Indian Institute of Science
Bangalore

NPTEL

National Programme on
Technology Enhanced Learning

Global Supply Chain Management

Lecture-31
Ecosystem Aware Location Analysis

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In the previous lecture we have looked at location selection problem and various methods of performing, this location selection basically the location selection problem is a very important one for any business it has.

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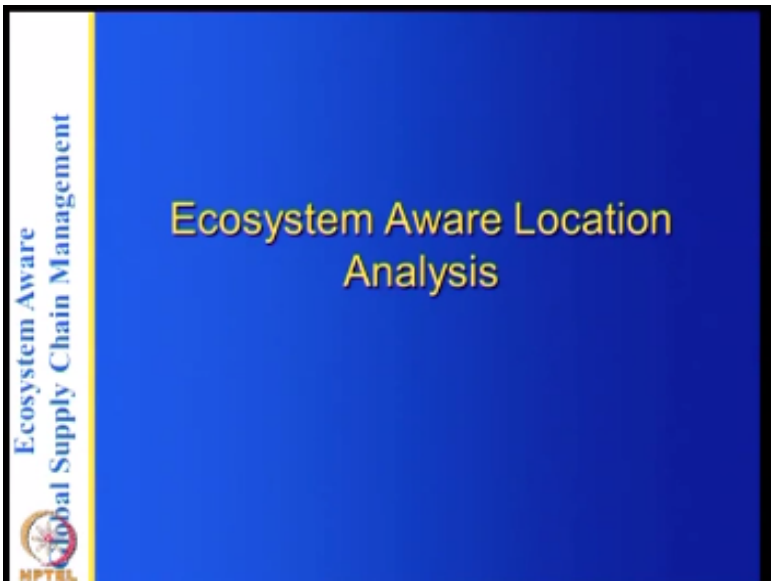

It wants to enter into a country or into a state and it what store starts its business and it wants to sell a select location and in this location need not have to be four factories it can be for warehouses it can be for call centers and so on so the issue as we mentioned before the idea used to be nearer to the markets nearer to the to the suppliers and also you should be economical and ultimately the business should make money ,so what we are going to do now is to look at the ecosystem.

Their location analysis the ecosystem that supply chain ecosystem in our view is the best way or if you use a way of doing the location selection in the previous methodologies, that we have in we have identified this is location dependent in other words their country dependent irrespective of the vertical they may be they directly take into account but not directly so here in this particular case we are going to look at the supply chain ecosystem-based hierarchical structure .

Let us look at what we do it rivals for supply chain competitiveness if you were given a vertical what are the drivers.

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Resources label materials and energy the talent managers, researchers engineers and production workers availability and cost of materials energy and finance and connectivity in structure ports roads and so on and SEZs and clusters so these are basically the resources that are important and the government policies and investments and institutional environment and infrastructure elements so the economic trade financial and tax systems the legal and regulatory framework the investments and manufacturing software and innovation and what is about the government and delivery mechanisms logistics.

And IT b2b logistics players trade facilitation software cause distributions and special economic zones, sensors, cloud ,software for planning and execution and all that so if you look at the drivers of any supply chain competitiveness these are these are also called the investment climate but what we did here is we have said what are the drivers for competitiveness or the so-called parameters investment climate whatever you want to call it their resources government policies on delivery mechanisms now we have subdivided the resources into human resources the materials energy finance and so on and also the information structures clusters and so on.

So that is why we have divided and we have also divided the government policies into economic trade financial and tax systems the legal and regulatory framework and so on and the delivery mechanisms into this so if you buy separate looking at this what you are trying to do is see the ecosystem the supply chain ecosystem which converts , now one thing that is important it depending on the supply chain you have these things are different in other words if you are talking of an auto cluster then they kind of delivery mechanisms that you need are different from if you are considering.

I and gas and vertical or an electronic vertical so for example, if you look at any of these reports of consultants and so on you will have all of some of these factors and they call it

business competitiveness and are various kinds of names that they do now so this is a figure that we always consider.

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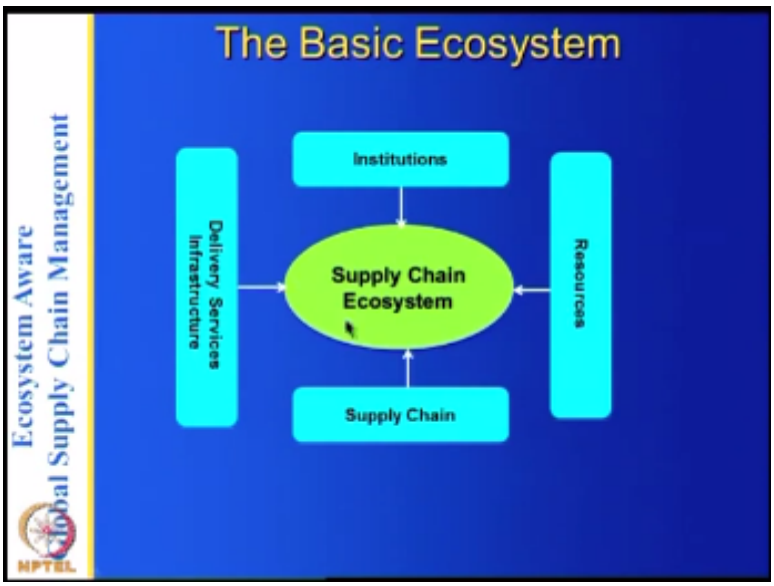

In terms of supply chain ecosystem you have the supply chain resources institutions and delivery mechanisms so in the previous slide we have seen that this also or about the same things that each of this so these three are called the investment climate these are called the investment climate and these are important for these are important for the convolutions of the innovations are also conflict resolution and also for risk propagation, so since they are also propagate the risk you have to be careful to mitigate the risk because the propagators of the risk are the ones that had to be addressed for mitigating the risk.

So this is this is where that the ecosystem framework not only gives a place for location of the place it also gives the risks that are possible possibly the supply chain is going to face or any of the part of the supply chain that it is going to face and how do you want to mitigate that risk it is also possible that you want to innovate using this and how to coil wall with the innovation so in other words whatever part that your supply chain is making, how does that how do you make it successful and what are the convolutions factors.

In terms of resources institutions and other things that are needed well make many you are making the product particular product if you are making a product like which is a cheap computer or a tablet and so on if you want to import it or if you want to send it to other states what are the kinds of government regulations that are needed to be this one and what how do you deal with those kind of things and so on. So it becomes very important that you look at all these factors not only from the location perspective but from the perspective of innovation possible innovation.

Because nothing is constant everything is changing their disruptive technology is coming out every day and in all the verticals so in the presence of that when your location it should be possible to look at not only the location advantages of today but also of tomorrow's innovations I also possible ways you know whether the rest if you are location at the if we are locating at a place is it a natural disaster place is it a place where there are quick's is it a place where there could be thunderstorms which will disrupt the delivery or is it a place where there are frequent level strikes.

So you should look at all this and try to mitigate them or be prepared risk where this so that is what the ecosystem framework gives you this so it is not just a static problem of location selection it includes the dynamics of tomorrow's innovations and also mitigating the risks that the system may face from whatever source ,so this is the thing you have got a business value chain.

