So, we have seen that there are 2 types of price in the market. So, if we say that the price like if we say that - price which is P_c the competitive price or if you say the price which is P_m which is the monopoly price.

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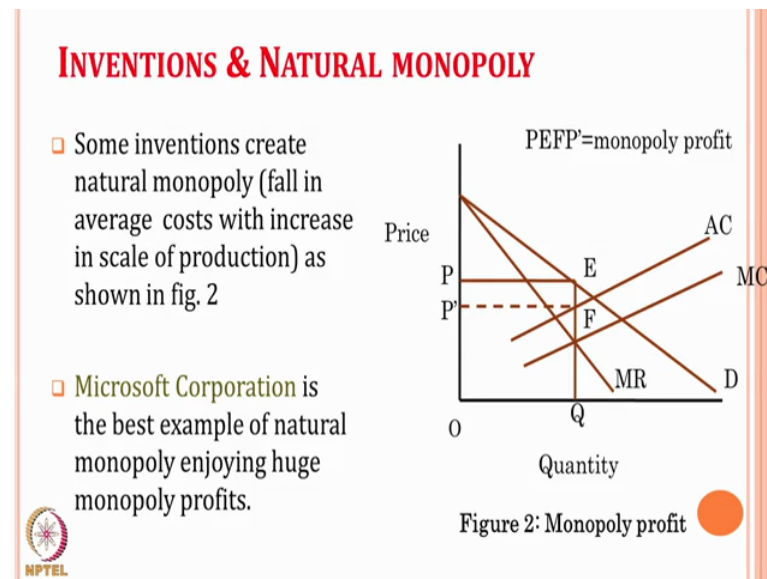
If a owner is having the patent right, if a owner is having patents rights the owner is authorized to charge or you can say automatically a owner is having authority to have the price which will not be the competitive price, but it will be a monopoly price. So, what is the difference between these 2 price if we can see here, when if a person or a firm is charging the P_m that is the monopoly price a price for the innovation, that in this diagram you see here that the P_m is little higher price than the P_c which is the competitive price because when it is competition large number of firm are ready to supply the innovative product and we are finding that in that case we have a different quantity supplied.

So, when you have P_c you have Q_c the quantity competitive quantity product are supplied, but when you have P_m you have a different quantity that is Q_m that is the monopolist quantity. So, this Q_m the Q_m is always less in the quantity compare to. So, this Q_m is less compare to Q_c because this particular quantity is the quantity supplied by the competitive firm where the Q_m is the quantity supplied by the monopolistic firm.

So, on higher price, on higher price it is not only the price which is high, but it is also one of the controlled quantity which is Q_m which is supplied by the monopolist in market. So, there are two demands curves shown in the this diagram where we are finding that in one demand curve we have this particular Q_m quantity supplied or while we have another demand curve on which the Q_c quantity supplied and 2 different

quantity is shown here and it shows that the higher price is not only the merit or you can say the condition of the monopoly, but also the lower quantity supplied is seen in the case of monopoly. So, under monopoly, the price and quantity of innovation is determined as shown in figure 1 because, both these Price and Quantity is a different feature which is not available in other market.

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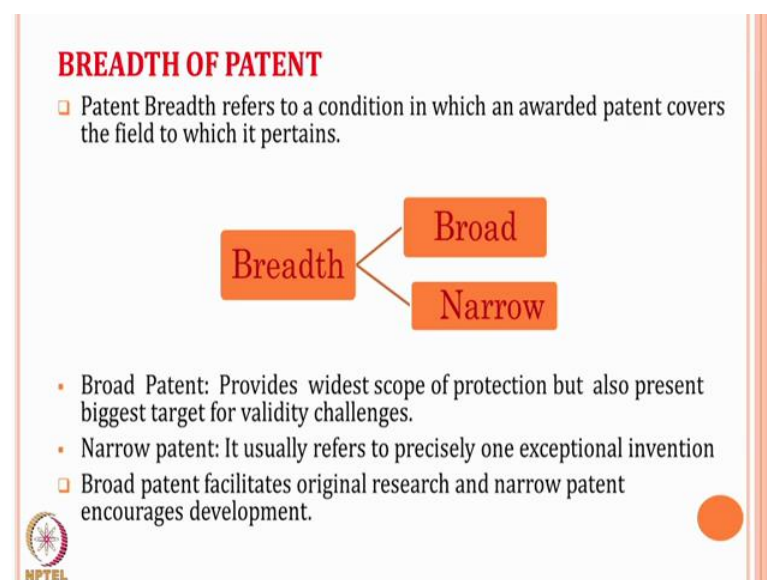


