Indian Institute of Science
Bangalore

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Global Supply Chain Management

Lecture- 37
Overview of the course

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In this lecture we are going to do the summarizing of the entire course so either you can listen to this lecture in the beginning so that you know what is coming in terms or you can basically listen to the end so that you can summarize what you have learned but this will be an important lecture that is because we are going to mention what are the what is the way forward in terms of this I mean as we mentioned before this supply chains are very important and labor product or service is the result of a supply chain of service chain and bills are affected by extraneous factors outside of the supply chain so people know how to design supply chains.

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But in the presence of these extraneous factors that is the ecosystem where supply chain management becomes very important thing and then the contents of this or from my book authored by me and Commission which is published by world scientific which is released just a week ago so it will start in the next one hour we are going to look at what we have learned so far see what we said is the highly connected supply chain and fragility.

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So over the last couple of decades the people who have spent a lot of time and effort to basically design highly efficient supply chains and the result is we have highly connected and fragile supply chains so when we have connected and preside then the risks travel from one place to the other but also the risks can break down can bring right down to the in the supply chain so we look at that and because of that there is a need to look at the ecosystem occur the risks come from a number of factors which are outside of the supply chain but come from the government comes from the resources and so on.

So people have been saying that these risks are there to model lunch on the list the tens and twenties and thirties of the number of risks but what we are going to do here in the ecosystem model is to say outside of the supply chain there are only three factors which affect the supply chain three very highly generic factors they are the resources there are the government's are the institutions and third one in the delivery mechanisms and those are again can be subdivided the resources can be human natural and financial resources and Industry resources and so on so.

And the comments can be governments and social factors it can be state comments central governments or the local city governments and so on so the issue is that the ecosystem model captures all the factors that will affect the supply chain and we are going to present the that generic and cosmic view of a supply chain and present all these factors and then we look at the drip framework that is the governance risk innovation and performance.

So the performance obviously depends not just on the supply chain but on the delivery mechanisms on the resources if you are looking at the cost then if the resource costs increase or the human resource costs increased then there is going to be an increase in the cost and if there is some later yes in terms of the customs clearance then your lead times will get this one so basically your performance innovation razor risk and cleverness depends on the four fact all the four factors.

And we look at some applications try and show you what degree in supply chain design is on conclusions because of the shortage of time we will not be able get into the details of the application but I will just show you this and you can listen to the applications.

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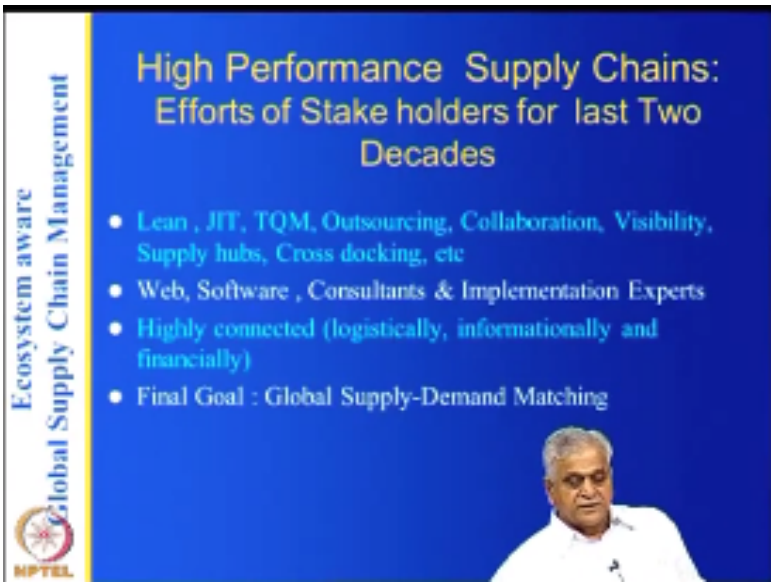

In the other lectures so high performance supply chains efforts of state stakeholders for the last two decades so there are lean, JIT, TQM total quality management outsourcing collaboration visibility supply chain cross docking etc you name it you there are several of these things that have happened of course you have very variety of resources like web software and then consultants and implementation experts they have come ERP SRP and all this software and the logistics you have software like transportation management systems.

We are also management systems and all that so all the software and interconnection of the global supply chains have made them highly connected now why did you make them hike and highly connected because you want them to be logistically connected so that your goods move from one place to another one city to another city one continent to another continent just in time so you have basically the logistics providers who are who won ships who own aircrafts and so on so.

That we the logistics is very well connected and similarly the internet other communication devices have made it informational II connected and of course financially once the finance becomes information because the banks are all very well connected with the Internet and the bad connections transfer of money Elsie's letter of credits all become very easily so once you have all this what is the final goal of for the supply chain of all these I connectedness the high connectedness is global supply demand matching.

So you do not want to the war do not want to miss the customer so you want to have the customer orders fulfilled as quickly as possible so we supply demand matching right of course when I say supply demand it is high quality products at low cost which the customer lives.

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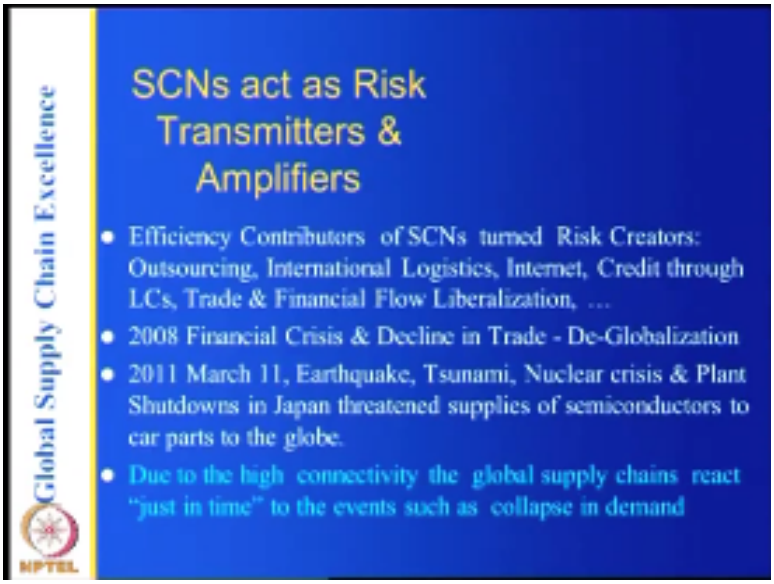

But then the supply chains also has elected as service transmitters efficiency contributors of the supply chain network have become risk creators for example outsourcing I create a lot of ways like information risk like theft of intellectual property international logistics has created piracy and others problems internet of course you have other security problems credit through LCS if there is a financial crisis the letter of credits become very expensive trade and financial flow liberalization and all that now the liberalization is good when the things are good but when there is problems of financial crisis then liberalization becomes protectionism.