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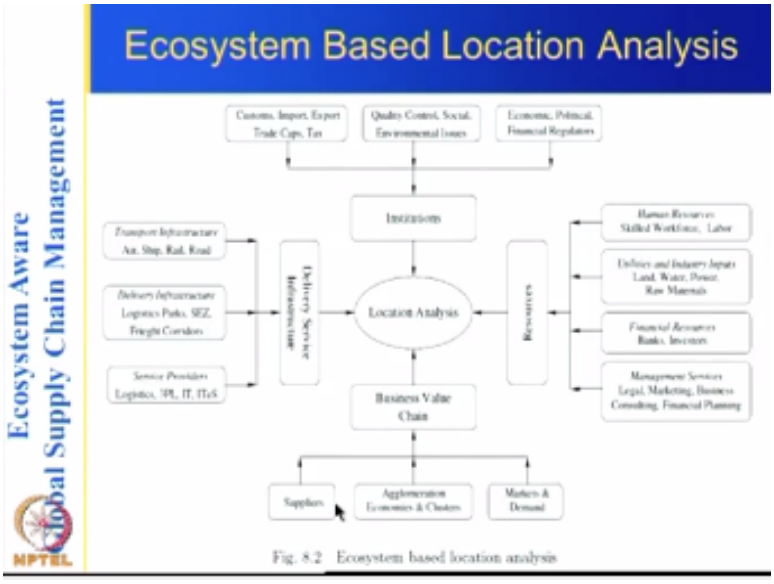

Fig. 8.2 Ecosystem based location analysis

Which are the suppliers agglomeration economies clusters markets and demands and so on and you have few resources utilities financial resources and management services these are the kinds of resources that that you require and you also have the delivery like transport infrastructure delivery infrastructure logistics power service providers these are all the people that are needed for this and institutions, so the issue here is that once you have you try to locate yourself what is needed is in the business value chain you are looking at your suppliers market demand agglomeration of business clusters.

These become an important factor in selecting this of course it is possible that you could put them under resources the industry clusters are also under resources so whatever it is it is important to consider this particular factors.

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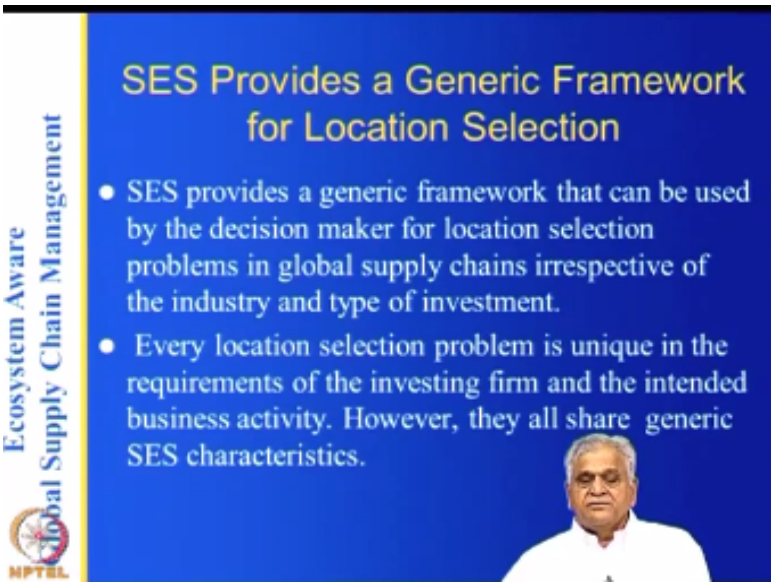

SES provides a genetic framework for location selection provides a generic framework that can be used by the decision maker for location selection problem in global supply chains irrespective of the industry and the type of investments you know the parameters that we select whether this is a generic framework if you are talking of auto you choose the corresponding talent your corresponding financial requirements, the corresponding delivery mechanisms, the corresponding rules ,and regulations and so on.

So that it is like filling the blanks within this is the kind of framework that these are all the issues that you need to address and depending on the kind of vertical you are talking or the industry you are talking then you can fill in those particular blacks and if education problem is unique in the requirements of the investing form and the intended business activity however they all share the SES characteristics.

In other words if you are talking of any investment any business location that it is unique when itself because once you make an investment and start enter a business in one place it is very difficult to change but you can always change it but at a terminus amount of loss so what we have here is the a kind of framework that basically a generic framework with the supply chain ecosystem parameters. Which are the resources in institutions and delivery mechanisms once you select the corresponding vertical based parameters for all these three then you can determine the location its effectiveness.

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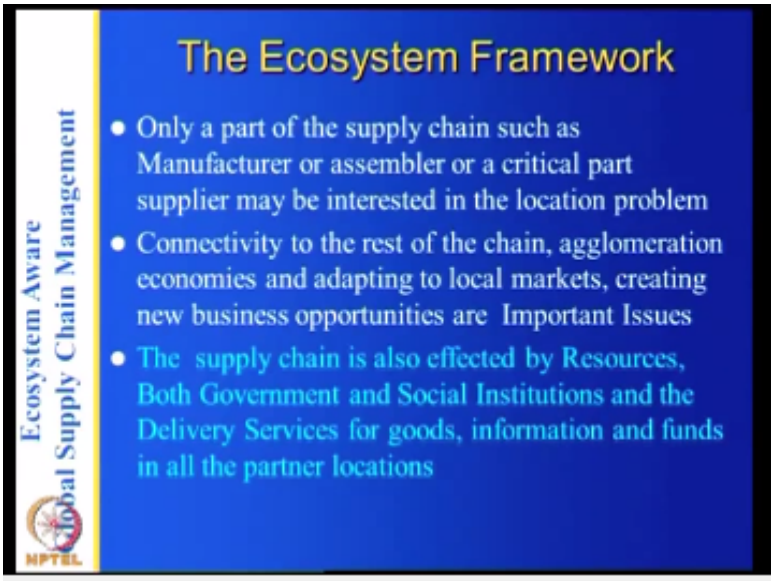

So what is the framework here only a part of the supply chains such as a manufacturer assembler or a critical part supplier may be interested in the location problem ,when it is seldom that the entire supply chain is located at one place as we said always that the supply chain is global various parts of the supply chain is located in various parts so if you are a manufacturer you wanted to look at yourself in China or India or something or you are a contract manufacturer you are looking for a location then you need connections with other players in other words you need to connect with connect yourself with the supply or somewhere maybe in some other country and the logistics providers.

In both in this country and other country and also with the upstream people like the dealers or the retailers and so on so connected to the rest of the trail connectivity to the rest of the chain what backwards and forwards agglomeration economies and adopting you local markets creating new business opportunities are important issues so we do not do this one that you are doing you should have a generation of economies you should be within a cluster so that you minimize the cost associated with that part of the supply chain that you are interested.

In that location also you should have both the connectivity for goods transfer for information transfer and for fun transfer funds transfer with your other partners of the supply chain both upstream and downstream and the supply is also affected by resources both garments it is also institutions and the delivery services for goods information and funds in all partner locations.

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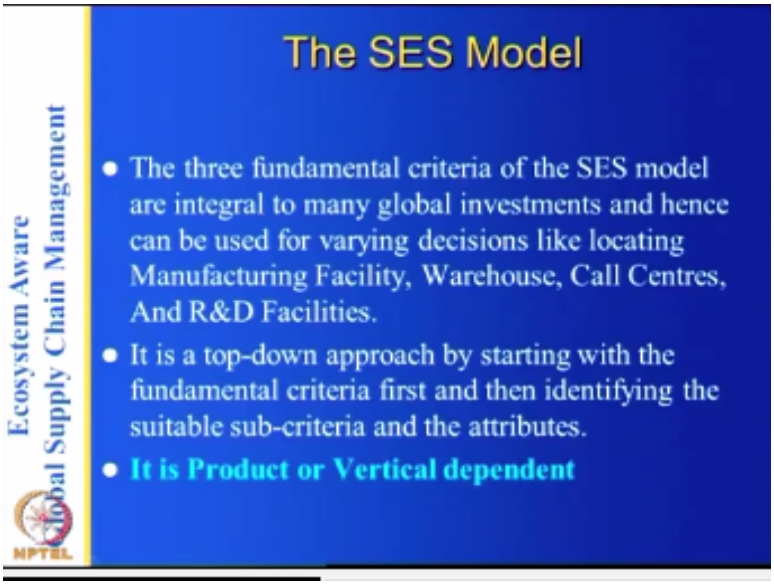

So what is the SES model the three fundamental criteria for SES for our integral to many global investments and hence can be used for marrying decisions like locating manufacturing facility warehouses call centers or and R&D facilities it is top-down approach by starting with the fundamental criteria first then identifying suitable sub criterion attributes direct or vertical dependent so basically this is the point in SES model this product or vertically dependent.