So, some Inventions create Naturally Monopoly is a condition which is the fall in the average cost with increase in the scale of production. So, once you have the patent rights when we have you become the owner of the patented product or you are owner of the patented items you do not have again go back for researching on that particular product you have a cost incurred, but you do not to have to incur the again the similar cost in the production you might be having some variable cost in the process of production.

But ultimately your cost of production fall dramatically, but you have the chance to increase in the scale of production as one can find here in the figure 2 that on a higher price you have the similar quantity produced, but that price is the price which is shown here as the P is higher than the P1 and P1 is the price where the average cost is also matched; this was the price P1 where you are equal to the average cost of the product, but we are finding a price which is P higher than the P1, higher than the P1 and this particular price is P1 is the price above the average cost.

So, we find here that a monopolistic is not really considering the price which will be when the equal to the A C and higher than the marginal cost, but in a monopolistic deciding a price which is much higher than in the average cost price. So, Microsoft Corporation is the best example of natural monopoly enjoying huge monopoly profits because, once a software is patented you have the entire world to sell that is software, you have a larger scale of production going on, but you are not really having a more cost added in the production your cost average cost is going to decline, but ultimately you are not really deciding your price equal to the average cost, but your charging the customer more higher price compare to the average cost.

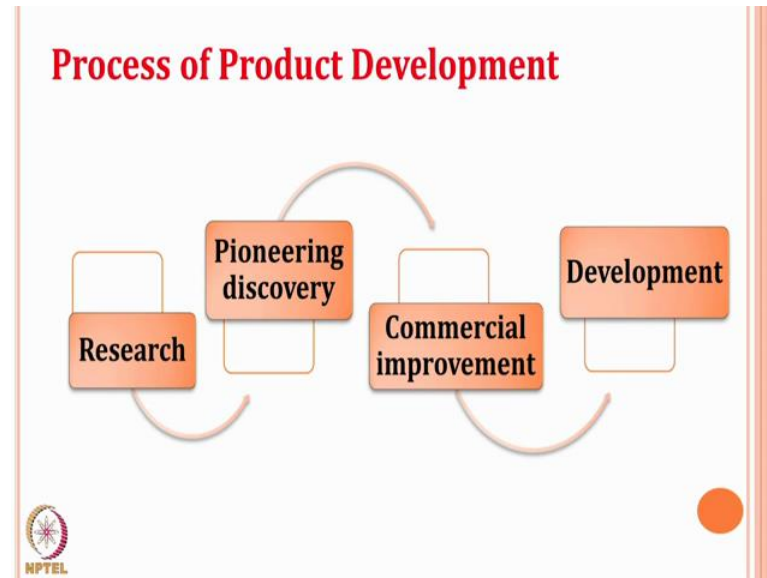
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So, it is case of natural monopoly like copyright we also find that patent has also narrow and broad division and Breadth of patent refers to a condition in which an awarded patent covers the field to which it pertains. Broad patent: are the patents which provide widest scope of production, but also present biggest target for validity challenges. When patent is broad in nature it means that you are patenting not only a small composition, but you are patenting the entire process you are patenting all the compositions and the a steps involved in reaching to a final product, but you have a large chance for validating the truth it may be challenged, but the Narrow patent: Is usually refers to the precisely one exceptional invention a very small composition which you have involved based on the previous work done by another inventor, you have added a small change in that and now you are having the patent on that that comes under the Narrow patent System.