So the other thing can try can go the other way around and turn its face and then say in slow globalization or help reductionism so 2008 financial crisis and the decline in trade and that people thought whatever is the globalization has happened and that globalization can be d globalization because there is a decline in terms of the trade that has happened and 2011 March 11 earthquake and tsunami nuclear crisis and plant shutdowns in Japan threatened supplies of semiconductors to all parts car to car parts on to all parts of the globe.

So basically when the tsunami has happened I mean Japan has been a contributor to most of the industries that has created a lot of problems in this due to the high connectivity of the global supply chain then they react to just in time to the event such as collapse and in that for some reason that happens in the United States financial crisis or some disaster then if there is a collapse in the day in the demand then that will just in time cancel the orders in China and that will make the logistics providers have no work so this correct high connectivity has given the possibility of higher risk and the recent.

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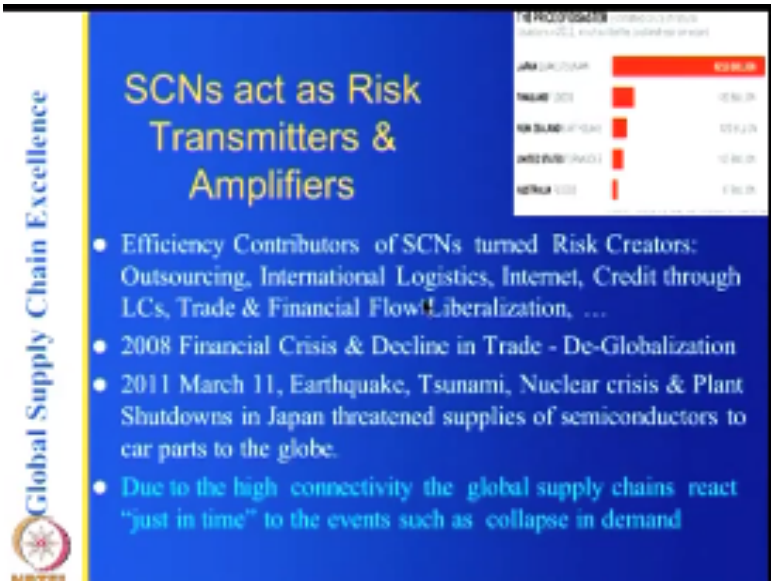

The earthquakes tsunamis and so on they have created a lot of problems for the people and Japan earthquake has 210 million dollars loss to Australia flights at seven billion and so on so well anything that happens anywhere in the world has an effect on your supply chain.

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So if you look at the 2008 create collapse if you look at 2008 quarter three to two thousand nine point four that is synchronized collapse in the global trade you can look at all the countries

both the export and import has come knock so the global trade s has collapsed twice as much as the global GDP but people why this has happened global trade has collapsed that is because of the supply chains and they are instant transmissions of the risk globalization highly connected supply chain amplified and transmitted market collapse across the clip and also governments turned protectionists.

The resources become very expensive and high concentration clusters became very colorful very vulnerable if you have all the electronic clusters in Japan then there is an earthquake in Japan everything gets affected and all the supplies of electronic components to car parts they per don days for the production in other parts of the world stops so organized organizations extreme least in the supply chain like the government's tradeoffs energy social political factors influence the performance.

So what we were used to in the supply chain literature is to study the effect of your supplier the suppliers costly times and so on and the quality that all those people are aware of the risks that face social government and other resource rates and so on they have not taken into account while designing the supply chain they have not taken these factors into account while analyzing the supply chain so that is what we are going to do what or we have done in the in these lectures and that is what we are going to present.

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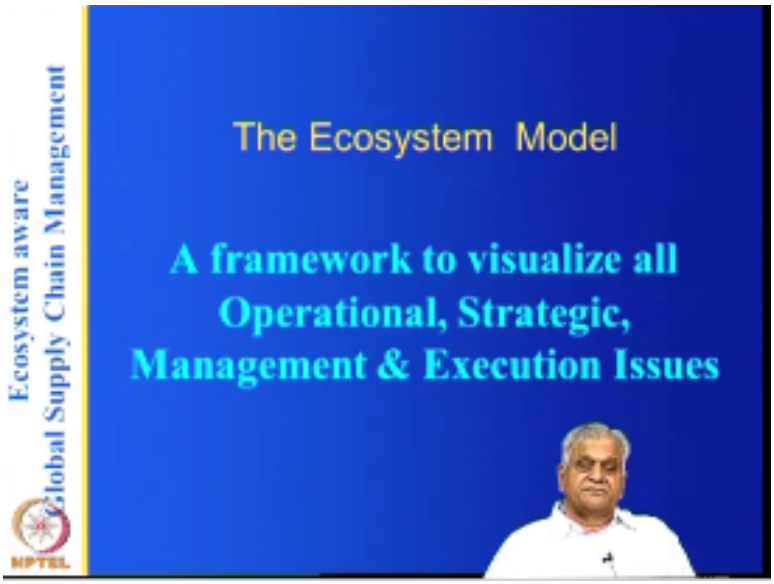

So that is what we call supply to an ecosystem model so the ecosystem model is a framework to visualize all operational strategic management and execution issues of is a supply chain so it is not just right cheek issues it is not just planning it is operational management and execution it also gives you the governance of the supply chain how do you govern what is the mode of governance that is best suited for your supply chain what are the risks it faces what are the innovations that are possible and so on.

So let us look at the way what does the eco system consists of and in if you definitely have a definition that is borrowed or closely matching the biological ecosystems so eco systems comprising of a network of companies.

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Countries their governments social and political organizations natural industrial clusters financial and human sources and delivery infrastructure including logistics IT connections and knowledge of the industrial environment interacting together with the landscape and climate and the climate here is there going to make an industrial climate and the landscape is the vertical landscape the vertical is either its healthcare or it is it is food or it is or no it is electronic and so on.

So there could be there could be a interactions between across verticals but for this purpose to keep things simple we will talk of a vertical of a supply chain and their interactions on the vertical of this so for us the ecosystem is basically that consists of all these factors so let us look at the diagram of the ecosystem you have the supply chain ecosystem.