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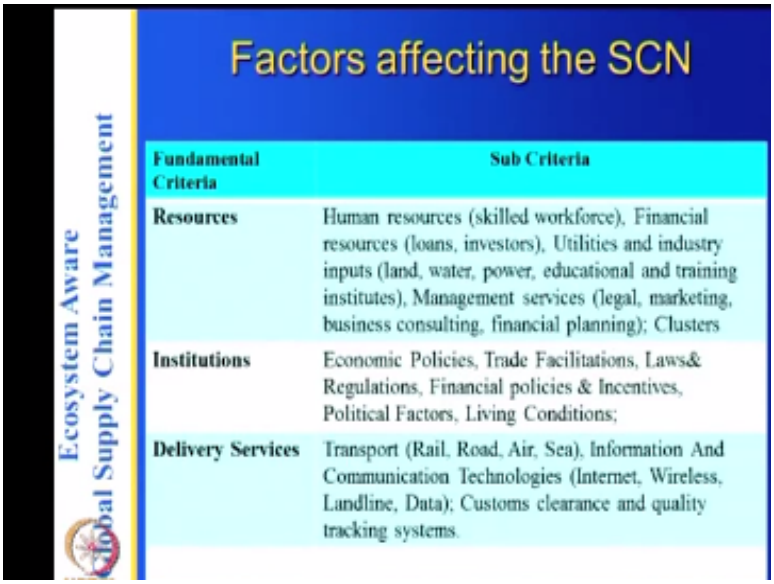

So let us look at what are the factory is not affecting this one so you can see in terms of the resources the fundamental criteria or the resources the institutions and delivery mechanisms these are called the fundamental criteria and the sub criteria within the fundamental criteria or human resources, financial resources, utilities ,management resources and clusters now if you

are giving an signing scores to each of them if you want to source as financial resources utilities and so on then depending on supposing you have a place A and in that place.

You give scores to all this and then you can get the resources score for A and if you take a press B then this course could be different it may not have the power it may not have the university's it may not have the human resources that are English-speaking or whatever so depending on that what happens is this course for the various places in terms of resources is going to be different and similarly institutions the economic policies for example, somebody some other countries have low income tax capital corporate taxes and some of the reports.

In some countries have very good trade facilitation now for example ,it takes only eight hours to try to transfer Data for trade cash or goods in Singapore whereas it may take eight days in some other places so the laws and regulations are different financial processes are different political factors are different and living conditions are different so if you have if you are now taking A and B for you give scores for each of them these are all sub criteria you give scores for each of them and have a way of combining all these scores into a scores for institutions so for a you have A score for B you have a score.

Which is an added up of this in a some fresh and similarly for the delivery services you have transport information communication technologies customs clearance and quality drinking systems so similarly for A and B you can give scores for each of this and you can combine them and basically say that this is the delivery score now you have a class A and you have scores for resources you have scores for institutions you have scores for delivery services you can have a weighted average of this you have less B a weighted average of this.

And you can choose whichever is greater or less depending on what your criterion is so the point here is that these are the investment climate is one for any place for a supply chain now depending on the vertical if you write down what are all these sub criteria now if you are in biotech which we are going to consider this one the human resources should not be scaled resources there should be researchers with PhDs and similarly if you are talking of auto industry you do not need PhD's you are talking of human resources.

Which are skilled wife over this one so and also if you are in auto industry the financial resources should be four letter of credit and so on but on the other hand if you are in biotech R&D the letter of industry is there a the financial resources should be in terms of venture capital and so on so the depending on the vertical for the same these things these are different but then you talking about attack for example and in two places so the kind of resources that you have you can basically order them gives close.

To this and get a final score for the places and add them up offer this course for all this that is going to be give you the best place rank order the various places and then very simply this is the techniques that that is being used in AHP or some other thing whenever you have multiple

attributes like this and this a way of combining all this into this and combining all this into Iraq so that is what is being done here for the new supply chain here but when we use the HP.

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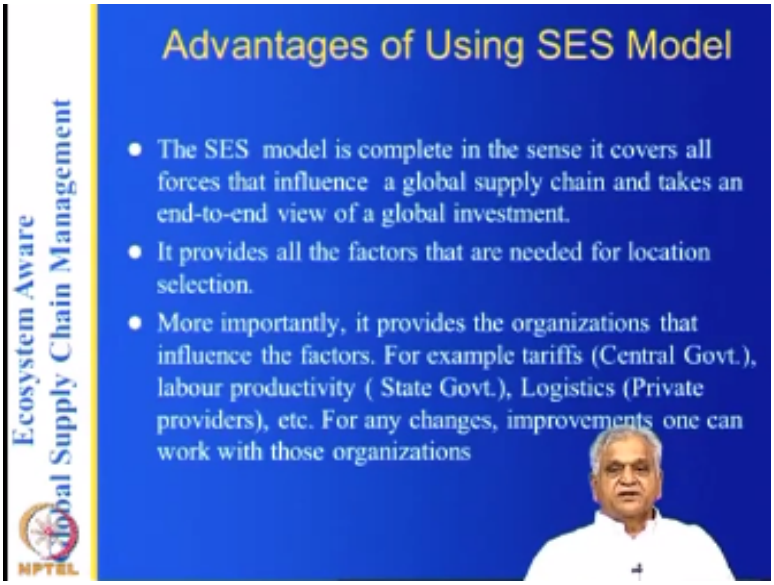

So what are the advantage of using HP the SES model is complete in the sense it covers all the forces that influence a global supply chain and takes an end-to-end view of the global investment so you are talking of an end-to-end view from production the resources and the delivery it provides all the factors that are needed for location selection more importantly it provides organizations that influence the factors now for example, if you look at the kind of changes that may come in the resources or the kind of changes.

In the company government and so on supposing they are high tariffs who is responsible for changing their tariffs central government is it going to change or is it not going to change you know there could be some companies who may enter into we enter into the country thinking that there will be changes and the changes may never come one of the changes that people were expecting is the APMC act in the food supply chain case but that was never taken off so similarly people may expect things to happen and the government's may process.

But it may not happen and similarly the labor productivity in terms of this one technological an argument and the logistics which is in hands of the private players there are several things that that people may promise but if you try and look at yourself in a place thinking that the improvements will happen and if they do not happen then you are taking a risk and also here you get for example each of these cases, if you want to improve just exist in the area private logistics providers and you can have a deal with them.

But you cannot may not be able to influence the state government of the central government and particularly if your improvements are like infrastructure improvement or changing of loss and so on those are highly it is highly risky to say to assume that they will be changed in your favor now for example the golden quadrilateral linking all the major cities in the north south east and west in India it was supposed to be completed in 2012 but it is not yet so these kind of infrastructure projects may take lot of time they have a lot of the cost and time overheads.