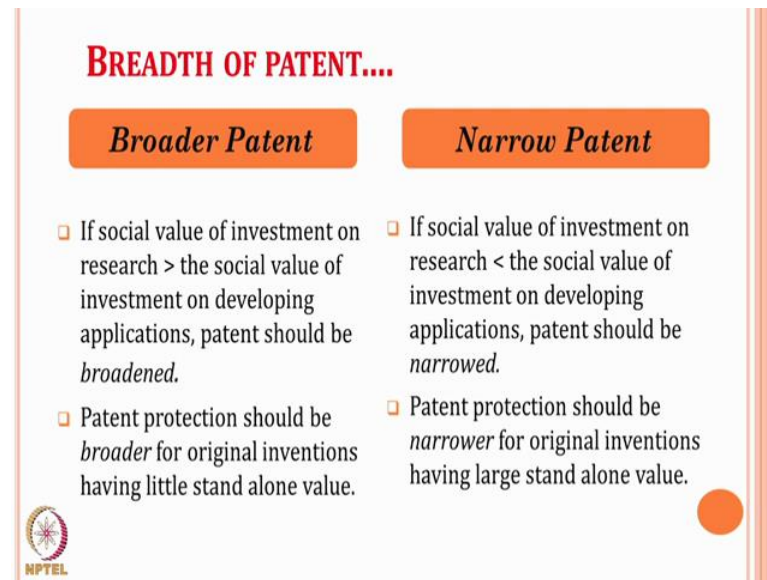
So, Broad patent facilitates original research, but the narrow patent encourages development. So, that is the difference between the Broad and Narrow patent.

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Process of Product Development is involving different steps 1 of the step is the Research, then the Pioneering the discovery, Commercial improvement and then the final Development. Because, this process involves huge investment and the level of Research, and the level of Pioneering the discovery for the Commercial improvement, a final Develop product cannot be out without these steps. So, it is important that those who are investing in patents or who wants to really hold the patent of ownership they wants to enjoy the benefit of that patent rights for long as because they do not compromise with cost involved in patenting those and once they are having the patent ownership they are free to really monopolize the market because patent provides them the monopoly rights.

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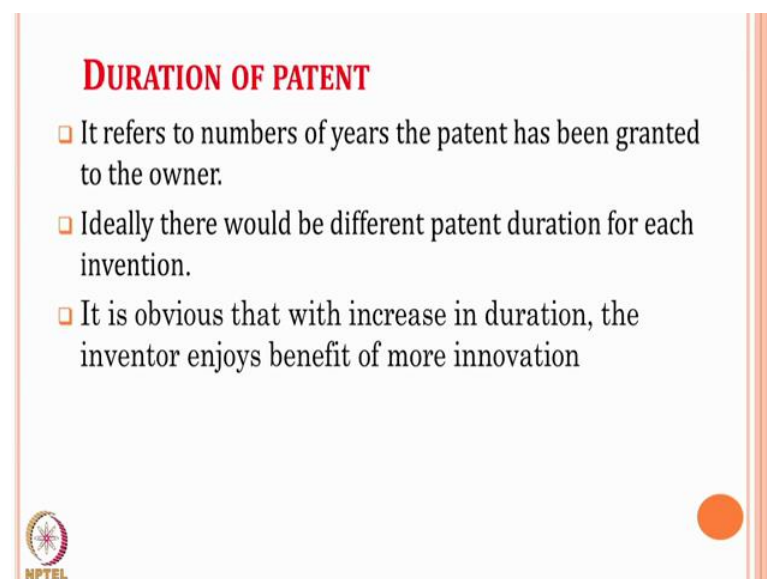
BREADTH OF PATENT....

Broader Patent	Narrow Patent
<ul style="list-style-type: none">❑ If social value of investment on research > the social value of investment on developing applications, patent should be <i>broadened</i>.❑ Patent protection should be <i>broad</i>er for original inventions having little stand alone value.	<ul style="list-style-type: none">❑ If social value of investment on research < the social value of investment on developing applications, patent should be <i>narrowed</i>.❑ Patent protection should be <i>narrow</i>er for original inventions having large stand alone value.

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So, Broad patent: If social value of investment on research is higher than the social value of investment on developing applications, patent should be broadened. Patent protection should be broader for original inventions having little stand alone value. If social value of investment less than the social value of investment on developing applications patent should be narrowed, patent protection should be narrower for original inventions having large stand alone value.