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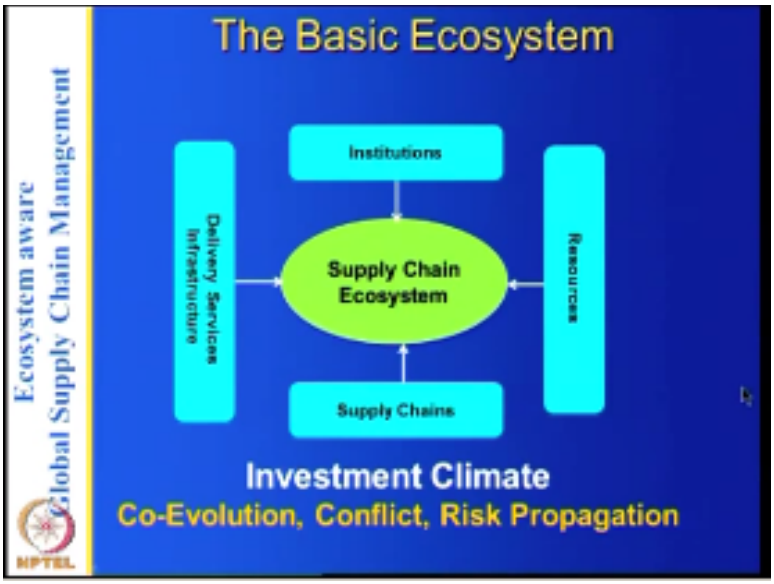

You have the supply chains which is of course consists of from suppliers to the manufacturers to the retailers and the finality consumers we have the resources and these resources or the human natural financial resources and industry clusters and others like educational institutions or any organizations and all that the institutions are the government's and social factors now if the supply chain has say three thousand suppliers and then they are all there in 10-15 countries you have to talk of 15-20 governments and you have to talk of the resources in each of those countries and of course the delivery mechanisms are the ones that transfer goods.

And the information and also the finances across the supply chain partners so since we are talking of global supply chain this will be the delivery has to be international delivery so you have the disc LEDs ecosystem that we consider and the investment climate these three are called the investment plan in the World Bank on other reports where people have talked about the investment climate of a country or region now the investment climate is basically the institution's resources and the delivery and also the business friendliness of a particular country.

If you can look at all those then it becomes the investment climate there are lots of reports on the investment climate of China India each of the states in India or by the World Bank on other organizations there is also what is called as co evolution the co evolution particularly it corresponds to the innovation any innovation whether it is product or process which is typically

considered they just cannot survive by their own for example if you call it the modularization of products in the supply chain.

As an innovation instead of making integral products of one kind you design the product so that they are all modules and these modular products each of these components can be produced in one of these anywhere in the world so the modules are standardized the processes or standardized and so you can outsource them so that takes it to low cost resources and when he also other countries come into picture and you have the country's coming into picture that is instead of they have to liberalize their economies

And of course when you are transferring goods you should have good infrastructure so what happens modularization leads to Otter Singh outsourcing leads to it can happen only if there is liberalization and liberalization says that there should be logistics providers so you have determined that growth of the logistics providers UPS DHS DHL and others in the across the world then they wanted to you a single entry this one logistics for they across the global this one so you have you have resolution of this since this is a modular radiation has been successful in electronics it moved to apparel it moves to somewhat into a air pole apron air auto and so on.

And that is what is happens with the co evolution and there is also risk propagation financial crisis financial crisis it makes the supply chain demand very expensive that is because you cannot get loans once you cannot get loans and other loans become expensive than the demand drafts once the demand drafts they are the orders are canceled and also the financial companies also give LCS to this one letter of credits they become expensive.

So the businesses get affected so this means there is a demand drop means there is a drop in the in the demand for the logistic services when all this is happening the countries become protectionist so you can find that the financial crisis has created the trade collapse so you can explain the trade collapse using this diagram and that is what the ecosystem is ecosystem explains both the globalization as well as the risk propagation and so on the tomatoes the investment climate depends on the vertical in the World Bank as investment climate is for a

region or country a respect to the vertical so but it is important to note that investment climate for a particular vertical is more important.

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So we have the supply chain delivery service at mechanisms resources and institutions for this

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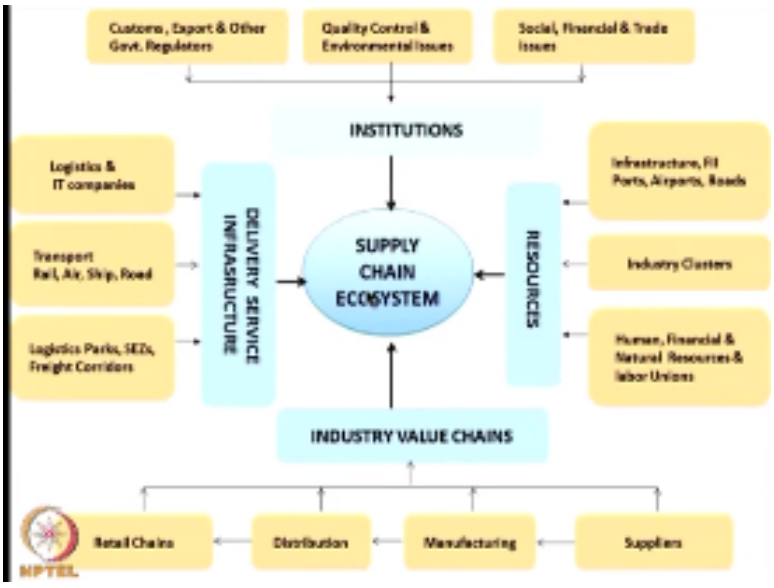

So if you want to map this ecosystem you have suppliers manufacturers distributions and retailers as the value chain or supply chain and you have all these institutions which are the government's customs export and other government regulators quality control social financial and trade issues which are connected with this and of course the resources which are infrastructure for an institution investors towards airport and roads and industry clusters human financial Natural Resources labor unions.

And you have largest exciting companies transport rail road infrastructure logistics box and so on so you can see if you want if you want their business to survive you require all this you want the trucks for b2b and b2c transportation or it is one reverse logistics and you want of course the resources for manufacturing 1p education institutions to train people you want of course the government's to allow foreign investment into the country or foreign investors coming into the country either to establish manufacturing or two or four for service industries and so on so this supply chain ecosystem aptly models all the logistics all the global supply chain.