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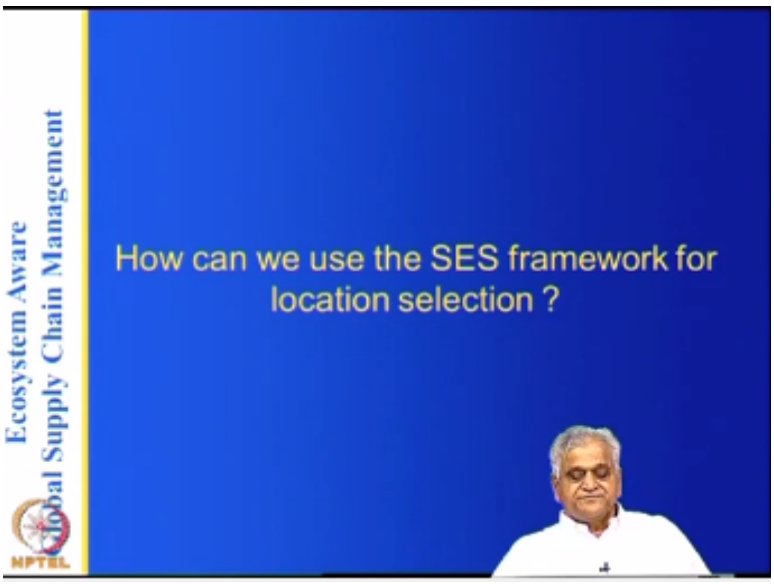

So how can you use the SES firm work for location selection?

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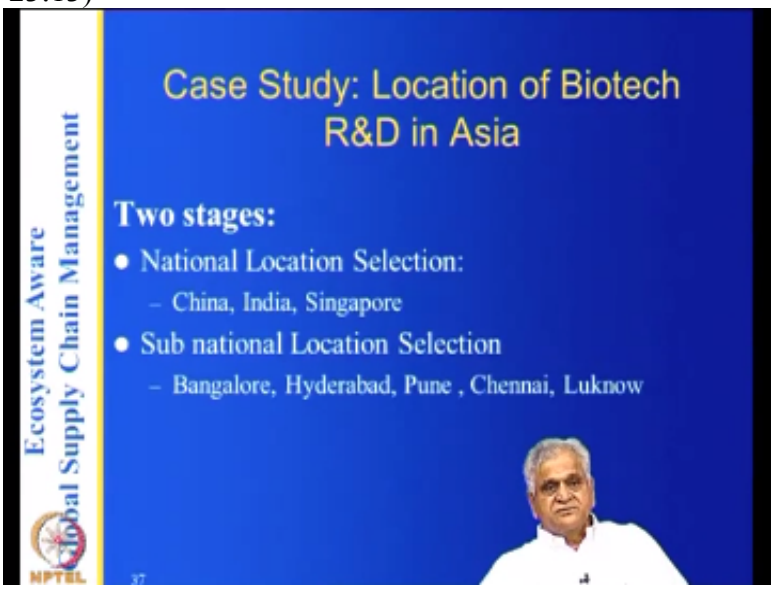

So there is two stages for example ,we will take a case study location of biotech R&D in India and the location selection is for example, we selected three countries China India and Singapore and the sub-national location within in within India Bangalore Hyderabad Pune Chennai or lucknow and so on so let us see how to do this.

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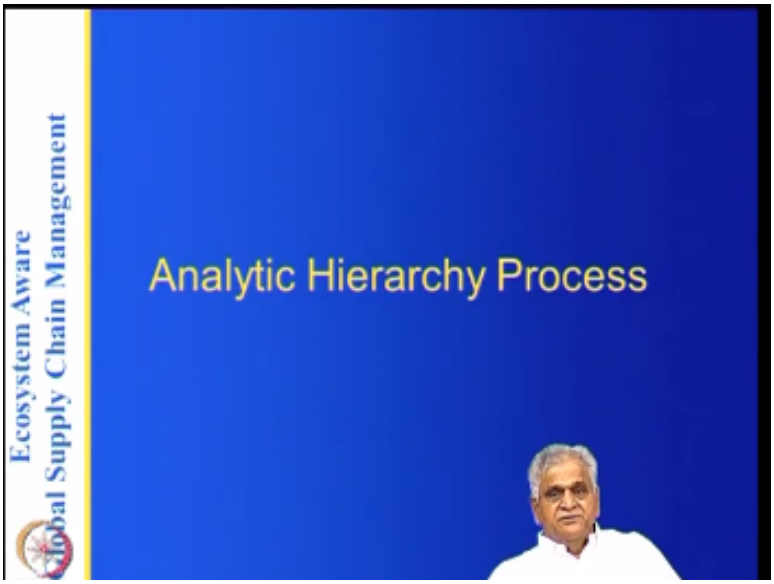

So we use the analytical hierarchy process.

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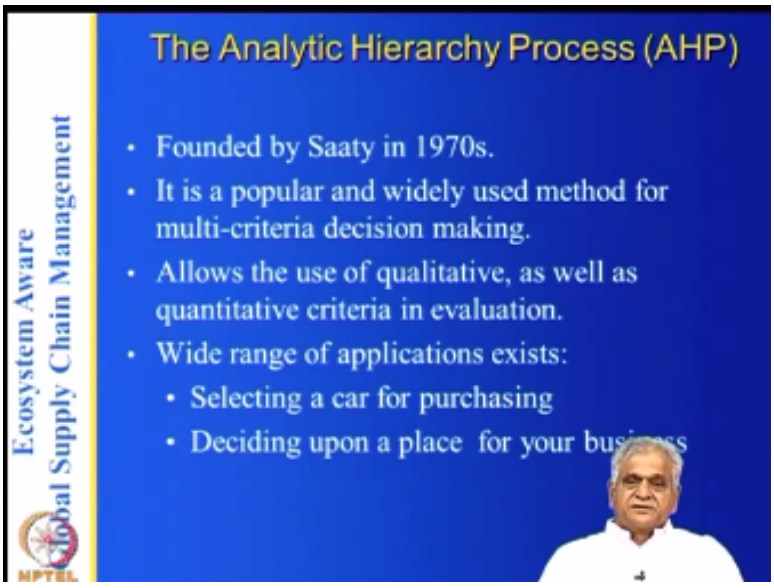

It is called AHP founded by Saaty 1970 it is a popular and widely used method for multi-criteria decision making this is whenever you have multiple criteria to characterize a particular

item in our case it is the location of the place and you have multiple criteria like resources, like government regulations, and delivery mechanisms depending on that and each of them have several parameters so how do you use how do you it is AHP is used with this it allows use of qualitative as well as quantitative criteria in evaluation in other words some of these things can be in terms of numbers.

For example taxes or tariffs this could be in terms of numbers but if you say how good is infrastructure maybe you can say very good the low quality and so on so basically sometimes you can give qualitative information sometimes quantitative and wide range of applications exist for example, it can be selecting a car for purchasing it can be deciding the place for your business whatever there are several applications that have been this one and the analytical and by the way this particular artists articles written is the number of if you type AHP analytical hierarchy process there you get a thousands and thousands of papers with lots of applications.

In this so the only reason why they speak very popular although it looks heuristic is that it is a systematic method of combining both qualitative and quantitative measures for multi-criteria decision making if you are using optimization methods then it becomes highly complex and sometimes the solutions may not exist.