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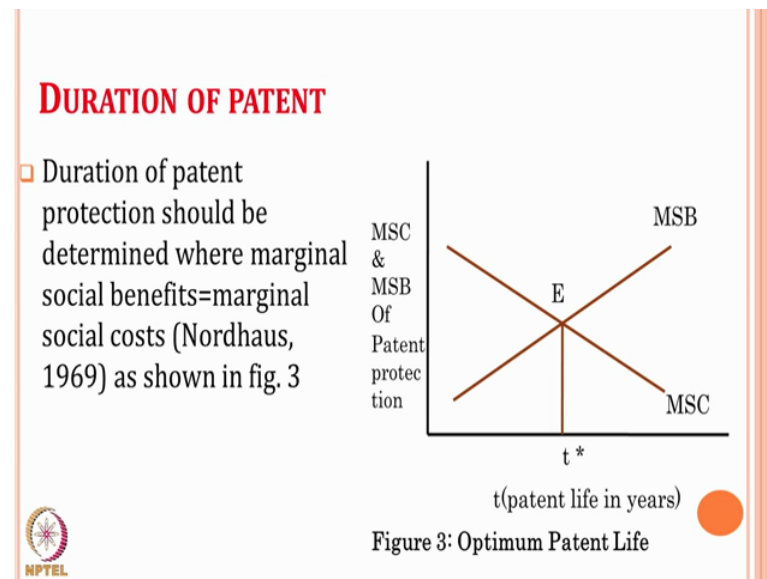
DURATION OF PATENT

- ❑ It refers to numbers of years the patent has been granted to the owner.
- ❑ Ideally there would be different patent duration for each invention.
- ❑ It is obvious that with increase in duration, the inventor enjoys benefit of more innovation

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So, Duration of patent: It refers to number of years the patent has been granted to the owner. Ideally there would be different patent duration for each invention. It is obvious that with increase in duration the inventor enjoys benefit of more innovation. So, if you have longer duration period the patent owner is having more time to enjoy the monopoly rights.


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So, this particular diagram shows that marginal social cost and marginal social benefits of patent protection and the duration of the patent. So, if we have larger years of duration of the patent we are finding here that mode you have larger years of patent, less you have marginal social cost involved, but when you have larger years you have marginal social benefits involved. But there will be a point of equilibrium where you have to have a equilibrium in the society because duration of the patents should not only should not only favor the firms, but it should also favored the society as whole.


So, there will be optimum patent life and the new patent act in India and in other countries based on the TRIPS agreement, provides in an opportunity to really enjoy the benefit of patented product for certain years and why it is so because the investor and firm who has the patent ownership they must enjoy the benefit of investing in the patented items.

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ECONOMICS OF PATENT....


- Patent rights deal with information related to inventions, innovations and technological improvement.
- Public goods characteristics of information like non excludability and non rivalry leads to under supply of inventions or less than optimum level of invention which refers to market failure.



So, the patent rights basically deal with information related to inventions, innovations and technological improvement. The patent is having certain features of public goods those features are non excludability and non-rivalry which leads to the under supply of inventions or less than optimum level of invention which refers to the market failure.

If I having the patent rights others are a patent rights cannot be excluded in different parts and in terms of consumption if I am really having the a patent rights those rights are a non-rivalry in nature because others cannot clear claim on my anybodies patented or patent ownership because that is the soul ownership, but the point is, everybody do not want to invest because it requires long period of time for the investment and getting patent rights is not really easy because you have to have a long waiting time for patent awarded, but you are not sure that whether the time and investment in terms of money is going to really give you back the return or not and even if it is patented whether the your product will have the market value or not.

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ECONOMICS OF PATENT....

- **Economics of innovation:**
 - Patent protects and stimulates innovations and inventions.
 - A. by giving return on the innovator's investment,
 - B. by disclosing knowledge and information.

