Indian Institute of Science
Bangalore

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Global supply chain management

Lecture-04
The supply chain eco-system framework

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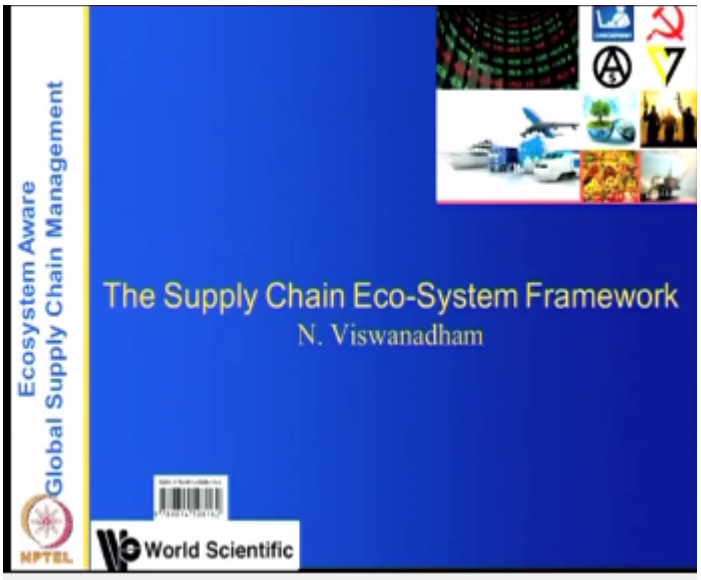

Today the lecture is an important one that is because I am going to give you the fundamentals of the ecosystem framework for a supply chain or a service chain and the basis for this lecture is from my book with the doctor kameswaran and the picture here shows the ecosystem in other words it shows the logistics it shows the government is and the environment and so on so basically this picture was designed to show that the supply chain or a service joint.

Is affected by the factors that are extraneous to the supply chain and it is from a book entitled the ecosystem aware global supply chain management it is published this year 2013 by world scientific.

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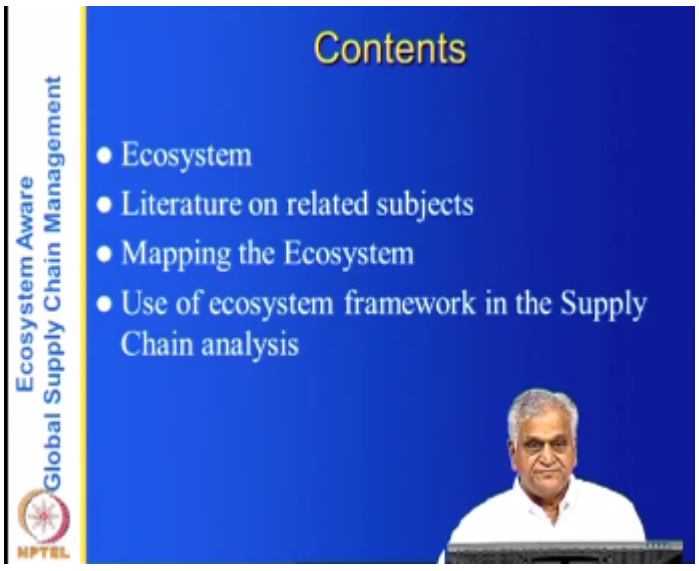

And the contents of this lecture on the ecosystem and then I will describe the ecosystem and then afterwards the literature on the related subjects in other words although the ecosystem Concepts is my own there is a literature as always from World Bank on other agencies the related subjects called investment climate and all that and I will give you examples of how to map the ecosystem and finally we end this lecture with the use of ecosystem framework in the supply chain analysis.

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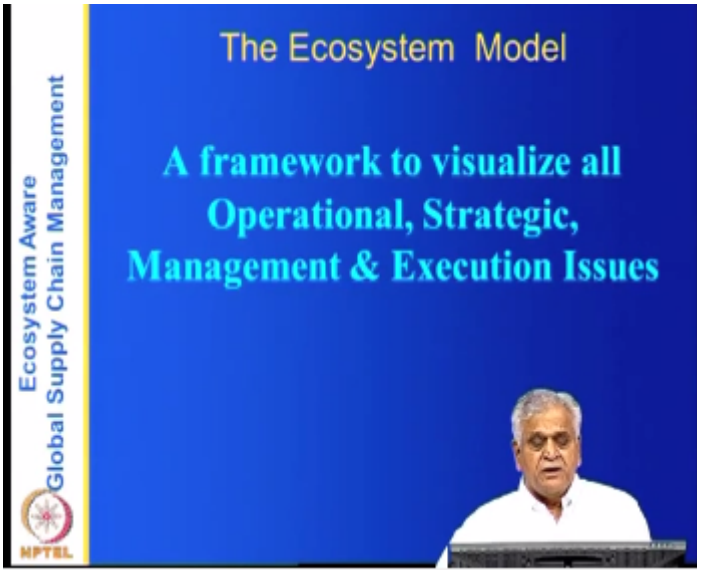

So what is an ecosystem it is a framework it is a framework to visualize all operational strategic management and execution issues why is this important it is important because as we have seen in the previous lectures this supply chain is affected by extraneous factors other than the supply chain it is not just the suppliers the manufacturers the logistics providers and the retailers and the customers that affect the supply chain in the earlier studies people were talking about supply and demand matching that was the most important thing but although even now it is the most important thing but the supply chain is affected by other factors like the location factors like the environmental factors the government rules regulations and the infrastructure that is available and so on.

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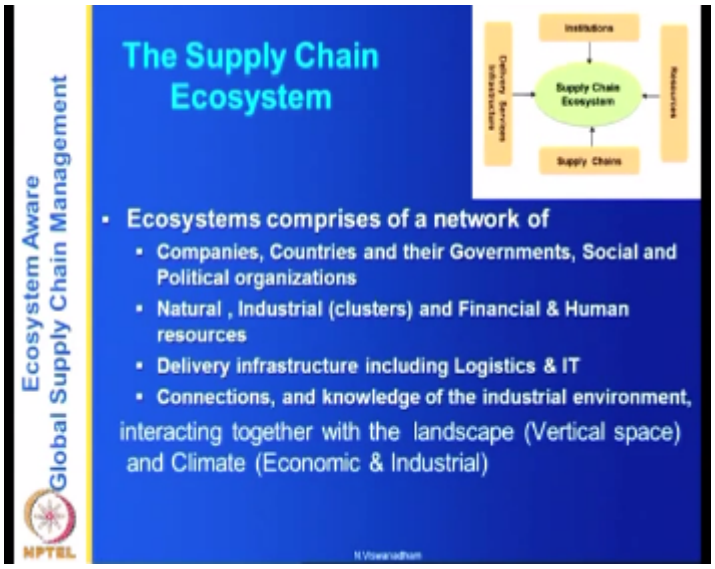

So let us see what is the request of say it is a network of companies and countries and their governments social and political organizations these are called this these are all the this one and then the natural industrial clusters financial and human resources the delivery infrastructure including logistics and IT and also the connections and the knowledge of the industry environment interacting together with the landscape and the climate.