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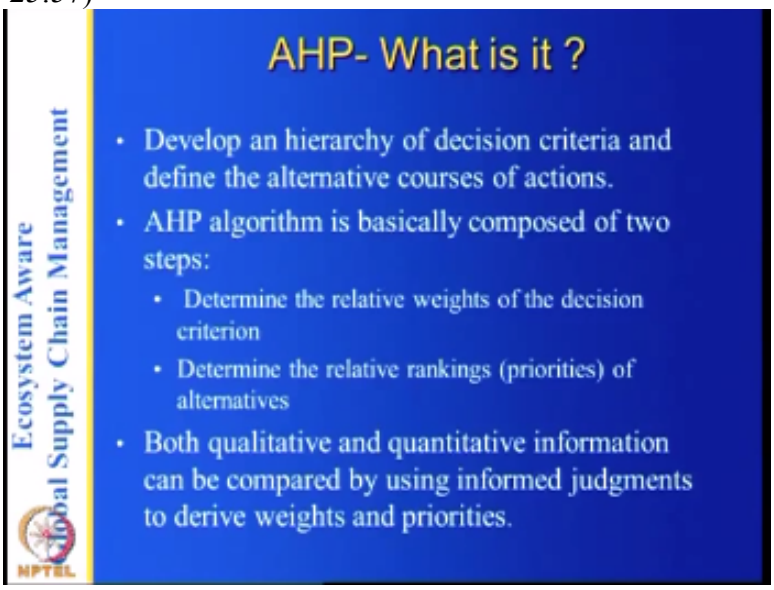

So if you look AHP develop a hierarchy of patient criteria and define alternative courses of H and HP algorithm basically composed of two steps that is determine the relative weights of patient criteria and determine the relative rankings of the alternatives and both quantitative and qualitative information can be compared by using informed judgments to derive weights and priorities as I said before you assign the weights and priorities to each of these sub items and combine them.

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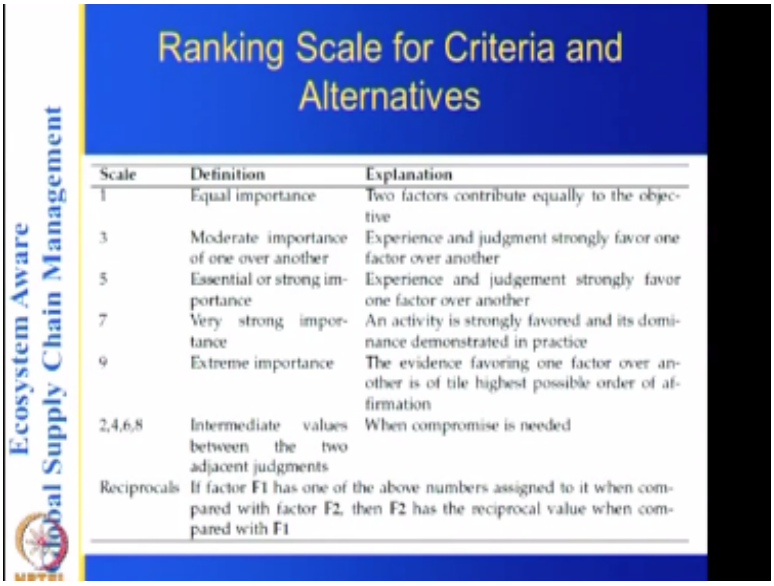

So when you are talking of weight you know the scale is if there are two factors contribute equally to an objective then you call M 1 and you give three weight or moderate importance experience a judgment strongly favor one factor over the other and five essential are strong importance now for example if you are talking about biotech R&D then you are a source of PhD's is a fundamental importance so you if that gets a score of five and if you are talking of an export-oriented business than the rules and regulations and the delivery infrastructure become very important so that will get a score of five.

So very strong importance and activity strongly favored and it is dominance is demonstrated in practice then it gets a seven the line is extreme importance evidence of having one factor all relative is use of tile importance highest importance in order of affirmation so let us go to two four six and eight are intermediate values when compromise is needed this could be between two and three when you say it is true it is between one and three if you want and if i factor f one has one number assigned to it when compared to the factor f 2 then f2 has the reciprocal value when compared to f1 and then that is obvious in other words.

If you have hacked as f1 and f2 if you say that for f1 it some factor is of extreme importance and say five then in the reverse side it is one by one by five.

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So HP for location of biotech R&D labs in India let us look at this.

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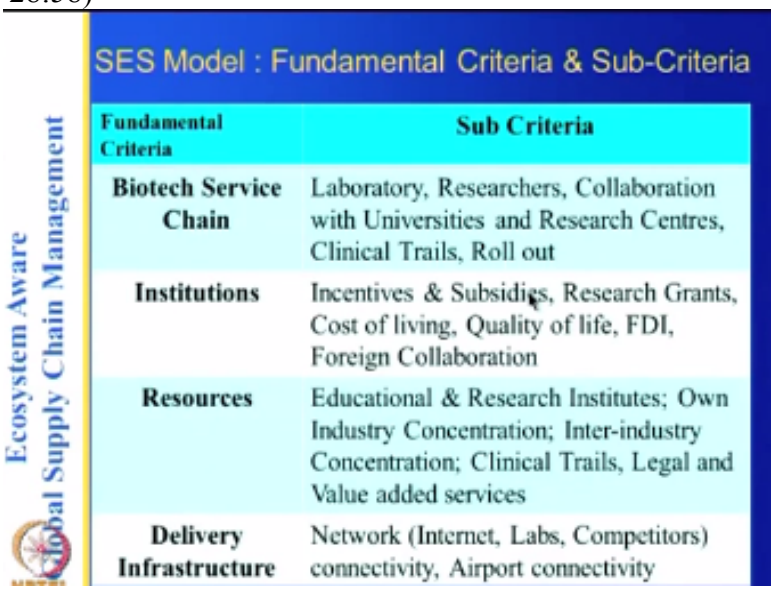

So if we could at the for example or want to analyze the biotech supply chain the SES is model who have to have the criteria as well as the sobriety what are the fundamental criteria of course biotech service chain which requires the laboratory researchers collaboration with universities this has centers ,clinical trials, and roll out finally and as I said before the researchers and the laboratory equipment and so on become very important and also some collaboration with other research centers clinical trials these are all.

You know if you draw the service chain for a biotech service join it is once you have an idea you start the research then you collaborate once you come with a product like a vaccine then you have to go for clinical trials and finally after everything comes out good then you have to roll it out as a product so that is the service rate but for doing this what are the kinds of investment climate that you need that is the point here institutions, incentive subsidies research grants cost of living quality of life foreign direct investment and foreign collaborations.

Now will the government allow for in collaboration in the government allow foreign direct investment in industry or and pharmacy industry or in biotech and if the cost of living okay in that city so that people can live and what is the quality of life what are the schooling for children so these are all the factors that will affect the location of this and of course the resources is the educational research institutes one industry concentration if you are talking about a tech industry.

Then one industry concentration inter industry conversation control concentration which is if you do you have a biotech industry you have a pharmaceutical industry which is related Beauty have a food processing industry these are all somebody is related with the same kind of issues and clinical trials legal and value-added services and so on finally you have delivery infrastructure which is the information delivery.

Which means internet lab connections and so on and Airport connectivity for people to travel so one of the things that happens with the biotech is this there is the communication, if they are not co-located the labs then it is possible that there is the people have they have to visit frequently so the airport connectivity becomes important so what is that we have here we can when the biotech this one these are the institutions resources on delivery mechanisms so and these are our requirements kind of thing.

Because this is the biotech supply chain that do you service chain that we have and so on so you a sense course to all this now for example, if you want to say research score we want to give China India or this one what are the kind of score that you are going to give for various of these factors and finally as the map.