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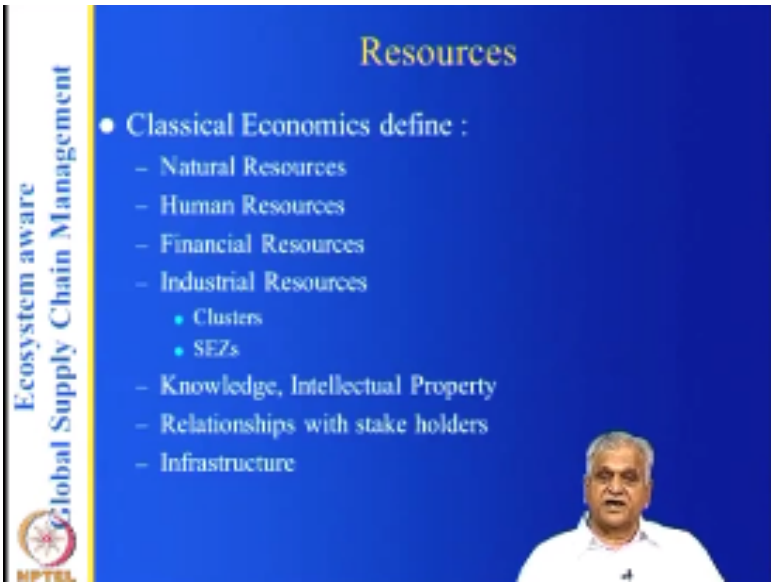

So if you look at one by one what are the natural resources the resources include natural human financial resources and Industry resources like clusters special economic zones and they also include knowledge intellectual property relationship with stakeholders and infrastructure now

one view SD forum is the what are the resources that affirm needs and there could be all the all the inputs and outputs and so on but there are soft skills that are needed to run the forms nowadays and their connections with the government connections across stakeholders if you want something they stakeholder listens to you.

And he respects your order because they are so much of computation it becomes it becomes a very difficult to get attractive attack the attention of your stakeholders so if you want to do this you are to have connection and good relationships and also things are changing so very fast and there are disruptive technologies all around so you have to be careful about the intellectual property and the knowledge about one who bought industry vertical what is happening what are the those things.

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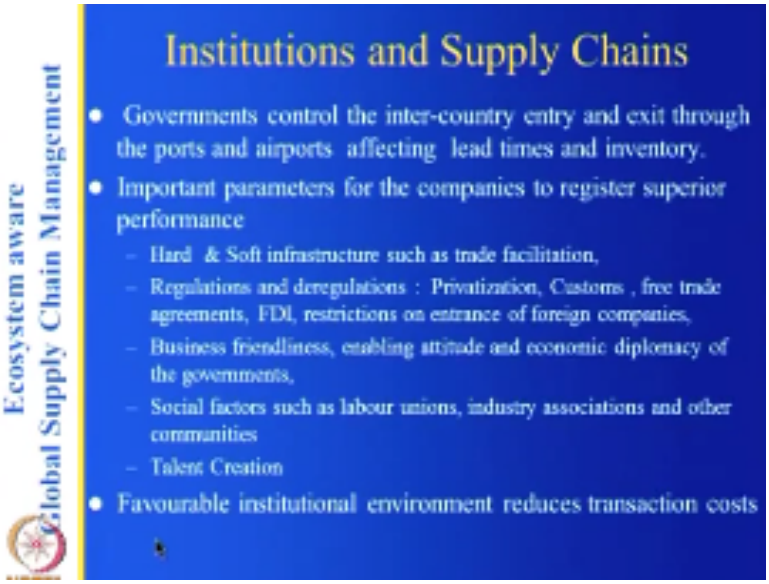

Well where are institutions and the supply chains or government's control the inter country entry and exit through the ports and airports affecting lead times and inventory so important parameters for the companies to register superior performance or hard and soft infrastructure such a trade facilitation because when you are crossing the reports you need not have to spend more time regressions and deregulation privatization customs three free trade agreements foreign direct investment restrictions and on entrance of the foreign companies.

Of course you have business friendliness enabling attitude and economic diplomacy of the government's see ultimately any business that is coming into the creates value through economic development it creates jobs for people it gives you the people the products that they need so their social factors and such as lower lenience industry associations and others and also talent creation you need talent to run this talent is both hard and soft skills knowledge of the subject in which they want they have to work and also the soft skills is which is the relationship with other employees relationship with other companies and so on.

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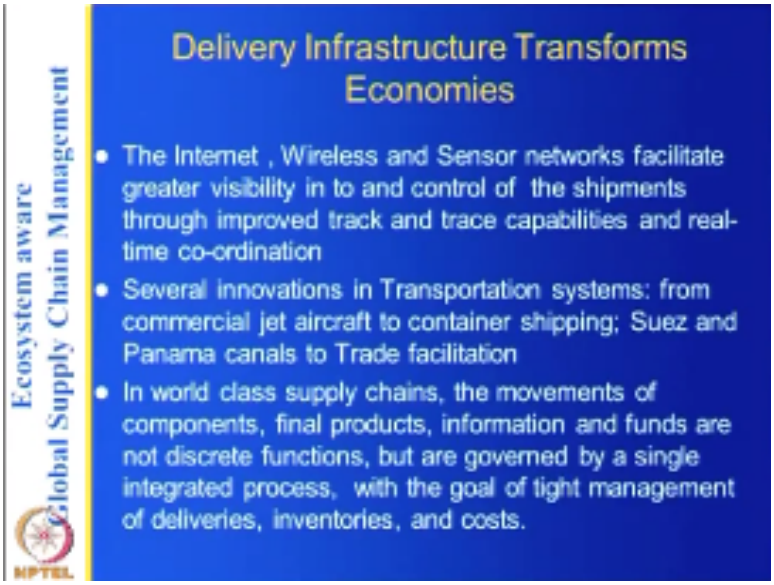

So delivery infrastructure track and transform economies the internet wireless sensor networks facilitates greater visibility to into and control the shipments through improved track and trace capabilities and real time coordination so the sensor networks have become very important several innovations and transportation systems from commercial jet aircraft to container shipping so as when Panama cannot to trade facilitation so there are several innovations the innovations need not have to be always product and earn processes.

They can be services like transportation system containerization is a biggest renovation of the sentence and Suez and Panama canal's is another big innovation that we having so innovations can be either in terms of resources or it can be in the institutions government regulations or it

can be in terms of products processes and so on in world-class supply chains the movement of components final product information funds are not discrete functions but are governed by a single integrated process with the goal of tight management of deliveries inventories and cause.

So you should understand although we are showing them as four different aspects they are not separate they are tightly integrate and the governance mechanism for the organization structure which you are going to design has to take into account all your resources all your supply chain factors all your government relations and also the delivery infrastructure.