In other words this supply chain ecosystem presents you with like here all the four factors that is the apart from the supply chain and the companies which involve the suppliers logistics providers the manufacturers retailers and distributors and so on there is the resources that are available for the supply chain that is the human financial and industrial and natural resources they become very important because the human the labor productivity.

Is very important for the supply chain competitiveness and similarly the institutions which are basically the country is their governments the social and political organizations they are also important and they affect the supply chain because the in a global supply chain all the regulations are set by the Recon tries and also the social organizations can move vagueness scrollable eyes organization are moving as some party company coming into the country.

Or and so on so similarly the industry organizations have to cooperate because they create a brand for the country in which they are coming similarly the daily and delivery infrastructure which is the logistics information technology and so on and also it is like you delivery it is like home delivery or it is like you know selling through the retailers and so on so the supply chain

ecosystem consists of all these four factors and that is what we are going to study and given any particular example there are a particular example like auto or even a service change like logistics can you map your supply chain can you identify all the resources needed for your auto supply chain and what are the government regulations for your supply chain and what are all the delivery mechanisms that have needed what is their status in various countries.

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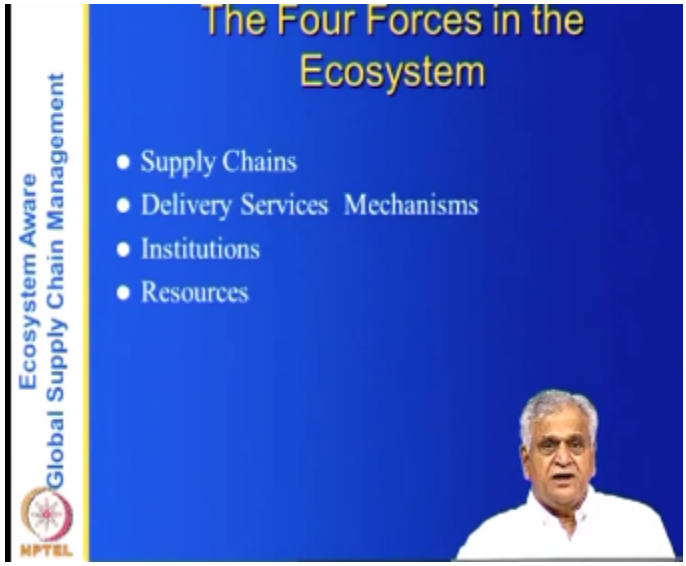

So that gives you all the factors that are needed for you of this one so the four forces in the ecosystem are in supply chain delivery mechanisms institutions or institutions the word for the governments as well as the social factors are also the resources which stands for the human financial natural resources and industry clusters and so on so let us look.

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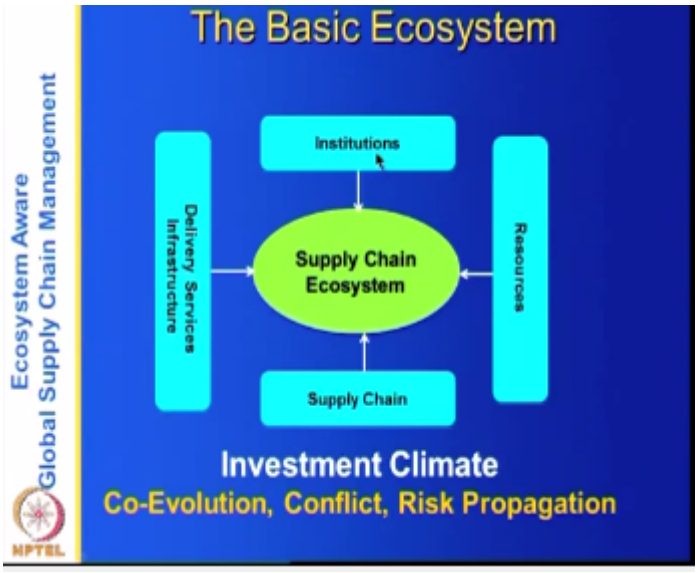

At the this one here we have the basic ecosystem which you have seen at the supply chain ecosystem where which consists of the supply chain the supply chain as you know we have seen it consists starts with the it can be a multi-tier supply chain starting with the raw materials and ending up with what is delivered to the customer and then we have the resources institutions and delivery mechanisms and here what is important to study.

Is that these three factors the resources the institutions and the delivery mechanisms these three are known also called as the investment climate investment climate of a country or religion can be defined has been defined by the world back and a lot of studies on various countries concerning their infrastructure there in their government regulations and policies and different less ness of the bill to the businesses and also the resource availability of various kinds of thing.

So this is basically the investment climate but the one thing I should mention here is that the investment climate as defined by the World Bank is for a country or region but here we are talking of the investment climate for a particular vertical in other words if I were an auto supply chain here I am considering the corresponding investment climate all these three factors for the auto vertical if I am considering oil and gas then I am considering the resources.

That are available and the institution the regulations are oil and gas and the delivery infrastructure that is needed for oil and gas as we know the investment climate these three factors are different. For different verticals so it becomes very apt that we consider them the investment

climate for a vertical in a country rather than an investment climate for a particular country now we have three factors here which are shown down below.

One is the co evolution and 2nd against the conflict and third one is the risk propagation let us deal with the conflict rust what happens is in a if you want to a supply chain an efficient supply chain in a particular country or region then as a part of the resources you have read us industrial clusters if you have industrial cluster friendly industrial clusters then it becomes it makes the supply chain more efficient but then to develop industrial clusters.

It takes time and it takes capital but on the other hand the institutions the government can make the environment more friendly by having regulations of free trade so the conflict is free trade enigmas developing the particular resources so it is a regulation you want to deal with regulation which depends on the government and it takes a day to for the government to discuss and give the regulations on the other hand it also if you want to create the corresponding resources which is a long term effect and also capital intensive then there is a conflict here and we will deal with the co evolution of innovation and the risk in the next slide.

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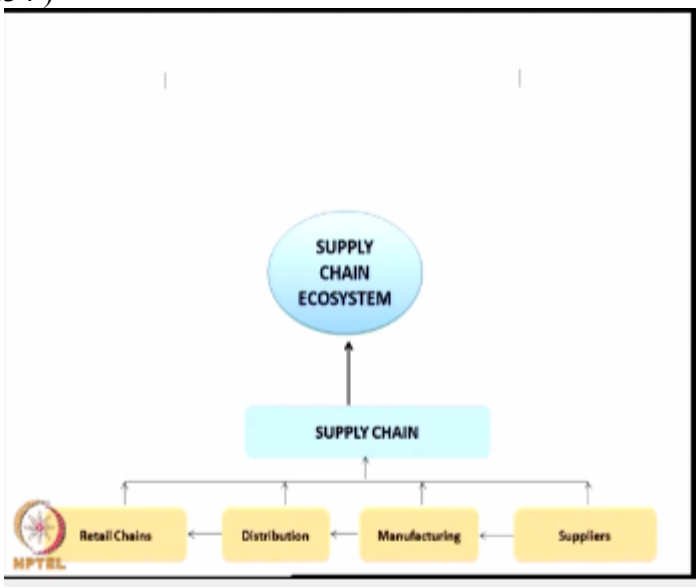

So let us map this you know in more detail what do you have here in the ecosystem is the supply chain here the supply chain consists of the suppliers manufacturers distributors and retail chains so this is the map of the supply chain given any vertical let it be all so let it be food

let it be electronics let it be PC let it be handful any of these verticals oil or gas they have all these four factors if you want more this one you can include as necessary.