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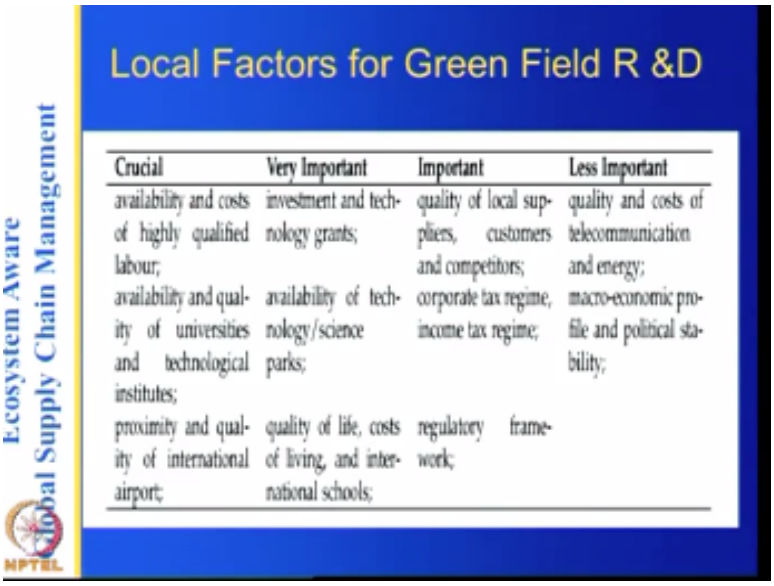

So the local factors are Greenfield suppose you are starting a green field this one what is crucial availability and cause of highly qualified labor availability acquire quality of universities and technological institutes proximity and quality of international airport people say these are pro sure. I mean most of these things are coming from some kind of a literature survey which is available on the on the net in public domain and very important or investment and Technology grants.

Because you require you require the support from the both from the industry as well as the government because ultimately when you are talking about R& D it is going to be the welfare of the people the product so there are grants that can come from the government as well as in the pharmaceutical or another food processing industry availability of technology and science parks that is the clusters quality of life cost of living and international schools because if you do not want to know the quality of qualified scientists may not want to move into an area.

Where which does not have school because ultimately the family becomes important so if you want to locate your green field lab in a place where there are no schools people may not this one we've got that as quality of local suppliers customers and competitors corporate tax regime income tax regime and regulatory framework and so are less important quality of course of telecommunication and energy micro economic profile political stability and so on so basically what we are trying to do within.

The parameters of resources institutions and the delivery mechanisms we are trying to make what are the crucial things what are important things what are very important things what are less important Thanks so you can see the whole procedure of AHP is so qualitative that you start with the resources with the investment climate parameters and then have supper ammeters

and have them placed like this and once you have these local factors which are crucial very important and all that then you can give them scores.

Which we have given as 1 3 5 7 9 2 4 6 8 in between and so on so depending on their crucial things for example if your biotech the availability and cause of high quality labor is basically very important it gets a ranking of five or seven availability of qualified universities it also gets a rank of seven in terms of the resources so if less has these three courses which is what if place do not have this that matters in terms of the location.

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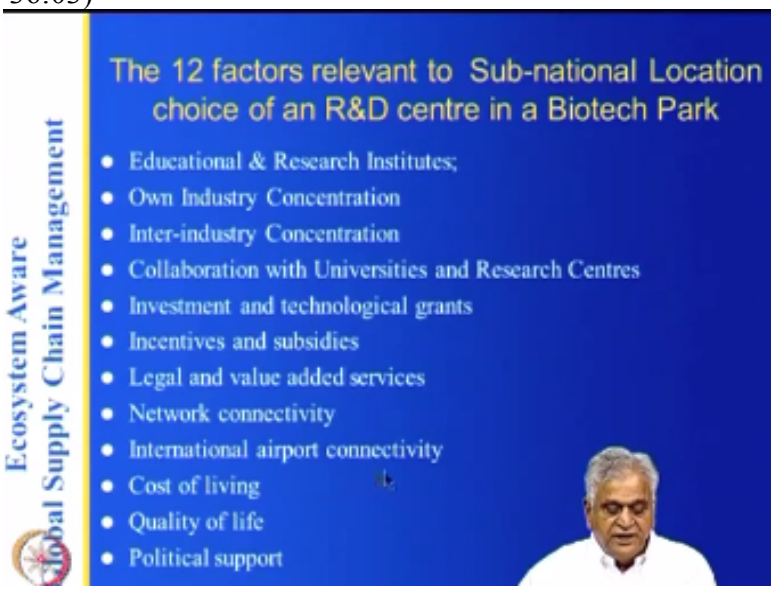

So the twelve factors relevant to sub-national location choice of R&D and tours in this so education research institutes one industry concentration inter industry concentration collaboration with universities and research centers and investment and Technology grants incentives and subsidies legal and value-added services network connectivity and International Airport connectivity cost of living quality of life political support these are the 12 factors that same thing.

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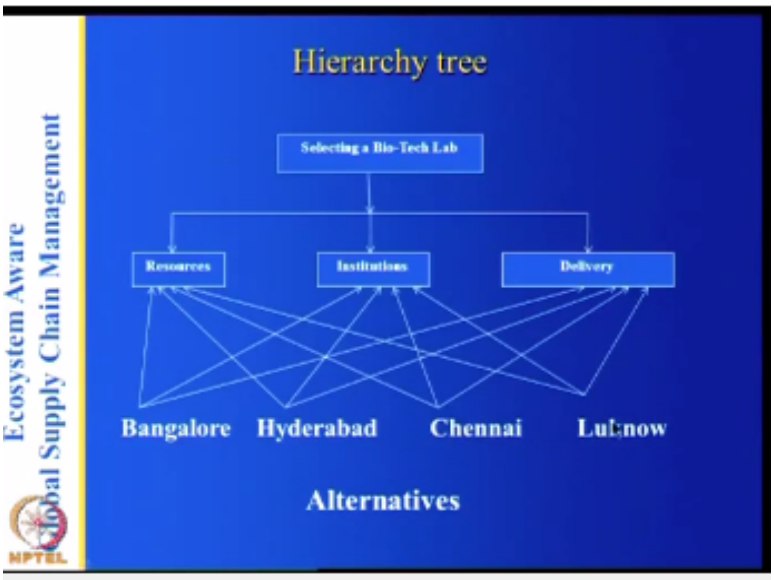

For example we want to select a biotech lab based on resources institutions and delivery and Bangalore Hyderabad Chennai and Lucknow and so on these are the alternatives so that is what the selective correction.

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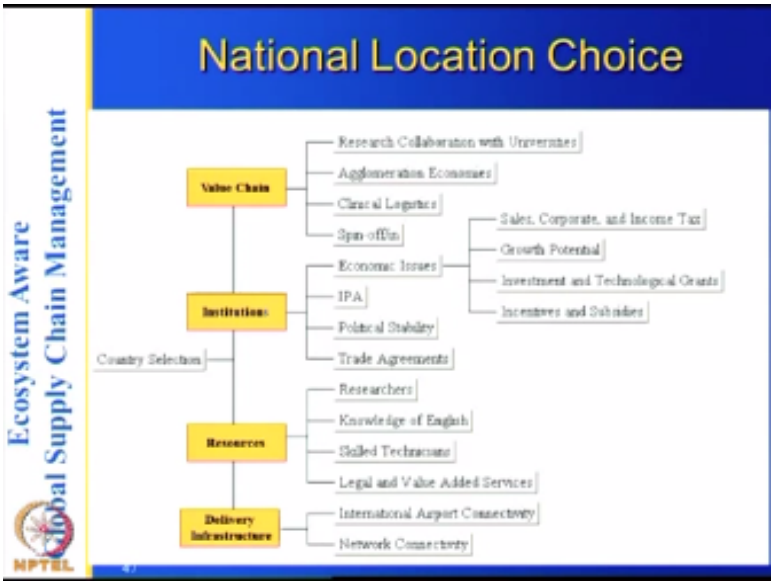

That you need okay, this lifestyle location choice for example, you want to say like this one I mean you have the institution's economic issues intellectual property issues and political stability trade agreements and economic issues sales growth potential investment and means incentives and subsidies and so on and you have resources you have the delivery infrastructure in this from these are important become important for the country selection now if you give

scores for all this one like we have got the these parameters earlier and add them up to all. This and finally get to a score then what you get is this.

