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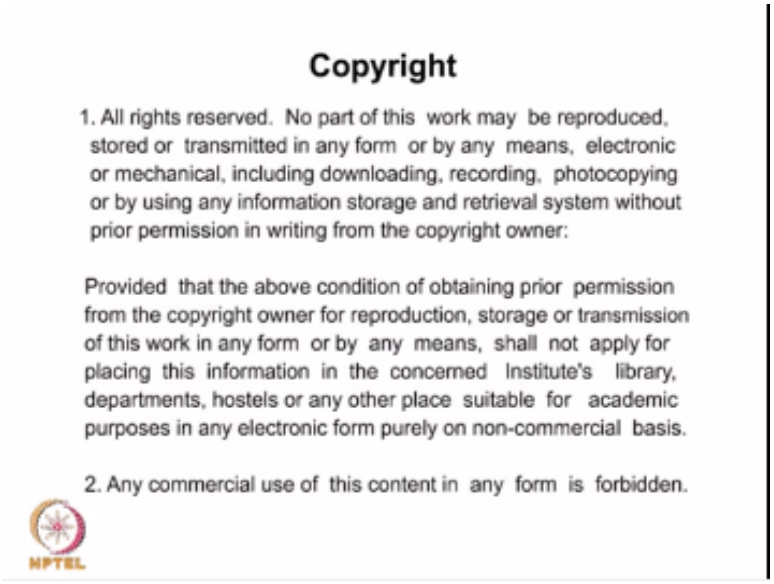

Global Supply Chain Management
Lecture – 24
Supply Chain Design – Part 1
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Okay so this and the next lecture we are going to talk about global supply chain.

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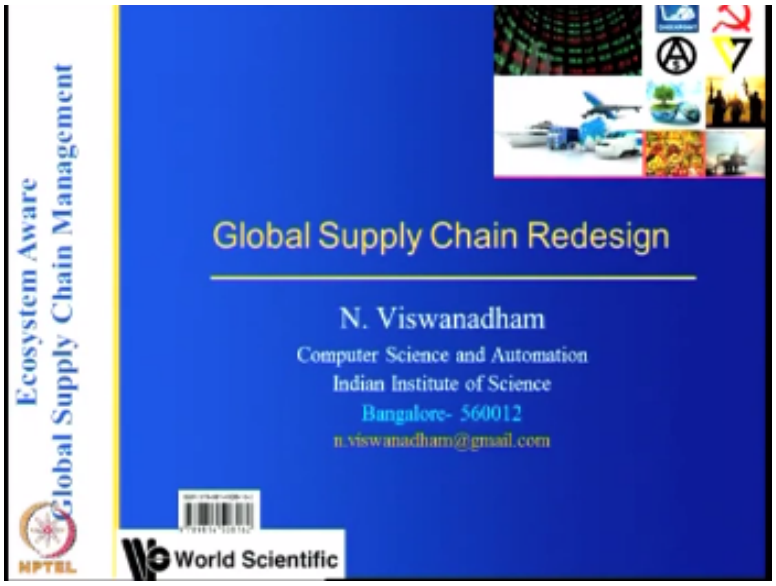

To redesign I took you know we are talking of not global supply chain design but redesign this is because for a number of reasons that we have been dealing with in these lectures the designs of today the way you design the supply chains they are not up to the mark they are subject to all kinds of pressures all kinds of disruptions and so on so there is a need to think about how to redesign the supply chains. So that is what the topic will be this lecture on the next one so we are going to use as before the ecosystem framework to redesign the supply chains. So what do people design supply chains.

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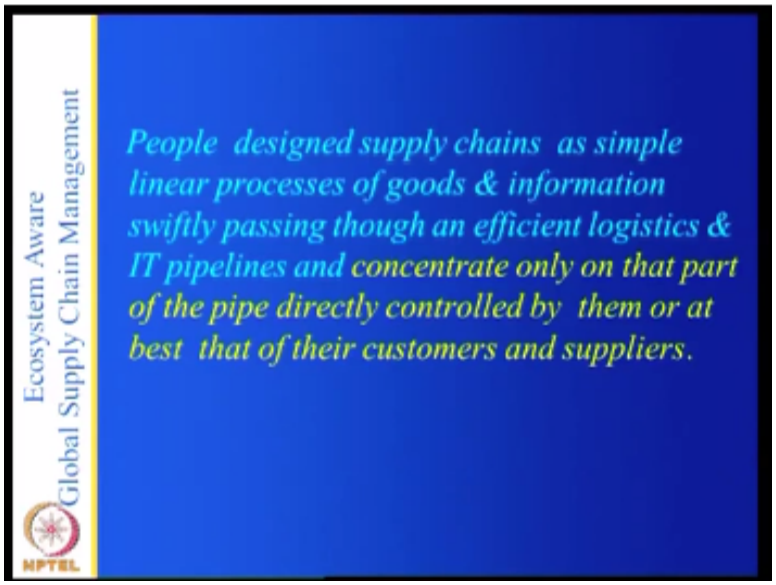