It can be shown with the help of fig. 4.1

- **Patent impedes innovation :**
 - A. by restricting use of knowledge,
 - B. by generating monopoly power,
 - C. by imposing short run costs,
 - D. by creating difficulties in the determination of boundaries

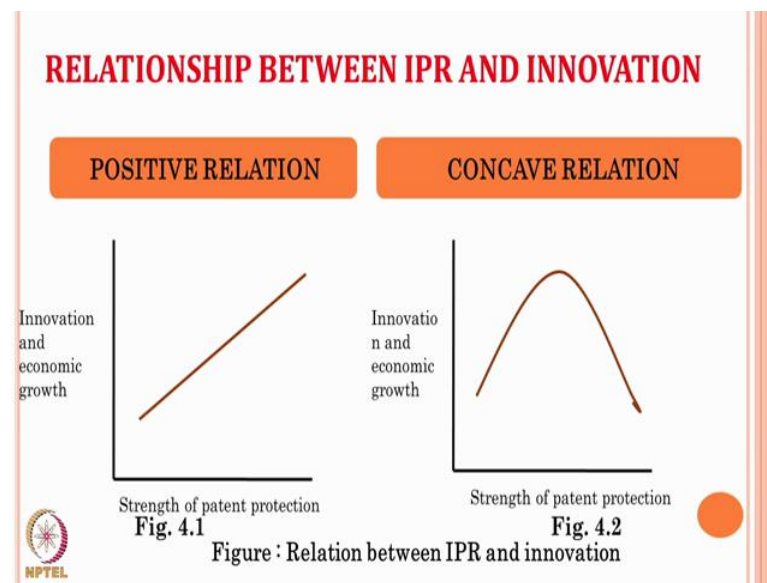
Thus patent may possibly discourage innovations and therefore reducing knowledge spillovers as shown in fig. 4.2



So, such sense of insecurity and such sense of uncertainty is involved in the entire process of patenting, but the fact is that patent protection stimulates the innovation and inventions by giving return on the innovators investment by disclosing knowledge and information because in case of patent you have to have disclosing information before getting the patent rights that whatever formula, whatever composition, whatever steps you have to take that has to be explained.

So, patent basically impedes the restricting the use of knowledge because if one has the patent rights it will not be, it is not going to allow others to really go for the single product or for the same product using the same composition and same formula because you have to have the right to judge to continue with your power monopoly power on that particular product. By creating difficulties in determination of boundaries and you have strict rules you are not allowing everybody to really make any other product out of your contribution out of your research. So, patent may possibly discourage innovations and therefore, reducing knowledge spillovers as shown in figure 4.2.

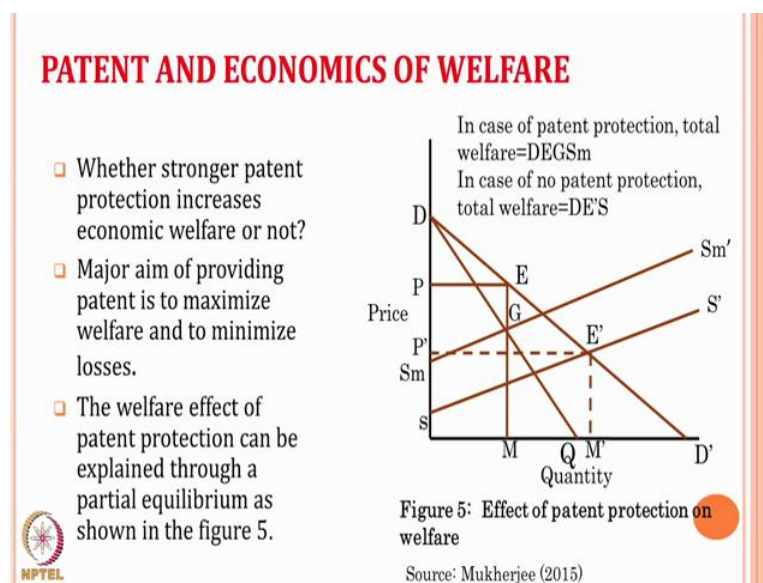
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And 4.1 is providing us the information, providing us the idea that innovation and economic growth and strength of patent protection is positively related, while in case of in case of second diagram you are finding that more you have the strength of patent protection innovations are not going to really have always the positive relation, but it is going to have negative relation.