So and then what are the kinds of resources that are the government factors that will say now when you are talking of a global supply chain you have the issues like customs then export and other government regulations export-import another government regulations so these become very important because when you are having trade this one and from if you are sourcing your for before your manufacturing plant if you are sourcing the supplies or recompense.

From some suppliers from a country which is different from yours then in such a case a customs duties and the export and other regulations on both ends of the north of the chain will become very important than the quality control and environmental issues in other words a manufacturing it he has a lot of GHG gases and a lot of people out of countries coming up with environmental regulations and also there is the quality control of the .

That you buy and that becomes very important at this week sometimes become the country factors that is where we have included this and our institutions the quality control factors for example if you are talking of a of a particular product a pharmaceutical product whether the Quality Control tells you whether you can use that particular product in that country and similarly the environmental regulations the carbon footprint they become important.

And all that and social financial and trade issues become very important sometimes the social factors like some you may have labor union problems and sometimes the financial problems because the banks may not give loan to foreign countries and they are also trade issues related issues coming in and the third one that we are considering is the resources there is the resources are the infrastructure the foreign institutional investors and ports airports and roads. This becomes an important thing because the when you are importing or exporting then the ports are important this one and industry clusters industry clusters that means if you are having sourcing a particular component if there is a cluster that is available for example their auto clusters in pune or two clusters and go home auto clusters in Chennai and these kind of clusters will help the supply chain owners to basically source from these clusters because everything they need is available at one fact at one factor and also there is the clusters also create the labor knowledge and labor productivity in this and also human financial and natural resources.

And labor unions are the other resources that are available Human Resources becomes very important in the supply chain you need rare people at various levels in the manufacturing in two in the management and also at the mid-level in the software and so on so this human resources come from educational institutions they can be engineering colleges they can come from polytechnics they can come from skill based training institutions.

They can come from management training institutions and so on so the human resource and their productivity become an important thing when in the terms of resources similarly the financial resources the financial resources mean meaning the banks are always needed to give loans to the customers to give to give lack of credit to the suppliers or manufacturers and so on and also this the interest rates the charge become an important thing that in making the resources which are competitive and for the supply chain and similarly the Natural Resources a power water and the mines all these things affect and also the labor unions and their strength is an issue.

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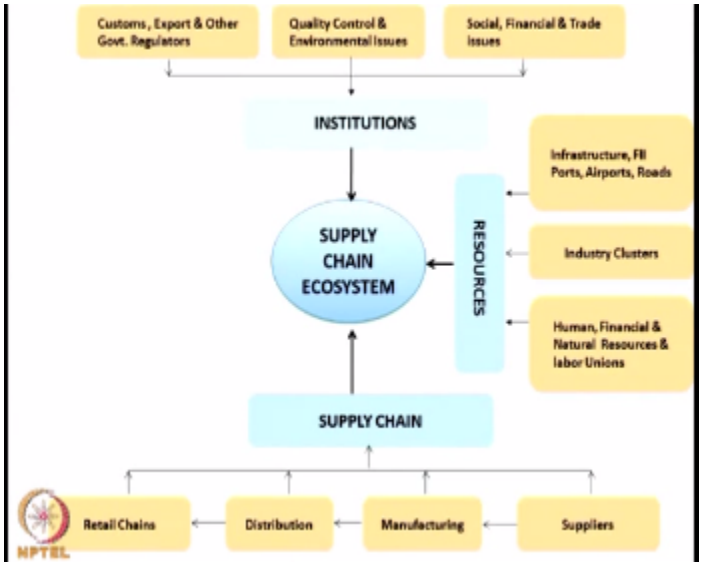

And finally we have the delivery infrastructure or delivery mechanisms the logistics and IT companies not or need the we have seen in the last class there can be one pls two pls than three. Pls and four bills are also the transportation that is available by rail airship and earned road and also the logistics parks is special economic Jones right our corridors and so on so if you look

At his particular diagram it gives you cosmic view of not only your supply chain.

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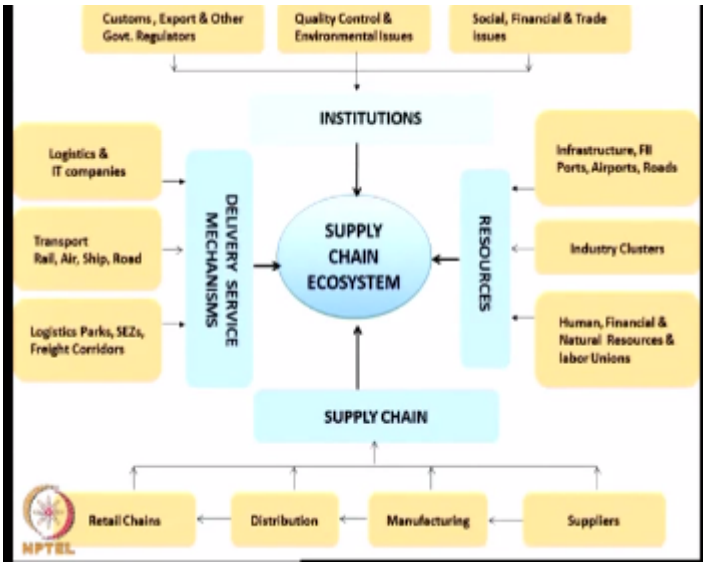

But all the factors all the extraneous factors from the government is from the resources from wild delivery and the it gives you all the extraneous factors that affect your supply chain so it is a kind of an environment that you have so while studying this particular the subject there are four things that we study a list that is called a grip frame work the first one is governance now you have a supply chain here which is the suppliers or in one country.

The manufacturer and another distributors out in another and retail chains and customers or in another different country so when you have supply chain that is dispersed then how do you govern this particular thing the governance should also take into account the resources the institutions and delivery in other words if you are sourcing your supplies from China or from Malaysia or from some other place then your staff or your management.

Should be aware of all the rules regulations customs export and other things and also the quality control the environmental issues on that because you do not want to may be a party to any in work in basically going against any of this country regulations and similarity should be aware of what is the logistics providers what are the logistics companies what is their delivery mechanism and do they do the perfect delivery or an effective delivery and so on.