As simple linear processes of goods and information plus weekly passing through an efficient logistics and IT pipeline and concentrate only on that part of the pipe directly controlled by them or at best that of their customers and suppliers in other words they are looking at their part if you are a manufacturer you look at the manufacturing if you have a supplier you look at the men in the supplier if not the best some of them.

If you are a manufacturer you look at this applier and you look at the logistics players but you don't look at the supplier suppliers or if you have a manufacturer you look at the distributors but you don't look at the retailers so if you are a distributor you look at the manufacturers and retailers or mostly retailers and do not look at the manufacturing effects so that is the current state of affairs and also as we said several times before it is something like supply chain design supply chain supply chain demand supply matching.

So that is the kind of thing that we have and this is a myopic view this has to change and people have to have an idea of the entire supply chain from n to n from materials inputs to or the end the customer to the consumer and also look at all the things that are happening the ecosystems the governance in which your suppliers are subjected to and so on so basically you have to take an ecosystem view of this. So what is supply chain redesign?

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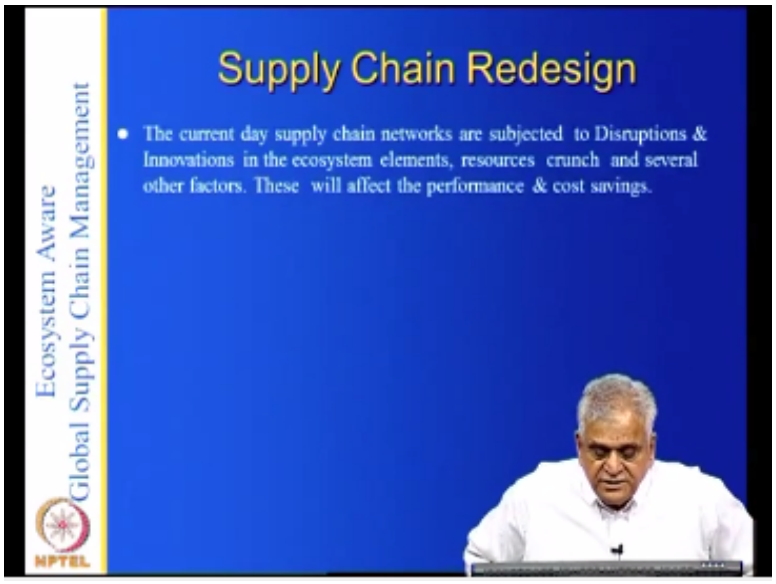

The current supply chain networks as they are designed today and using all kinds of packages like ERP and others are subjective disruptions and innovations in the ecosystem elements

resources crunch and several other factors in other words they are disruptions of due to earthquakes and so on el disruptions due to financial crisis they're disruptions to do two wars and disruptions to oil price increases and so on so but ultimately they will affect the supply chain performance and also recast savings.

So disruptions can originate from bags from governments bankruptcy of supplier suppliers natural disasters piracy cyber attack squad strikes and as a several around on factors so one can say look you know we do not know where the disruptions are going to come how can you mitigate them now the issue it is one but one cannot anticipate always and that they cannot be ignored either you cannot say i do not know the risk these are known unknowns or non loans and.

So on you can say all kinds of things it is a perfect storm it is something it is like a black square and you can give any number of metaphors and try to escape from that but at the end of the day you cannot ignore them you have to do something to mitigate so the disruptions innovations and products manufacturing and delivery processes you know business models governance relations such as FTAs regulations and the regulations and many more effective supply chain.

So there are technological disruptions which are happening like the cloud big data you name it and wireless cell phones there are several things which are which are happening which will disrupt your supply chain and fluctuation Hill resource cause we know wages oil prices for an exchange are important for the bottom line for example the prom thing why outsourcing to low-cost countries has been adopted and it was hired by the developing countries and the multinational multinationals is because of the local sourcing but that no cost is disappearing because of the wage increases or in pairs increases.