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So that is the basic ecosystem that that we have so far formulated so the ecosystem is has four elements apart from the supply chain which is one arm of the ecosystem the other three arms are resources the institutions and the delivery mechanisms these three were seen that the very affect the supply chain a lot now one thing one should understand is that their global supply chain or in the all the companies or independent companies it is an entire organization network any supply chain is an entire organization network you have in China.

The supplier in china and IM in the USA I have been the this they have a relationship alright but we the way am does not have any control on the supplier if the terms are good they both L to write the terms are bad then they do not so the ether organization network where companies

are independent entities and they are bound together by some factor and that is the market factors and the governance of that the performance of set where what are the innovations are possible and what are the risks with faces or important issues.

That is what we are going to look at in the next few slides but suffice it to say that the ecosystem framework you can map the ecosystem for auto you can map this for food you can map it for telecom you can map it for or any other logistics ornery of these services it would be good exercise if you are working for some company it will be very good exercise to map the ecosystem for that company if you want some examples you can refer to the book or the previous lectures this so then this the clip framework as we call governance risk innovation and performance now when we consider this will kind will go in the reverse order.

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So international chains lead time and cost if you look at the performance means V time and cost right causes several countries making supply chains long and fragile these terms are dependent on resources the clusters if good clusters they closed by then the lead time is less if the clusters and view your fellow supply faulty components and they have to be inspected then the laundry times our law infrastructure customs clearance logistics and IT providers and their business

models and the pre tax costs or dependent on tariffs transport costs energy costs and foreign exchange situations.

Now the post at net income depends on transfer prices income taxes rules in various countries well most countries file their income tax returns in the where the country is headquartered it all depends on how what is the kind of relationship that countries have if you are sourcing from a country from another country supplier from another country then what is the kind of relations is both these countries have so the cost let us look at the enablers of this.

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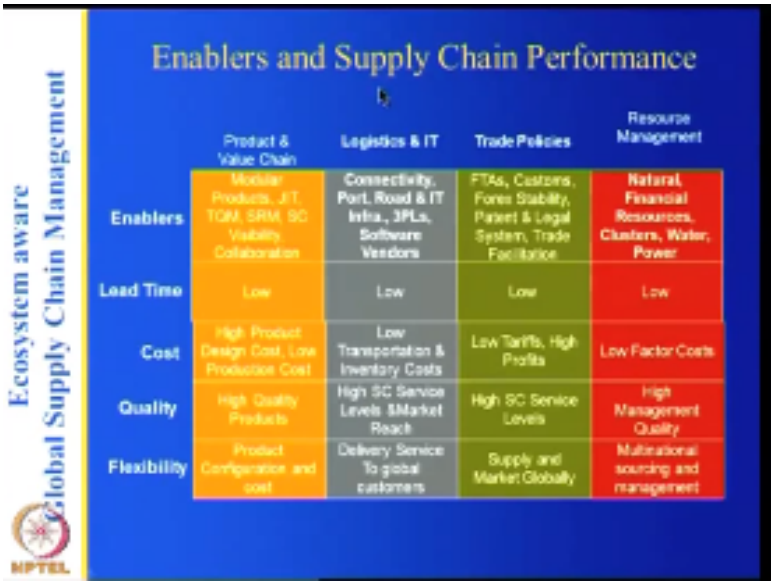

so if you look at for example the supply chain global supply chain if you look at the product and value chain or the supply chain this module product as I told that the products are not integral products they are not designed as a single one like a scripture but it is a parts of modules and they are screwed up to form the total part and those you have just in time total quality management supplier relations management and supply chain visibility collaboration these are all the factors that that have taken into account.

Once you implement all this you have ERP SRP and other packages which are basically integrating all your supply chains then you have some kind of web services switch with this then you have any rated supply chain so the enablers for a supply chain or these are the factors

the fact that they are modular so that they can be outsourced and then they can be integrated later and also in case of repair the module that is spoiled can be thrown out and you had to replace only the module not the entire product and logistics of course many were when your product is traveling across continents.

And it is visiting lot of ships a lot of ships and lot of words then connectivity port road and IT infrastructure 3PLS software vendors become very important so if they are all good then you are your logistics is good trade policies free trade agreements customs for an exchange stability pay attention legal system great facilitation these are all the trade policies that under come under the institutions and resource management natural financial resources clusters water power they are available and cheap then that is good.

Now if you have all this or enablers for a general supply chain ecosystem then the late and this leads to a time is low all these things are low so you have a basically as the your product is traveling across continents it goes off smoothly without any problems and you have both hard and soft infrastructure which will carry through the product across continents and similarly if you look at the cost of this high product design cost and low production cost because the pro high product design cost comes because of modularization and otherwise no transportation invasion cause low tariffs no factor costs.

So the cost is going to be low similarly you can interpret the quality and flexibility and so on so what does the diagram show it shows that in global supply chains if you want to get a good lead time low lead times then you have to have consider it helped as it goes through all the countries you have to map its journey through all the countries and when you are visiting a 10-3 beware of the connectivity beware of its travel policies may beware of the resources that it has now if you want your only time to below then in all the countries you are visiting for you have business with you have to have very good investment climate.

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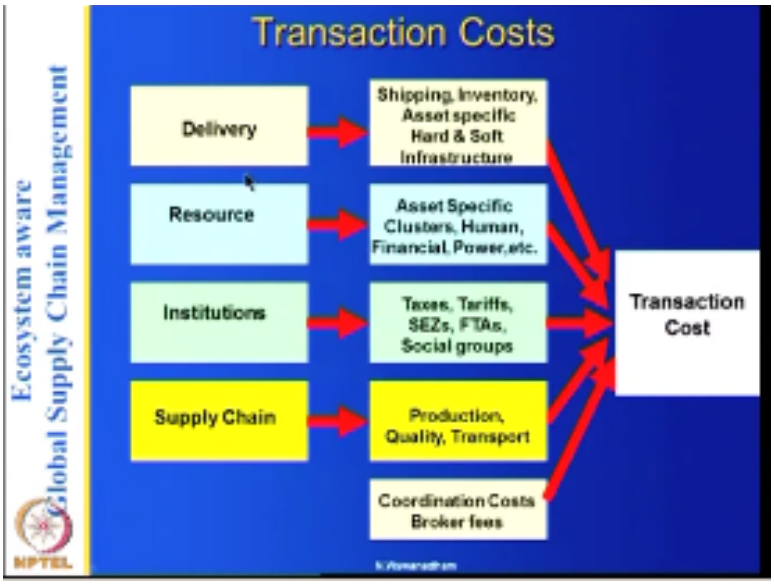

So if you look at the transaction costs unless they have the supply chain cause we have of course the delivery cost shipping inventory assess specific hard and soft infrastructure sometimes the infrastructure may be dependent on a product of that you have this one and then you have resources as set specific clusters that means if you have electronic business then you have electronic clusters if you have the shipping business you have the shipping shipbuilding clusters and so on and of course institutions which taxes tariffs SE jets and after years and social groups and also the coordination cause because a lot of coordination that is needed then the product moves the end to end.