So the Knowledge is needed for about all the supply chain factors that is the government so the governance is a non-trivial issue here when it is globally disturbed disposed you should have connections you should have the knowledge and also you should have the management skills. And so on so there are those things with the risk this and I stands for innovation and P stands for performance now let us look at the innovation here what happened here.

In this supply chains was first there were modularization of products as I said the my first lecture that the whatever product you are manufacturing whether it is a autumn automobile whether it is a cell phone or a PC or a laptop or whatever it is Blanche of products these products are modules and each of these modules are basically standardized and the processes and virtuous modules are made is also standard so that means then you are looking.

For where to manufacture this particular thing using industrial clusters in low-cost countries so in other words the products are so standardize the assemble in the sub assemblies are so standardized they can be manufactured anywhere so if you want to reduce the cost of production and the cost of supply to your customers have either your retail chain at the end then you want to choose a country where you could do it cheaper so the low-cost countries.

But if you want to do it at the low cost countries then you need the particular countries where your it is low cost to manufacture and where the expertise is available to manufacture these particular companies those countries to allow you to manufacture them there either you set up your own shops like the FDI for foreign direct investment or you outsource but whatever you do then unique while permission firmly from the governments.

Here so and then it goes if you want to transport all these components quickly following just-in-time principles then you will require logistics and you also require the communication companies to communicate work lower with your partners so that becomes a virtual co evolution that is the modular rejection of products low-cost countries manufacture then liberalization of economies and transmitting or transportation of the components.

To the manufacturers or the supply chain partners in just in time there so that you keep minimum levels of inventory and reduce the cost so that becomes what is called a co evolution that is what we were talking in the previous slide so the co evolution has been possible because

Of the all these four things are basically correlated in other words a particular supply chain master he is aware of the resources he is aware of the countries regulations rules.

And so on is aware of what kind of logistics and other facilities that are available so can he cannot reduce to use those and select the suppliers are the partners and use it to his advantage so that the total cost of production comes down that is a co evolution and similarly you can have what is called the risk problem what is the risk here supposing there is a financial problem in here in one country now the financial country maybe because when you have all sourced.

This you are using the resources in a particular country and that particular country the financial issues are important because they are either your customers country or they are your suppliers country supposing they are sub or sub your customers country like in the United States or the U.P and so on so supposing when there is a financial crisis there like it happen in 2008 in the United States then what happens is there will be what is called a credit squeeze so the financial crisis here there will be credit screech meaning that here the retailers will not be able to sell because the customers will not get loans even if they get the loans they are going to get it there. To pay higher interest so the customers are going to postpone the buying of these items that it be a refrigerator let it be a car or let it be a laptop or something There will either repair or use the world equipment rather than buying this that is one thing that gets affected so that means the demand he will drops so once the demand drops then across the chain everybody is going to cancel the orders and suppliers get affected and another thing that happens.

Is when there is a financial crisis is if your financial crisis happens in a country where your suppliers out there the banks you know what is called letter of credit to that is the stand guarantee for the manufacturer when the manufacturer is getting the products and the supplier is shipping to the manufacturer the supplier needs a guarantee that the manufacturer is going to pay or he has the capacity to pay so the manufacturers bank gives a guarantee to the supplier.

Bank that is called the letter of credit and the letter of credit can be used by the suppliers to get a loan and so on but the letter of credit when in case of financial crisis becomes very expensive so when the then becomes what happens here is the supplier will not be able to supply to the manufacturer so the supply chain gets affected and also the countries become product protective because when there is a financial crisis and their suppliers are not able to supply to the manufacturers outside.

They become protective and they want the country to the country is first rather than the globalization or the tree and once it becomes protective that means the import export and the globalization becomes d globalized so basically the risk from one part of the chain transmits to the supply chain and in effect either the quality of the product you are supplying goes down or the number of the quantity that you are manufacturing goes down or the cost of your production goes down.

Both up and so on so there is several ways in your supplier and gets affected due to factors supposing there is a war in some country and that country is supplying you I will then that oil becomes expensive that means the transportation costs become expensive that means the logistics of supplying you know in all this b2b b2c logistics becomes expensive and which means that your cost is of the total cost of your product which you are supplying.

To the customers becomes expensive so this globalized product dispersed supply chains one has to be extremely careful both it provides you innovation it works of co evolution but it also provides you with the risk and so you were governance then you are trying to put this governance at the this one then you should be able to first discern all the factors that affect your supply chain and you should be able to do the take care of this and acquired and design appropriate governance structure.

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So this is the virtual revolution which I already this product or process modularization leads to outsourcing and the low-cost countries liberalized like economies and reduce the terrace the internet enable secure man machine and machine machine communication and words hard and soft infrastructure logistics infrastructure gets developed and finally contract manufacturers third-party logistics providers consultants software companies have sprung up and it is still 2008 it is up and up and up and so on and everybody is so happy and similarly you can global supply chains.

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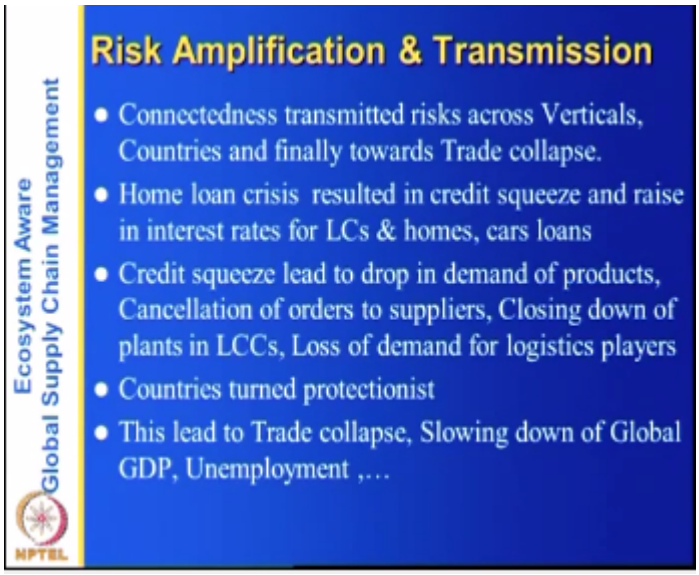

Have proliferated similarly you can talk of the risk amplification and transmission so connectedness transmits risks are as the verticals countries and finally towards leads to trade collapse as we have seen in the last class home loan crisis resulted in credit squeeze and raise. Of interest rates and credit squeeze lead to drop in the demand of products cancellation of orders to suppliers closing down of plants in low-cost countries loss of demand for the logistics players and countries turned pro texting protectionist and this leads to trade collapse slowing down of global globalization as well as GDP unemployment and so on so people are saying that they know there are a lot of articles in recent two thousand nine ten eleven which show which blame the global supply chains and their risk amplification and transmission through connectedness to the global trade collapse.

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So if you want to see what is that that has happened here in this global supply chain networks here you have a supply chain and all the four actors that ecosystem factors and in olden days the products they were produced they were integrated and they were locally produced and in terms of resources they were all vertically integrated and localized to enterprises so you are using local resources if you are in India then your Indian manufacturing.