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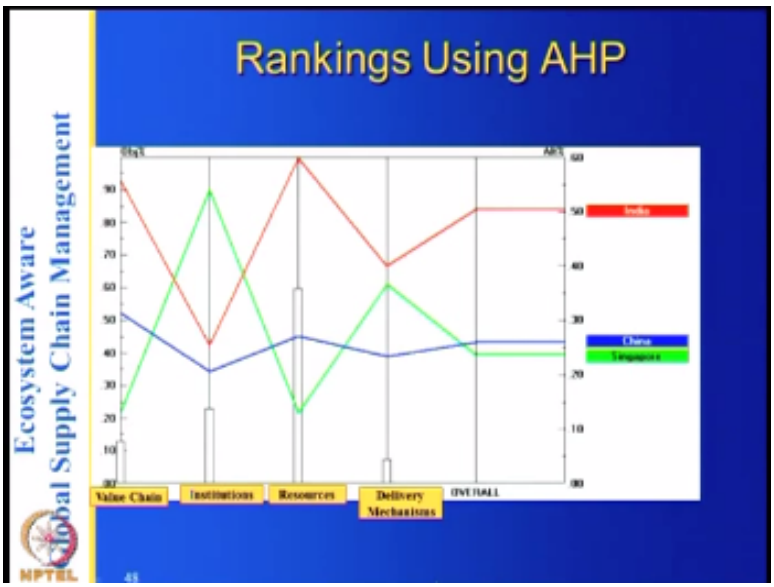

Now for example into banking of this you have this is the and although these are connected they are not connected the value chain score is this for India institution score is this institution score is much best for Singapore in terms of biotech whereas it is medium for India and for China it is lower most probably because of intellectual property issues and similarly in terms of resources India has very good research this one and medium for China and Singapore has lower in terms of the numbers and you have the same thing.

In terms of the delivery mechanisms by the way the data is sort of voltage but if you have new data you can always use that and so on so the overall you can add this add this scores for the overall you get this particular thing and then you select in you now do you get this delivery mechanisms course you know we went to the delivery mechanisms looked at the connectivity you assign scores for the connectivity between the laboratories internet connectivity and so on and also the International Airport of course all.

These places now have international airport that connectivity there but Singapore has very high connectivity in terms of the delivery mechanisms which you can see here so simple dense both in terms of the institutions as well as the delivery mechanisms but in terms of the resources and the value chain it gets lower so but anyway these factors can change the only thing is it is only to illustrate the method it is not we are not here to go on the rankings of this and so on just to illustrate the method if you take the current data and use these techniques.

Which are which are very common in the AHP this one which you can get it in any book or in the web through examples then it is very easy to get this so for this it is suffice it to say that we have selected India here that is because of these various parameters ,so what is the big point here the big point is we have selected the resources we have selected institutions and delivery mechanisms we have sub divided them into various sub parameters who have collected the data from the field recording what is the availability and crack order them given them a rack and for each of them and finally.

We added all of them then got this so that is what AHP is about and you can go through the various this one that.

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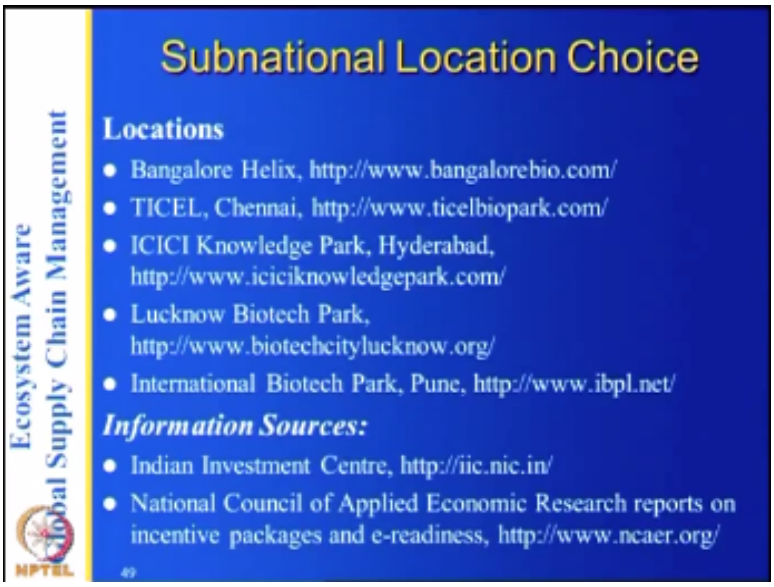

So once you have selected the country the next to you is to select the locations of choice now for example of the locations that were Helix or Bangalore Chennai and ICICI knowledge park Hyderabad Lucknow biotech park and international biotech park Pune and information sources or India investment center on national council for applied economic research reports and so on so basically be the kind of information you have you may not be able to get for all these parameters of the ecosystem. But it is possible to get most of these parameters.

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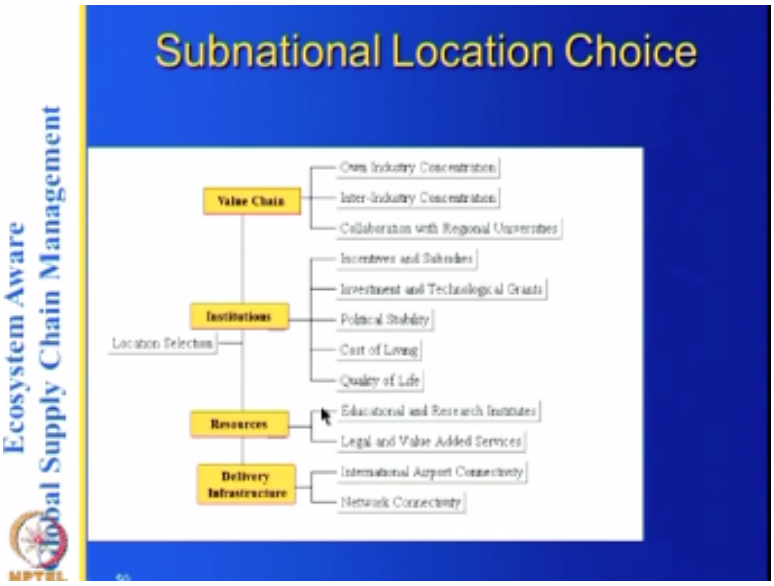

So if you look at the sub-national this one and look at the location this one that the institutions in subsidies investment technology grants political stability cost of living quality of life you are looking at a city cost of living quality of life political stability and so on and also educational research institutes legal and value-added services and delivery infrastructure and so on so basically you can see that these sub national institutes are the cities where these are located are the ones that you are interested here.

So you can give a scores for each of them now for example, you have an India in biotech and in Singapore there is a I am sorry the in India we have selected India and now you are talking of Bangalore Pune Lucknow and so on so basically for each of them you can see the quality of life for each of them.

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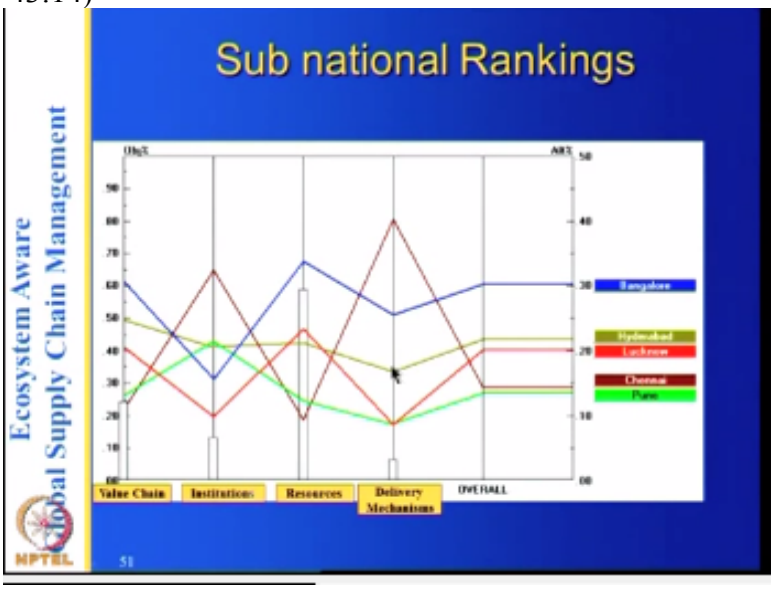

Now you can see that for example for dam work it has high resources that is because of the presence of the Indian Institute of Science and several other parks and IT infrastructure and there is also the family quality of life the presence of the international schools and the state government is good and supporting the research and of course after at the International Airport Bangalore has an international airport and the connectivity is not as good as good as Chennai what it used to be but in love it is now it has a very good international airport and so on Bangalore.