So, there are 2 different opinion one gives us the Positive Relationship, the idea of positive relationship between IPR in innovation and second figure gives us the idea that it did not going to always have the Positive Relationship it as to have again the negative of or inverse relationship after the certain point of time.

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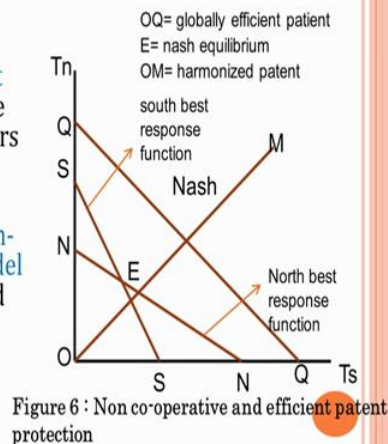
So, there are 2 different uses. One supposes the positive of which one supposes that it is going to really have a very negative result of a strong patenting system. So, whether strong patent protection increases economic welfare or not, the major aim of providing patent is to maximize welfare and to minimize losses.

So, the welfare effect of patent protection can be explained through a partial equilibrium as shown in figure 5 here. In case of patent protection, total welfare is shown as $DEGSm$, but in case of non-patent protection, the social welfare total welfare is equal to $DE'S$. So, it shows that both conditions are not equal and it is up to the strong sense of patent protection that how much welfare you want to really provide it back to the society.

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PATENT PROTECTION AND INTERNATIONAL TRADE

- ❑ In an open economy, the determination of efficient patent protection is not simple because one country's policy affects others (cross border externalities).
- ❑ Grossman & Lai (2002) studied efficient patent protection in non-cooperative regime through model of Nash equilibrium as explained in the figure 6.

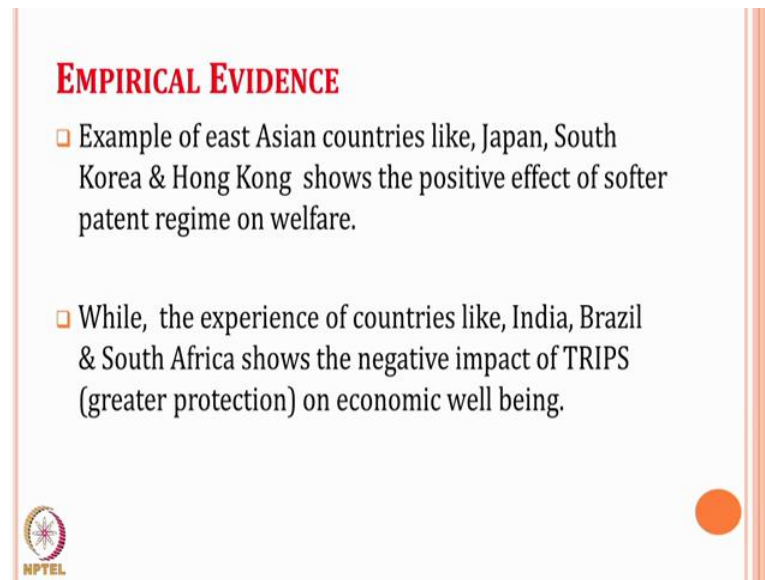


In terms of International Trade and patent Protection one of the diagram figure 6 which shows that there are two types of locus of efficient prospect formatting the efficient protection system is available by the north and south and in this diagram we find that O Q is the globally efficient patent where E is the Nash equilibrium condition where as we have two different curves intersecting - one is the patent, efficient patent system evolved by the south and one is the efficient patent system evolved by the north indicated by N N and S S.

So, this shows that there is not any corporation between the south and north because in an open economy the determination of efficient patent protection is not simple because one countries policy affects others and cross border externalities are available today. So, Grossman and Lai studied efficient patent protection in non cooperative regime through model of Nash equilibrium as explained in the figure 6 that northern and south is not really having a similar system of efficient patent system patent protection system.

So, there is a non cooperative game going on and that is not really going to give us a sense of very equal opportunity in the field of international trade related to the patent right.