You are using local resources you are not getting anything from anywhere and so there is this local manufacturers and controlled export that was the thing that about the world trade has not grown in earlier days so that is the institutional this one and you have delivery mechanisms which are paper communications and truck transport and service local markets that is the delivery mechanisms that people are used to so what this circle above shows is what was prevalent in the 60s and 70s.

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But now you have a global supply chain network now what does the global supply chain network mean what the products which are integrated and they were produced locally it has become modular and global production networks so there is a transition from local production to modular global production Network and similarly vertically integrated to globally distributed networks there is a transition in terms of the resources.

Which means instead of using your own resources earlier your and producing resources by yourself by having polytechnics and so on for labor for having banks on giving the loans for finance and so on you have now globally distributed networks that means you have to get financed from global companies where a mucho country over there you have to get human resources from the country which where you are sourcing.

And so on so basically all the resources become globally distributed Network and similarly the institutions have to deal with free trade enabled global markets from local markets and they were only exporting to rated enable global markets and similarly the delivery infrastructure has moved from paper communications and truck transport serving local markets to Internet enabled third-party logistics provider serving local markets so you can see that the global supply chain has made into these four factors and that is how the evolution that we have described has happened and our ecosystem aptly describes.

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All the factors that are involved in this so before we proceed further will let us look at the literature yes the literature is retract what are the drivers for global supply chain competitiveness there are networks to my lot of consulting companies McKenzie Deloitte and others who talk about various factors but not in this for items that we have mentioned in other words the World Bank talks about the investment climate and the Deloitte and other.

Manufacturing competitiveness reports they talk about various factors may give least about 10-15 factors but in our the advantage with other this one is they are all basically grouped into three factors and the fourth one is the supply chain but the supply chain is affected by three factors and they are the resources the institutions and the delivery mechanisms the advantage of these three factors is the following that you know where the decision-making help is who is responsible for the decision making.

And which are the institutions that are making decisions in other words if you are looking at financial problems you know banks are responsible for that so if you are looking a human responsible this one human resource productivity then you know their skill training as well as education institutions are responsible for it if you are looking at say regulations trade and all that you know their government departments if you are looking at the problems with your logistics.

With your delivery with your ports and so on then you know the other ports responsible so by grouping all the factor effects are the three words you know who is responsible for it and now

you know how to correct for those things so the resources labor material and energy and the government policies investments institutional and one mental and infrastructure elements which is economics trade and tax systems the legal and regulatory systems investment.

In manufacturing and so on and the delivery mechanisms so we have basically all the factors that affect the supply chain competitiveness of course apart from the supply chain itself or given this particular this one I am there are lots of reports without mentioning is three top Items all these things are listed as 10 to 15 or whatever and I have added my own here in this and there are lots of reports from consulted companies.

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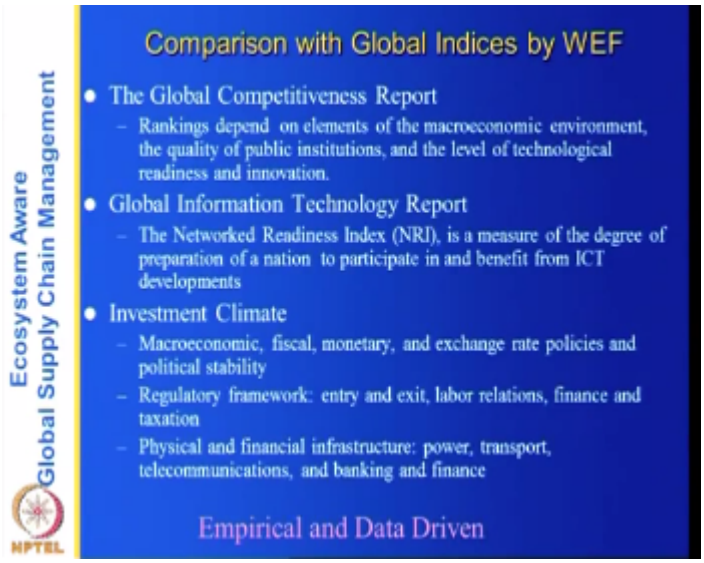

Similarly there is a comparison with global entities by World Economic Forum World Economic Forum apart from the World Bank on the investment climate has these reports on Global Competitiveness Report that is the rankings depend on elements of micro economic environment the quality of public institutions and the level of technological readiness and innovation of course this global competitiveness report does not include all the factors.

That we have included but it includes only some but still you know it ranks countries by these elements and there is the global information technology report which is the network readiness index is a measure of the degree of preparation of a nation to participate in and benefit from

ICT developments it deals only with the information technology which is a part of delivery infrastructure it does not deal with the institutions as well as the resources and the investment.

Climate which is a World Bank reports it is has three factors a micro economic factors the regulatory framework and physical and financial infrastructure power transport telecommunications banking and finance so these are all empirical and data-driven in the sense these institutions they which are making the report they collect lot of data and analyze it they are excellent reports but I will occur the ecosystem framework is much more general than what these people are talking about so if you take our framework it is possible to gain more knowledge more knowledge and then also give more info in law and informed decisions using ecosystem framework.

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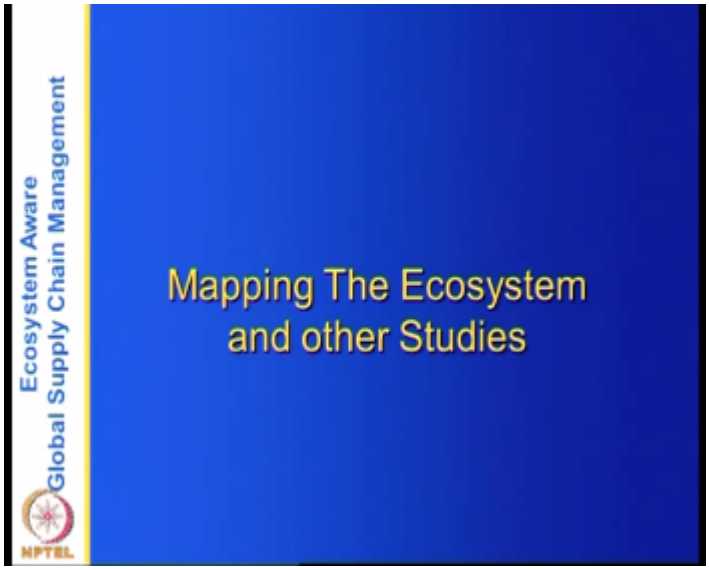

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So before we precede let us see how to map the ecosystem for some examples let us take an auto.