So if you look at all this then you will find that for example Chennai has good into institutions because the Tamil Nadu government is supposed to be very good in terms of it attracting industries and in terms of the land loss and so on but in terms of the resources it suffers so the kind of resource that you require biotic or a PhD's base and high-tech researchers so that is where I think to the presence of intuitive signs and other research institutes helps Bangalore and also Lucknow has a biotech or India lab the others suffer because of the lack of that and also for example if you look at Lucknow.

In terms of delivery services it suffers because of the lack of international airport facilities so move out these sub national rankings and so on and you get this so I want to mention again although these are connected this is not a connected graph but it is only these points that you have and they just to show that the values of this so on so finally you end up selecting Bangalore so we have the national selection you select India and then in between India we select Bangalore of course.

If you change this course which are sort of sometimes qualitative and subjective then you may get the other things but they suffice it to say that here we are using the AHP method on the scoring methods of pair wise comparisons and so on which is which are familiar in the AHP literature to rank order the sub-national things and finally bang load comes on the top.

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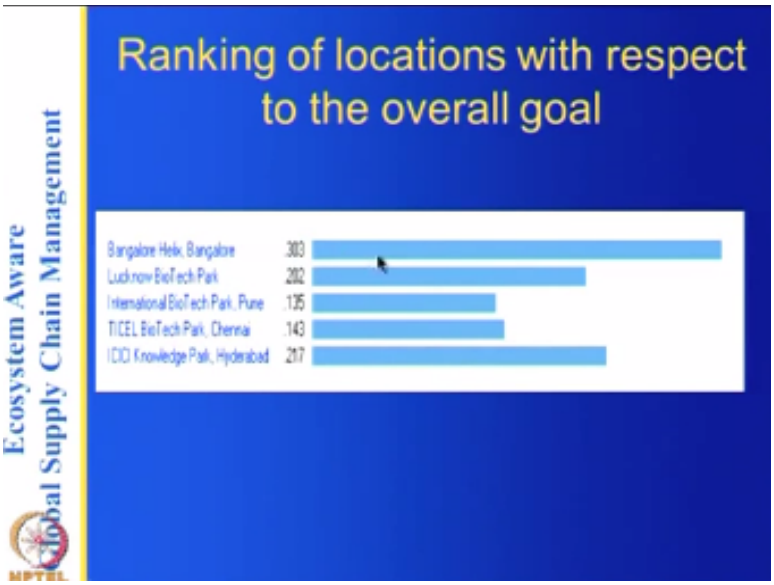

So here you can see that the ranking of Bangalore is point 303 and then text comes lucknow or next comes the Pune next Chennai and finally Hyderabad surprising because the Hyderabad has ICICI park but in spite of that it lacks and the other ones like the universities and also R&D labs although it has a good R&D labs so anyway I mean suffice it to say that these are some scores this is more a method of illustration of how to do things rather than the exact this one.

So if you take if you have available data for each of them it is an instructive to go ahead and use the AHP to recorder the places and finally select it and so on.

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One can use this for other applications like for improving the investment climate and market attractiveness now for example louder you will improve the investment climate we know the investment climate for that particular depends on the resources it depends on the loss turns on and also it depends on the delivery services now what you could do is if you want to improve the investment climate you can change the loss you can improve your trade facilitation or you can start new universities to develop talent.

In a particular industry vertical so you can improve the investment climate in some other this is the advantage of having the SES framework SES framework tells you where the where you should improve and who are the people to improve it for example if my filter cough biotech industry and the biotech industry requires PhD's then who should improve this the improvement needs to be done using in my universities or R&D labs because you require PhD's you require well-trained researchers for your R&D center.

So that is where the investment the SES framework not only gives you the values today but it will also tell you how to improve your investment climate. I would not find articles are developing in a region no for example you have the investment climate now given the investment climate what are the kinds of particles you should have you know you take Chennai with all the investment climate with a port and on that what are the kinds of verticals that it should be you should touch.

So that it uses these facilities of the resources and so on like to and others where the import-export and developments and so on right but on the other hand if you take a city like Bangalore with education resources and all that then probably R&D centers under centers would be would be a good location here and that is what is happening that similarly if you take Pune Bombay Highway and so on because of the palm bay port and also the airport and a financial hub by being financial hub it will attract industries.

Which are compatible with those kind of resources and the investment climate so you better look at the identifying verticals are developing and identify tire to cities and verticals so one thing that you know places are doing is this tire one cities or getting crowded people want to go to the title cities and also the salaries entire one cities are very high whereas in tired two cities will be low so for Verity reasons people want to develop type two cities so that also can be done these are the other applications that so to conclude what we have here.

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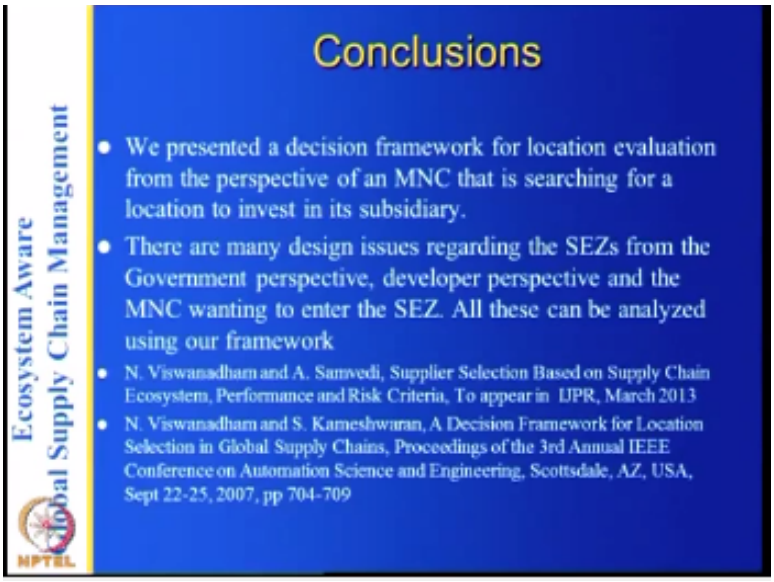

We present an addition framework for location evaluation from the perspective of MNC multinational corporation that is searching for a location to invest in its subsidiary that is what we looked started with and there are many design issues that regarding the SEZs from the government perspective developer perfect two perspective one dimension wanting to enter a SEZs all these can be realized using our framework so what we presented is a framework and you can use it for several different directions.

And if you want to go further with this there are these papers one by me and comets-- where we started this work edition framework for location selection it came in to be automation science and engineering it was presented in 2007 in Scottsdale Arizona and there is a recent paper will appear in international of production research and written just few months back with some MIDI so this is due to suffice it to say that the location selection problem is a very important problem that is faced by industries and the supply chain ecosystem framework.

That we have been talking about in all the previous lectures is extremely useful on the generic framework for the location selection let it be a component manufacturing or a contract manufacturing or a warehouse or a call center or whatever depending on the sub ecosystem parameters.

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