So somebody need to coordinate and there are several thousands of players in involved in all this so if you are looking at the performance of the global supply chain you can see where you are moving you are moving from just taking the cost of your product to you have the post parry the product of the COS plus the transportation and other cause you have resource cause you have access and so on so that is what it is a global supply chain and of course you should not leave out the coordination costs because somebody has to orchestrate the movement of the goods across the board.

So it would be interesting if you can map the product which is going through three here four countries and at each port you can you can take a lead time and so on as random variables and

also the costs and other factors and you can basically model it is a queuing network or something and then see what happens.

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So you hid ourselves lots of innovations when we say innovation basically we talk of products which are Nano video games cell phones search engines I pad and so on we talk of services like email he retail face book and so on we talk of new technology solutions like for example the water power another gas and other networks they were basically designed years ago decades ago and at that time new technologies IT and were not available so you want to use those technologies to make this network smart.

And new business models like containerization outsourcing BP was FD foreign direct investment sell directly write L ATMs clouds and so on there several of these new business models which are come there are all innovations.

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But also you have industry clusters special economic zones in China freight corridors new universities they have all come up and you delivery infrastructures digital delivery containerization Suez panama canals so you have government regulations process bait and product bait and deregulation of telecom and airlines back to green free trade agreements and other things so if you look at what are the kinds of innovations that will affect your supply chain any of these innovations.

For example if you make a regulation on green saying that you want to have fuel efficient cause then you have to make a lot of innovations in your this one to meet the regulation.

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And what are the kinds of supply chain race there are lots of supply chain race there is that come from the product as well as the supply chain and the rest that come from the institutions because there are lots of regulators they can say the environment should be clean and green so what does that mean for your company you have to figure it out and they put a carbon limit on your carbon GHE gases that your company can emit so you have to find out how to reduce these castles or involving carbon trading.

So there are several of these things and then they may say import duties import export duties they are all decreased increased and so on there are several changes that happen every day and also resource related risk the infrastructure deficit and the talent shortage and there is supposing level labour unrest that happens and raw materials price increases which is happening now these are all the resource related risks oil price increases so on of course the delivery infrastructure that is either there is the failure of the failure of the IT infrastructure or the logistics infrastructure there is an accident of the truck to anything like the natural disasters leading to inability to coordinate operations and so on.

But also piracy Somali pirates are creating problems only this Way's cannot so you have you have all these problems that are this one these are all there is well once you have this risk how do you mitigate this race is it possible to eliminate all these rays It is not possible how do you mitigate these kind of race so if you cannot mitigate them how do you absorb them what is the

kind of risk policy that you have so there of companies which will take risk as operational procedures in other words there is captains a truck for this one you are prepared for it you know what to do you have addition support system.

Which tells you whether you should send another truck view or you know you send another repairman to repair it depending on the on the situation there so supply chain handling their supply chain risk officers which are basically being appointed now but if you treat the supply chain risk as an operational problem and leave it to the operational people who are knowledgeable about the operation of the of the system then probably that would be the best strategy because of his supply chain officer is a fresh guy and he comes in and he has to take the help of the operational guys in any way.

So supply chain risk management is a is a big issue of course the governance if you governance of vertically integrated enterprises is well known most of the early risers of the industries were vertically integrated like for General Motors and so on there is a president vice president's and so on so they the placement test the highest authority and his word listen to but in a global supply chain you have independent companies nobody is the boss it is only the market compare the mechanisms that keeps them together.

So in which case what are the kinds of governing structures that you do who tells the partners what to do and when and how and what is the kind of technologies you should use and what is the quality control measures so all those issues require attention and that is the governance so you have the government's in the supply chain is an intern organizational network.

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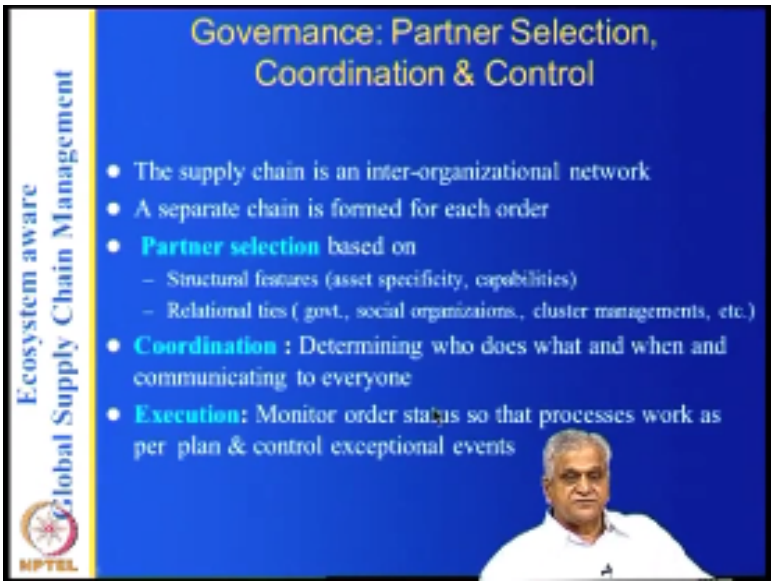

And nowadays a separate chain is wrong for each order that is partner selection there are three steps of in the supply chain governance one is partner selection second is coordination and third one is the control what the selection is based on structural features or in other words you have to have to select your partners if you are a VO EM you are going to select first years of the sub suppliers for all your auto parts now you may select the tier 2 tier 3 suppliers with the heck operation of tier 1 suppliers are independently.

But you are going to select the suppliers and it could be on structural features or relational ties so structural features or asset specificity and capabilities and relational ties or government social organizations cluster management cetera and coordination is determining who does what and when and communicating to everyone and execution is monitoring the status so that processes work as per plan and control any exceptional events so the government's has these three functions.