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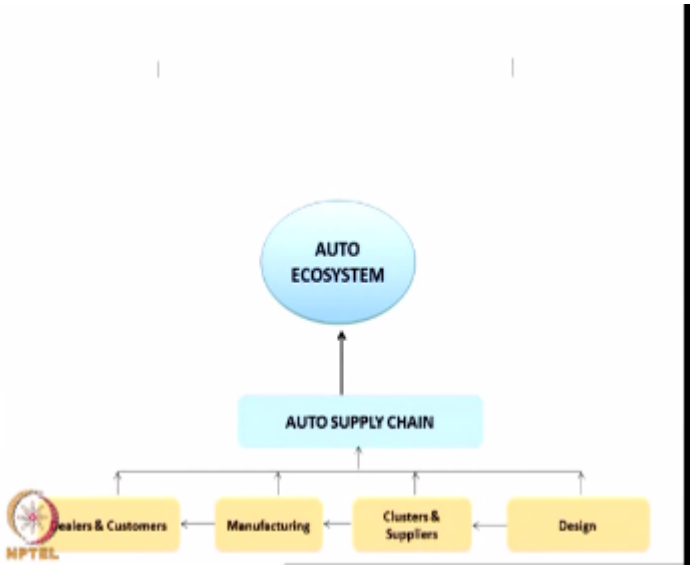

Example in the auto system we take that is the auto supply chain that is you have the design and then the clusters and suppliers manufacturers dealers and customers so basically that is the auto supply chain is that that one has LX ly look at what are the kinds of the government regulations come in and so on the government regulations are there are a lot of government regulations come in the free trade agreements for example India has free trade agreements.

In the auto with some countries there is the ACMA that is auto components manufacturers association and also CII which is the Confederation of Indian Industries these are the organizations that basically help in training as well as in making in helping the government in making policies and so on so this is the government regulations I am calculate for the Indian This one that enable country they have automobile Associations their industry associations and so on there are quality control and social environmental issues now the transport which is the auto system produces vehicles and vehicles produce lot of greenhouse gases and they use they use a petrol and oil so that becomes you know a lot of gas generation and inner environmental issues that are connected with this and also there is the quality control.

Depending on the particular type of roads that you have you have a quantity control of the vehicles and also there are the foreign direct investment policies for entry of the foreign companies in any country no Outsiders cannot come and establish this without the permission of the country so the FDI policies for example in India there the companies can come and establish here and their rules and regulations associated with that so there for example there a toilet oh there is whom died there is the GM and so on all these auto companies have

established the very presence in the Indian subcontinent so basically you can see that in the auto supply chain for a particular company how these institution factors help in establishing their companies they are establishing the presents are also in terms of any quality control and environmental factors so.

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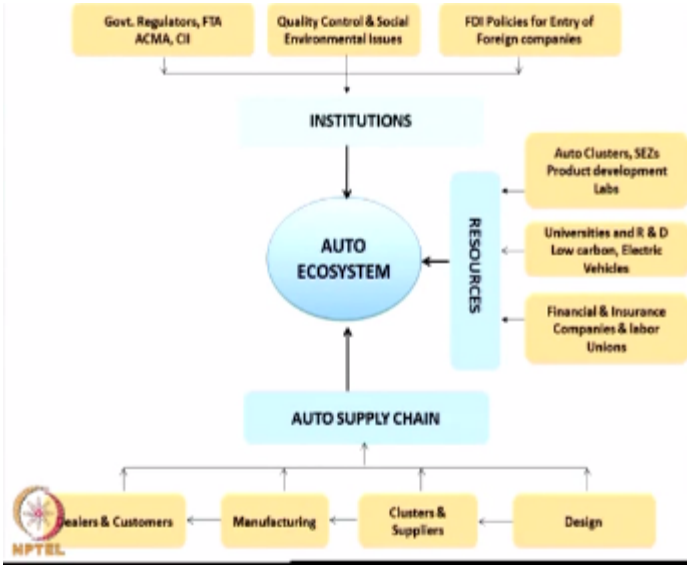

What are the resources that have needed the auto clusters the special economic zones and product development lab because the auto requires a lot of research and product development labs become very important and auto clusters for example in India we have clusters in the south in Chennai and in pune in the west and in a north in gorgon and near Delhi and so the auto clusters that is where all the auto manufacturers they basically try to place themselves.

Near the auto clusters and the universities and R&D in low-carbon and electrical vehicles because there are a lot of things happening in the auto industry that is because to reduce to make the auto industry environmentally sound people are going into gas driven autos electrical vehicles and so on so there is a lot of impact on the manufacture of these vehicles and financial And insurance companies and labor unions now auto industry the industry of all industries so in 1913 Henry Ford started the assembly line which has made the first auto.

The automobile as we know it today and so and also there is the insurance companies that are involved because of the accidents and other kinds of things and the labor unions are involved

in the auto this one there is a lot of financial assistance that is needed from the backs particularly forgiving the loans auto automobiles are very expensive for a person to buy so there has most people take loans and that is where the financial resources are needed.

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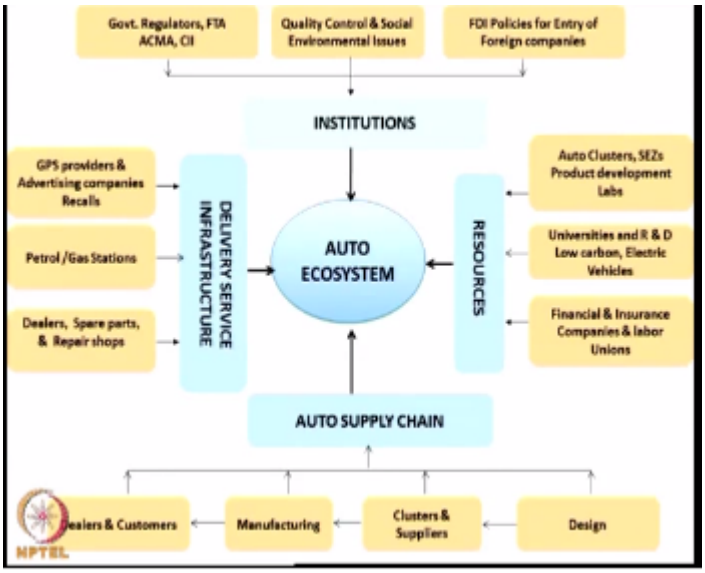

And finally the delivery infrastructure there the GPS providers advertising companies and product recall companies in other words in the auto for some reason or the other if there is a brake failure if there is something else then either all the products need to be record so you need to have some reverse logistics unless you need infrastructure and petrol and gas stations and also dealers spare parts and repair shops you know the dealer spare parts and repair becomes very important.

For an auto supply if you are a company you want to sell or over your car to the customers then you better make sure that the repair shops are available and all the spare parts are available the companies spare parts available at reasonable rates so you can see that we were able to map for an auto supply chain the ecosystem now you can see all these factors become very important if you want to make your auto supply chain is not just producing getting components producing.

A car and so on so there are other factors that are needed the banks that are needed to give the loans there replay repair shops that are needed and the governments has to permit you and the petrol and gas has to be cheap and it has to produce less emissions and also if you want

ultimately your product to be cheap your auto clusters you have to be present in auto clusters where you can get or in special economic zones where you get a lot of solves so you can see that this will give you the cosmic view of auto supply chain.