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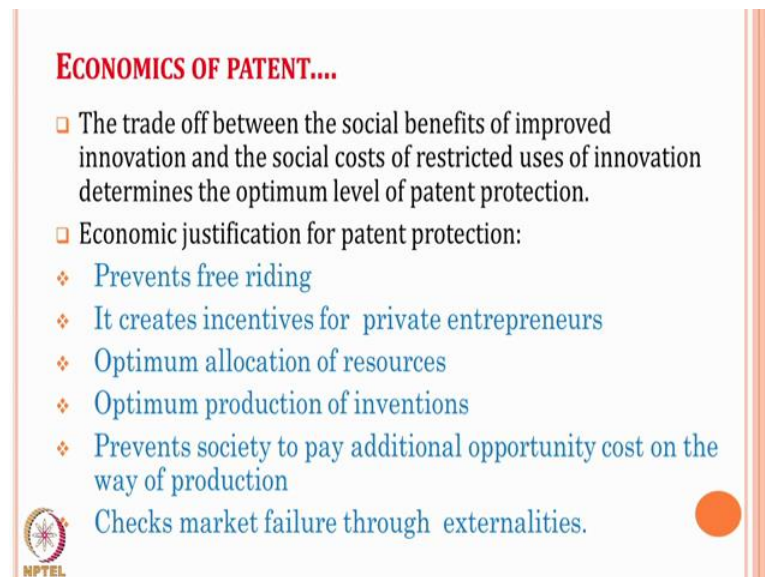
EMPIRICAL EVIDENCE

- Example of east Asian countries like, Japan, South Korea & Hong Kong shows the positive effect of softer patent regime on welfare.
- While, the experience of countries like, India, Brazil & South Africa shows the negative impact of TRIPS (greater protection) on economic well being.

NPTEL

So, Empirical Evidence suggest us that east Asian economies south Korea Hong Kong shows the positive effect of softer patent regime on welfare while the experience of countries like India Brazil and South Africa shows the negative impact on TRIPS on economic well being which is considered as the greater protection of the patent rights.

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ECONOMICS OF PATENT....

- The trade off between the social benefits of improved innovation and the social costs of restricted uses of innovation determines the optimum level of patent protection.
- Economic justification for patent protection:
 - ❖ Prevents free riding
 - ❖ It creates incentives for private entrepreneurs
 - ❖ Optimum allocation of resources
 - ❖ Optimum production of inventions
 - ❖ Prevents society to pay additional opportunity cost on the way of production
- ❖ Checks market failure through externalities.

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The tradeoff between the social benefits of improved innovation and the social cost of restricted huge of innovation determines the optimum level of patent protection. So, like copyright we can also find here the economic justification for patent protection, patent

rights are preventing the free riding problem, it creates incentive for private entrepreneurs, optimum allocation of resources are available if you are providing an incentive to the patent owner.

So, the researcher, the scientist, the investors are going to really allocate their time and resources for the development, for the inventions, optimum production of inventions. If you have enough time for the innovation devoted you are coming out with optimum level of production and since the entire patent system is incentive best. So, once a person is having patent right ownership on a patented item they are able to really have the control on that particular product having the exclusive market rights on that particular product for longer period of time. So, they are really about to monopolize the product for years and years and that is the incentive on the basis of that a society can really have the optimum allocation of resources and the optimum production as an outcome of those resources.

If prevents society to pay additional opportunity cost on the way of production because if you do not have such a strong patent system you have large number of insecurity and uncertainty the investors are losing its opportunity and they are less motivated to invest and certainly it leads to the market value through external it is because those who are not involved in the process of patent ownership and not involved in really paying for that paying for those inventions are really enjoying the benefit of are those materials which is patented, but it is really in the hand of the free rider's. So, free right basically invites the market failure.

So, After explaining these diagrams especially, in most of our diagram if we can just see here that when we have seen in our first diagram that monopolist is not really charging a low price because monopolist is charging a high price and this diagram who have seen that a monopolist profit is equal to $ha P E F P_1 P$ dash and it means that a monopolist profit is much higher from the level of average cost which we have seen in the beginning.