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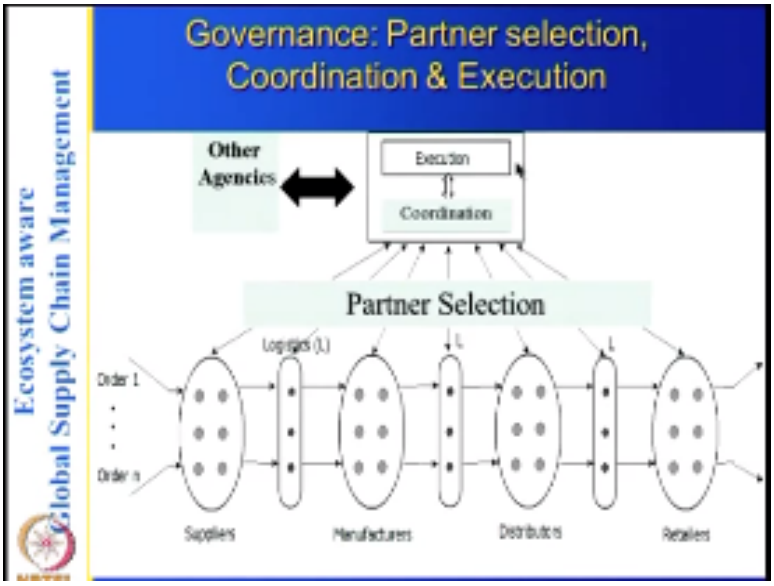

So if you look at the government's here you have all these players hear you have to select this partners for your this one for a particular order in other words if you have water in the United States and you want to supply it by say September first for the fall this one then how are you going to choose so that you can supply it by September first and of course you are the partner once you have selected them you have the coordination telling people what to do and when and how much and at the end.

You have an execution team where which says that whatever you have is a coordination you are told everybody does worry show that it is going to work on time so if a mishap that happens then how do you take care of it.

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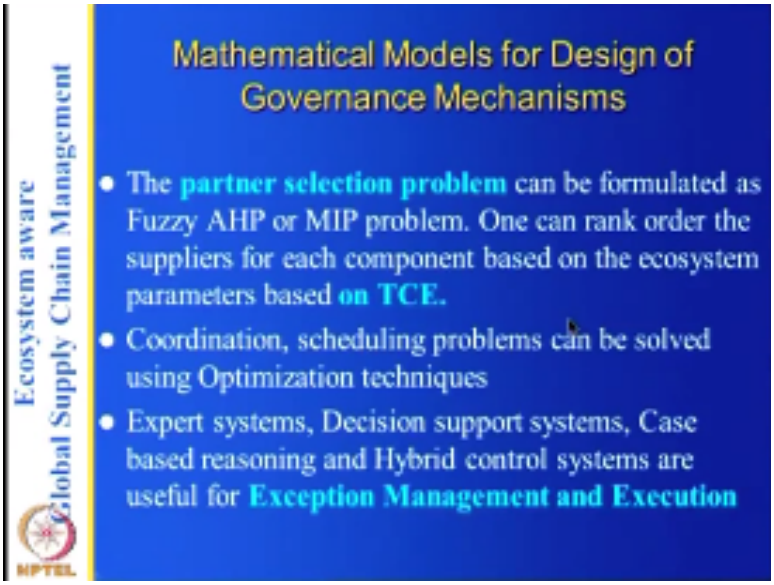

So mathematical models or design of governance mechanisms and a partner selection problem can be formulated as a fuzzy AHP or a mixed integer programming problem one can rank order the suppliers for each component based on the ecosystem parameters on TCE in other words you have the transaction cost economics model if you have all the data then you can find out the TCE of all the suppliers in all countries have an excel sheet and you can select the one that has the minimum cost.

And coordination scheduling problem can be solved as optimization problems who does what and well it depends on your demand and you can depending on the capacity constraints that each of these operators have you can you can solve the scheduling problem and of course expert system station support systems case where the reasoning and hybrid control systems are useful for exception management and execution so you can actually mathematics eyes these things and then use the mathematical analysis for the governance models okay.

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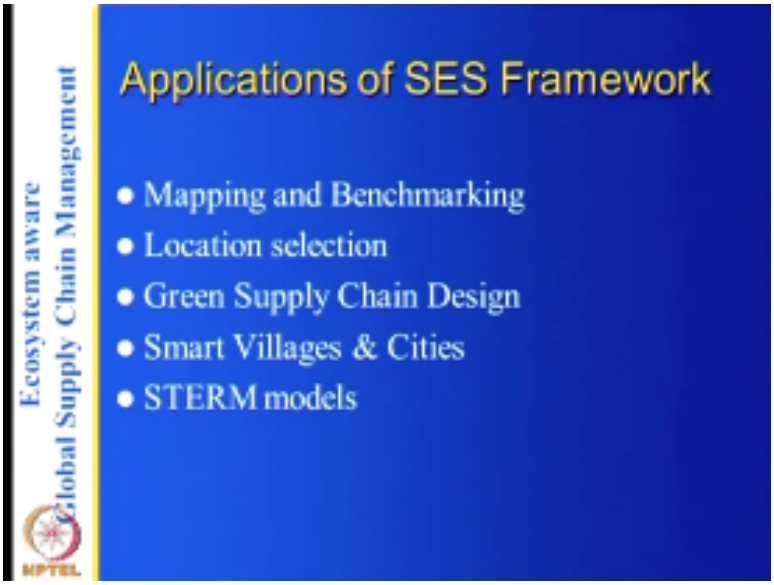

So what we have done is we have math with the ecosystem and we said what we could do with it we could read the performance you can use queuing theory you can use Petra nets or whatever and map the corresponding queuing network diagrams and then find out what are the lead times and what are the inventory is at each of the notes and so on whatever you are made doing for conventional manufacturing systems you could do it for these systems and also you can also study the influence of Port delays you can see the influence of the truck values on your system.

But the performance you could do you could know all the innovations deregulation or you have some innovations that are coming in terms of technology how does it affect your supply chain how are you going to change your entire procedures your manufacturing components so you will look at just they all the elements of this once you map them you could do performance analysis now you can use all this to design this budget redesign the supply chain how do you redesign the supply chain.

Basically what is the purpose of City it is I the purpose of the redesign is to find out what is wrong with this existing this one and then how do you incorporate the risk factors how do you incorporate new innovations that are possible how do you improve the performance of the of the entire end to end supply chain and what are the Garden of governance structures so if you do all this then you have a new design now the difference between earlier designs and this is in

earlier you are just considering only the way factors such as the lead time of the supply chain now you are taking the entire ecosystem into consideration let us look at some examples of this one thing that happens here is what is called STERM models.