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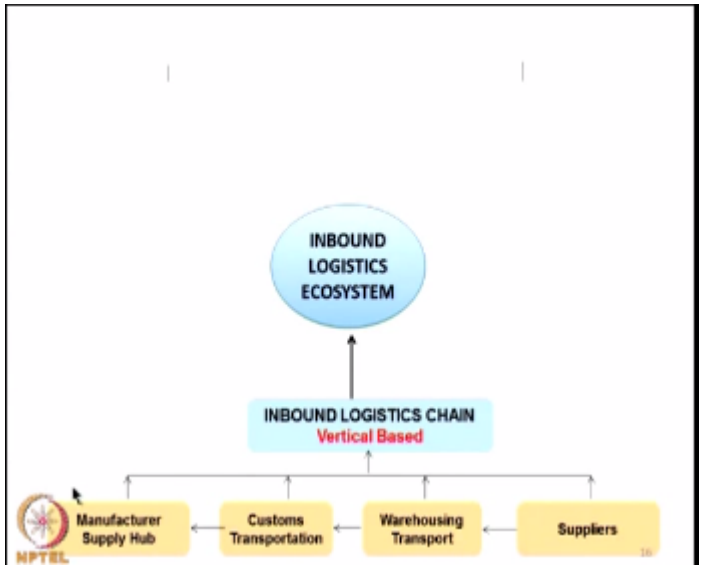

That is map another one which is a service chain that is the inbound logistics ecosystem that is inbound logistics is a logistics that is in transfer of materials from a supplier to a manufacturer Now in other words Agnes in order the supplier has supplies to a particular manufacture required quantities now this is important because the manufacturer product production depends on the suppliers reliability to produce this if you want to start your production.

At nine o clock in the morning then there should be assurance that take all the components that are available that are needed for the assembly of the automobile or any particular component but this one or on the road or near the near the factory or in the warehouse so what is the vertical based inbound logistics chain so you have suppliers for this one and it ultimately go to a manufacturer or the supply chain but in between you have warehousing on transporting.

And also customs and transportation so in other words with the both ends you have the suppliers here at the suppliers they have a warehouse where they will store all their inventory and there is the transportation that takes it and if it has to cross customs it is crossing the country singers go through the customs and then transported to the manufacturers warehouse or

I supply how we have seen what is a supplier business so this is very briefly the service chain that is associated with the logistics.

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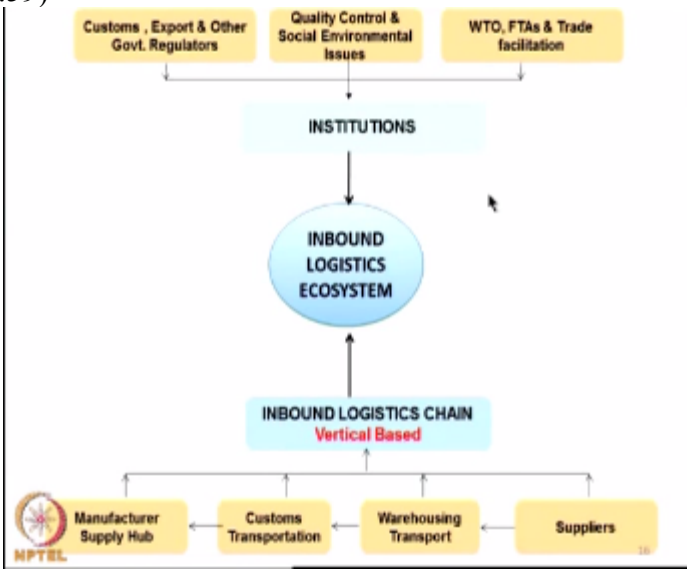

Now here what are all the institutions coming in because you are crossing the countries then the customs export on other government regulations that you need to quality control social environmental supplies and you have World Trade Organization free trade agreements and trade facilitation that affect the time that is taken for your at the port for customs clearance so all these affect the institution rules and regulations affect and also affect your the transit time at the port.

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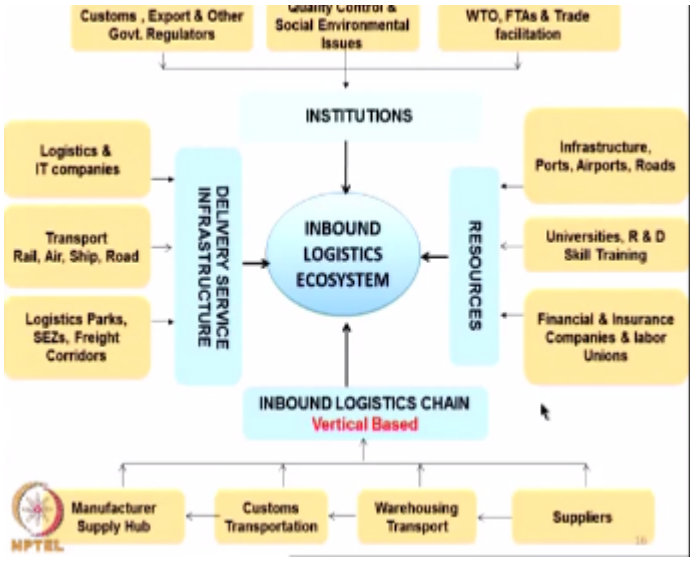

And what are the resources of course the infrastructure ports airports and roads and the university is already and skill training financial insurance companies and labor unions these are the same for the as in the auto this one because the same kind of logistics so you have logistics companies and IT companies that are in one and the transport the dial-in ship and road transport and logistics parks as chats and fried this one so you can easily see the map.

Although your Supper from suppliers to your transporting end to end in this and this particular thing is vertical base that is if it is auto this is different I mean these are all general labels but this vertical these are all these things are vertical based auto gas or electronic and so on so we are able to map this for a service chain this so given an example if you are working for an industry you can lap your own supply chain and see the effect of whatever the bad infrastructure on your supply chain the non-availability of financial loans on your supply chain the labor productivity on your supply chain and so on so branded the government regulations on your supply chain you could easily affect this so these two examples will give you some kind of an expertise.