So, if monopolist charging a higher price it means that, that is the price which is not the normal price that is the price which is the abnormal price and through that price and through the control mechanism on the quantity a patent owner is really having a control on both quantity as well as on the price, knowing the fact that there also having a third

factor in their hand and that is the time factor. So, the patent rights the ownership of patent ownership on a product is really giving us a sense of security for sense of maximizing the profit for years and years and that is the one of the incentive and one of the merit of the a patent system especially, when the patent system is product based not based on the process. Because now a days after the TRIPS agreement, the entire patent system is the product based you have to come up with a new product and that as to be patented, the process patent system is not really going to be expected at all we are really investing a lot in the process of getting a new product.

So, in that case when we have to have such incentives and we have to have a broad patent which may be validated and challenged by other owners, other patent experience in that case it is important to really have the very tough competition in getting the patent rights, very challenging conditions to get patent rights, it is so not easy to have the patent rights because it involves the process of Research, Pioneering the discovery improving the product for the Commercial purposes and to launch the product and to develop the product for the market. So, the entire process of product development a huge investment is required. So, in return the monopoly profit gives them an incentive back to them and as we have seen in our another diagram that there will be an equilibrium in market to have the marginal social benefit and marginal social cost for the patent protection and in more diagram we have seen that many economist are in favor of a very positive relationship between innovation and economic growth and the strength of patent protection.


But some of the economist are also making this conclusion finding, this conclusion that it is not going to always give you a positive return on the strength of patent protection because more you have a very strict system of patent protection innovation and investing in the innovation is not going to really have a very good return because investors are (Refer Time: 35:05) depth whether it will be the formula or composition and the content and the steps will be challenged by anyone and then getting patent rights are not so easy.

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CONCLUSION

- ❑ After explaining patent protection from economic point of view, we can say that it is an important tool for innovation and information.
- ❑ The economic value of patent protection is to a large extent based on the economics of monopoly, information, innovation, welfare and trade.



So, in Conclusion we can say here that a patent protection from economic point of view it is important tool for innovation and information so in fact, if patent protection is weak we can simply say that innovation and information is not evolving any tool for the innovation is not so easy because a people will certainly have more inequity in terms of in terms of developing any product. So, economic value of patent protection is to a large extent based on the economics of monopoly, information economics of information because, once you have certain information on a product you are announcing that information in public with lots of strength and merit that this and this contribution is my contribution and you are giving a free hand to anybody to challenge that information.

Once nobody is in the world to challenge that information you are having the monopoly power on the product and then you are the sole authority and you are having the exclusive marketing power to sell the product in the entire world. So, you have a large extent of patent protection is to a large extent based on the economics of monopoly, economics of information, economics of innovation, because you have innovated and you have the entire control on your innovation for many many years.

So, that basically makes you very strong in the market because you have all ready, you have well informed the world that what you have done and based on that validation by the by the cross examining of your data then only you were abiding avoided the patent. So, your innovation is unique and new, and there is a welfare involved, because as

investor I have invested for my own benefit but the Adam Smith invisible hand theory suggest us there are certain invisible hands in that process and society has a whole is getting the benefit of certain such innovations and patent. Moreover you have the economics of trade involve in that because trade related Intellectual Property Rights is the right which makes us, which gives us a very separate, a very independent tool in the world market today to put our product, to establish our product for the global market, because we are more liberalized market today our trading is in very liberalized frame work today. And we have all rights to control the unfair use or infringement of patent rights by any other authorized any other unauthorized users in the world.

So, we will also have a separate discussion on the disputes, current disputes among the countries related to patent copy right trade mark after finishing the economic theory and economic, economics of different types of Intellectual Property Rights. So, based on this conclusion we can say that like copyright patent is also one of the, patents is also one of the important Intellectual Property which involves the monopolistic rights, which involves the economics of monopoly and economics of trade welfare innovation and information.

So, I hope this lecture will give you certain idea that how Economic of patent work today, why there is a war for patent rights, why there is a hurry for the patent rights why world is really working hard for the patent rights because there are certain economic benefits involved in that and that benefits is the benefit of the time, benefits of the price and the benefit of controlling quantity in the world.

Thank you.