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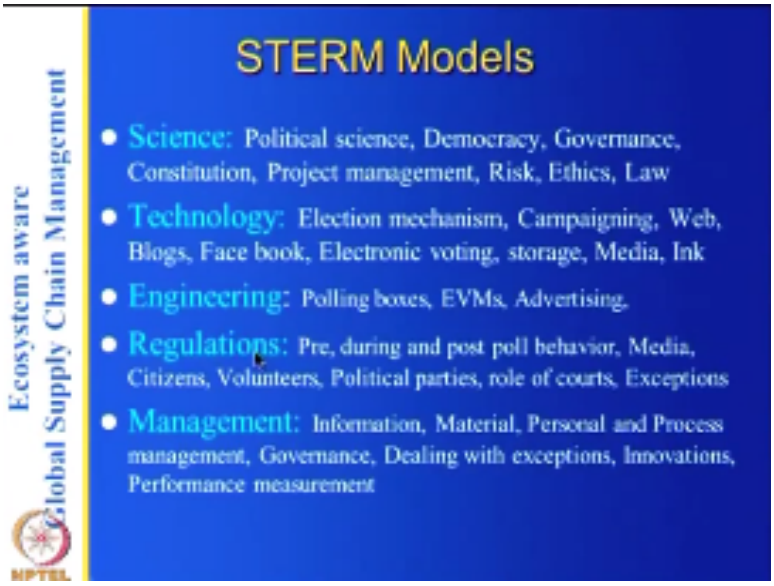

You know science technology engineering regulations and management they are all required in the design here usually people talk of stem model science technology engineering and mathematics but regulations and management they become highly important in global supply chains so as far as global supply chains are concerned one has to talk about this term models.

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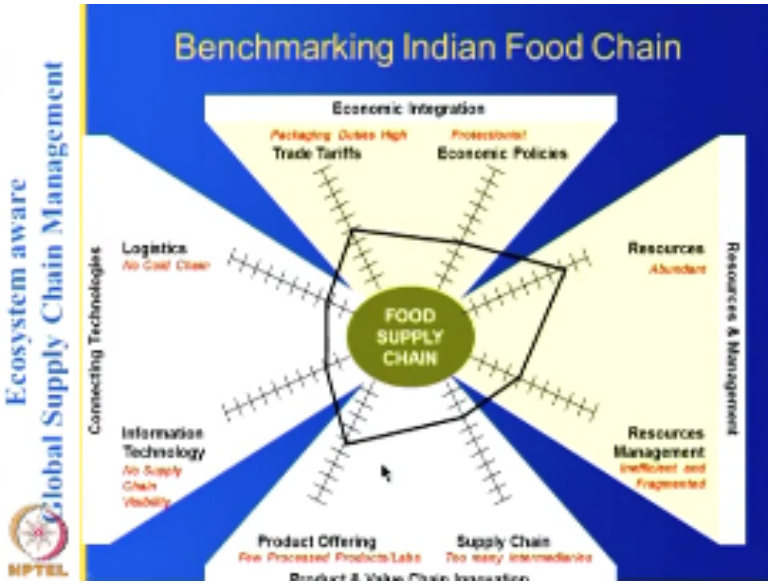

And also one thing that you could do using the these models is to find out what is wrong with your supply chain for example you take the food supply chain what is the food supply chain it is a firm farm owner to the consumer of you are the food products or vegetables or fruits or whatever if you look at that India has lots of resources fifty percent of the land is called to about fifteen seasons here you can produce anything that is possible in anywhere in the world in India nature is very kind but the resource management is this bad the supply chain has too many intermediaries.

And we are no product processing food processing and this there is no information technology used the logistics and cold chain is bad and you have lot of trial duties custom duties and acts which prohibit interactions between the farmers are and the big retailers and so on so what happens is all the others you know now if you want to improve the food supply chain or you want to compare the food supply chain in two countries.

You could do that but if you want to improve the food supply chain you could do that by just looking at this diagram well do you have to improve we want to get a glitter they would supply chain we want to improve the logistics or improve the use of IIT in the this one or you want to improve the process food processing industry so you have all the answers.

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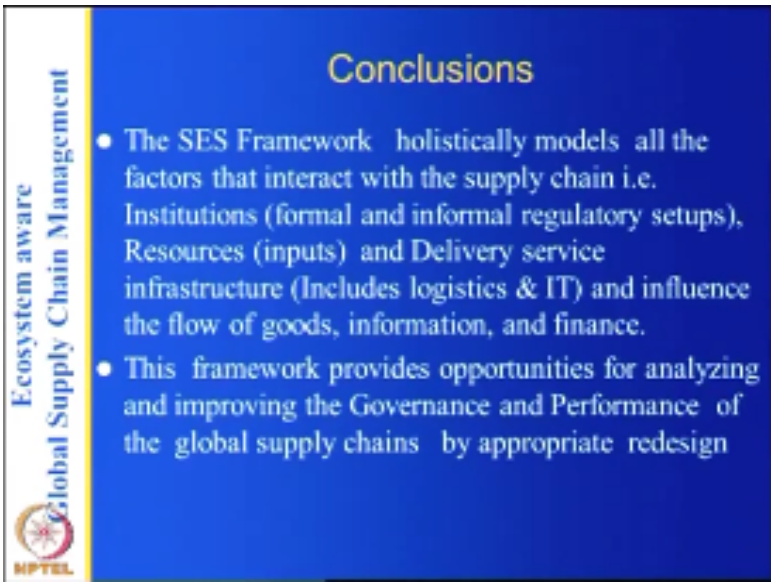

So basically you could be with lee in supply chain design and all that so that is what happened now in if you want to look at this particular SES framework it holistically models all the factors that interact with the supply chain that is the institutions that the formal informal regulatory setups the resources which are inputs and the delivery service mechanisms which includes largest excite and influence that influence the flow of goods so unless in ending supply chain that three flows their goods information and finance so how were they influence they are influenced by all these four three factors that so you are dealing with all those and you have a framework.

For that and this framework provides opportunities for analyzing and improving the governance and performance or the global supply chain by appropriate redesign of course in the book as well as in the lectures you have you have a design of doing supply chains we have design of supplier selection and so on we have redesign of the food supply chains and with several case that is why things one function and so on so it is very important that the in this lecture we have summarized all the importance of all the pictures of the supply chain ecosystem so that you will be very well motivated to study further the book as well as listen to the other lectures thank you.

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