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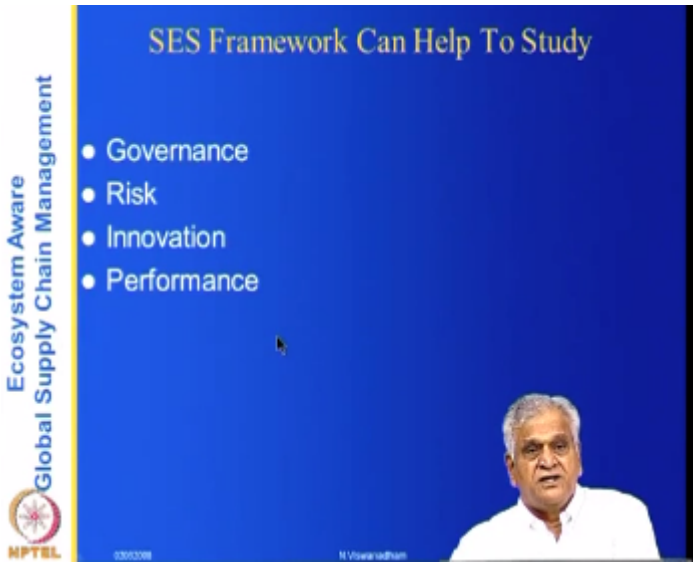

In mapping the supply chain so this as I said before the supply chain ecosystem framework can help you study governance which means how do you govern your globally dispersed apply chain you can evaluate the risk and the risk comes from all the four factors it can come from your supply chain of course that lot of people know how to study it can come from resources like the financial resources or it can come from the human resources or it can also come from the governments by just saying that they are turning protects or it can also come from your delivery infrastructure.

Delivery infrastructure labor strike sport strikes or it can be the truck values or it can be several other things or piracy during in the in the in the see and so on so similarly innovations can come from the governments it can come from the resources it can come from of course your supply chain and also in the delivery infrastructure your performance that is your lead time cost and other factors they are also depend on the four factors for example if you are talking of a lead time people usually talk about the lead time for the suppliers of the supply chain but if you are crossing the countries then the delays in your in the in the port or the delay in your delivery is going to affect your returns the total returns which are n to n so it we will we are going to consider all these four factors in future lectures but suffice.

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It to say that now as far as now this framework can help you study all these four factors there for another thing that is from a strategic perspective this particular perspective gives you their five factors people with five storm forces 10 S stands for science scientific research generates new and improved products they are as new technologies internet and search emerged at a rapid pace and new engineering materials and design come out.

Every day and what we are now introducing one thing globalization brings new challenges following of regulations and policies of the several countries the intermediate products visits regulations such as climate change require attention and finally you have new management techniques and business models such as outsourcing sell direct supply hubs or invented to phase computation and enable good so what this particular SES framework gives us is that there are five forces that are needed and usually people talk about stamp framework science technology engineering and mathematics but what we are saying here in terms of global supply chains you have two more that are needed which are regulations and policies and the management new management techniques.

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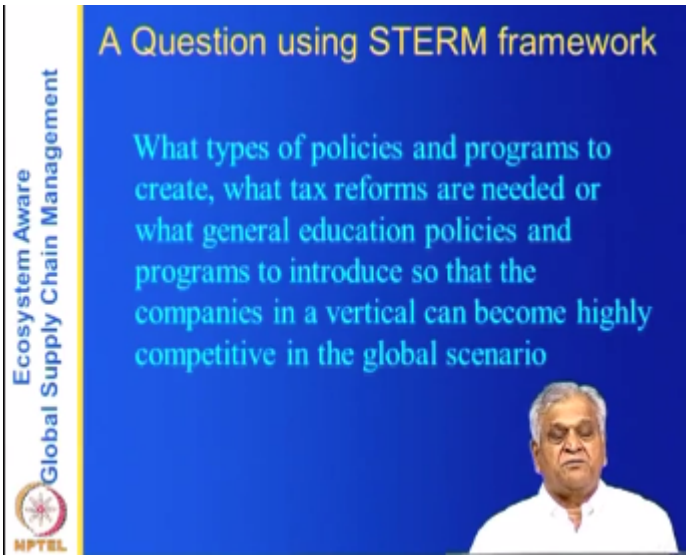

Yes and when you talk of this term framework what type of policies and programs to create what tax reforms are needed or what general education policies and programs to introduce so that companies in a vertical can become highly competitive and in the global scenario so in other words this is the worst question here if you want supply chain competitiveness people usually talk about cost-cutting within the supply chain or doing.

Something else of lead time just in time and so on but here there are other factors like what are the policies and programs to create your country can create and you can create tax reforms are needed and the general education policies to introduce so that the vertical become highly competitive and so on so the other three factors become or can also help in making your supply chain competitive so what are the conclusions.

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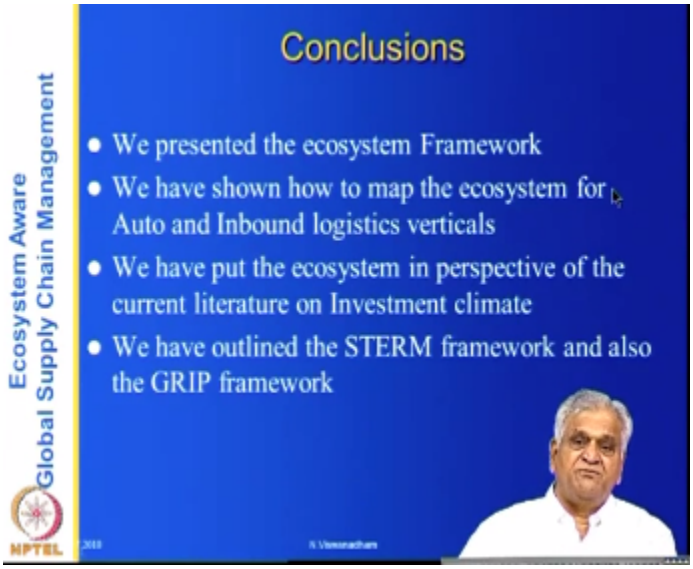

That we have here conclusions are that we presented the ecosystem framework that is there are four factors the supply chain of course and the resources the supply chain uses and institutions the governments they supply chain visit and the social institutions within those countries and also the delivery mechanisms the supply chain uses they are also become very important and we have also shown how to map the ecosystem for auto on involved logistics vertical.

Well you could do it for food supply chain you could do it for a telecom supply chain and other things and that will give you how these things the other factors affect this and it will give you a cosmic view of things so one exercise that you could do is if you whatever vertical that you are interested in then you can just map this the ecosystem and then see what it gives you in terms of the knowledge and if we put the ecosystem in perspective current literature on the investment.

Climate we said our ecosystem is the there is the World Bank investment climate which is our ecosystem is more particular to this particular supply chain than the investment climate are also there are several reports by consulting companies like they are like makalasy and others and other report basically puts all the factors that affect the supply chain into three big factors and the advantage of having three big labels institutions resources and delivery.

Is we know where the decision-making power is there so if you want to affect the financial the problem then you know where it is it is in the resources so if you want to affect the supply chain you have to get into the bags if you want to affect the transportation problems in the delivery

mechanism you know where to and how to how to do this if there is any problem with the regulations then you know where it is and you have to go to approach the government decision-making powers.

So we have outlined the stem framework and also the grip frame work here so what we are going to do in the next few classes is the next three pluses we are going to go into the each of these frameworks in detail for example will go to the global supply chains and afterwards the delivery mechanisms and afterwards the institutions and the resources in greater detail and expand that and then we are going to look summary applications that we could do and finally the grip framework with examples so thank you and then we will talk about global supply chains in the ecosystem framework like the next class thanks.

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