Which will affect the transportation that is lot of Warren exchange fluctuations there the emerging market currencies are appreciated so these will actually are important to the bottom line so supply chain design to select all these factors into account rather than resorting to its but I think cost saving measures and unknown strikes so what you usually do is you know you basically remove your HR try to save the costs in several ways you resort to expediting then your logistics does not work and so on. So but this is not the way of doing it you should you

should anticipate the disruptions maybe you may not be able to avoid them but then when they occur you should be able to deal with them.

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And this should be a part of your design.

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So it is not as though the disruption strikes you at a later stage and you do not know how to do it so okay so the local supply chain design consists of two steps according to us and one start with is this global supply chain formation that is you let all your players all your supplier

logistics providers in on countries with whom you want to deal you know given your vertical d given you are the kind of products your and services you are providing who are all the people who are relevant to you this is kind of social network that you prepare from one countries.

From all over the globe and also assess their performance know about the countries know about them what are their is what are the innovations? they are going to do and what would be the performance and so on how do you select them and collect all this information and brilliant governance mechanisms or frameworks for partner selection coordination and control so as we saw before governance means partner selection coordination and control.

But if it is on stage you should we should build all the governance mechanisms of frameworks for doing it when you are doing the governance you just do follow certain procedures you run an optimization problem given an order you select the supply or tell him what to do and also they execute this and control the entire thing but you have to build all the mechanisms for doing that so let us look at the first stage which is global supply chain information the formation involves five steps the first one is that the supply chain ecosystem for the industry vertical we have done this before so that is the map they supply chain ecosystem for a particular industry vertical whether it is auto leather it is telecom whether it is logistics or whatever and formulate the supply chain strategy.

What is your set or is applying the products or you supplying services are you going to outsource what are the kinds of innovations you are going to look at or you get into governments which are basically they are highly innovative into this are you getting into countries where they are modest and they may not be too much innovative and so on and select possible locations for factories the distribution centers based on their investment climate.

You look at the countries where do you want to locate your DS distribution centers you have to know the investment climate based on the ecosystem for that country and identify the supply chain risk and once you have all this you will have a list of feasible satellites and configurations in other words for component 1 you have these suppliers in these countries and there are these are the risk profiles that these countries do these kind of innovations.

And this is the transportation costs so for each supplier you have a database of what are the kinds of things that you use and have a list of feasible configurations and so on you are not

doing anything except having a list of this and Modi rank order the suppliers in terms of their cost performance and all that so that is a global supply chain formation let us look at each step.

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And the second one is governance part second step is governance.

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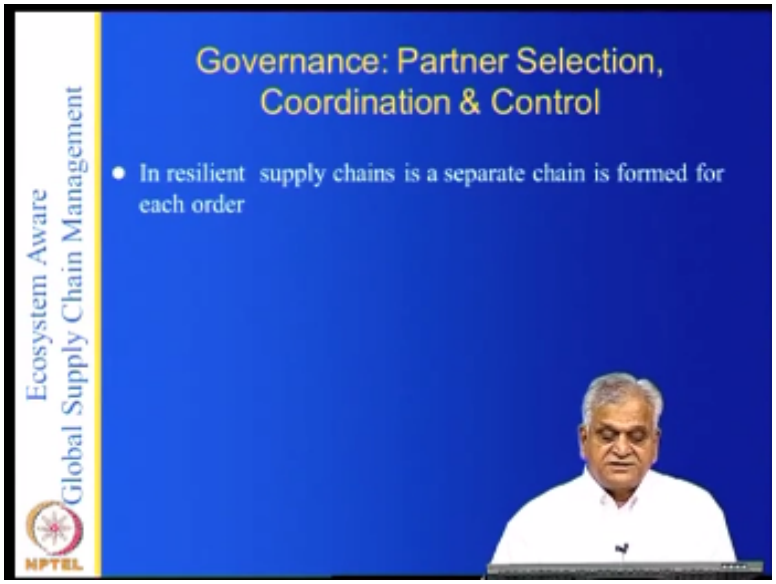

Which involves partner selection coordination and control in the easily and supply chains is a separate chain is formed for each order the governance function includes partner selection from the group of free selected suppliers from step one and coordination determining who does work

then and communicating table and execution so this step involves building frameworks by partner selection coordination and control for the company or the vertical under consideration for example for partner selection given an order you want to select the partners for that particular order so which will minimize your cost maximize the early.

Minimize your lead time and so on so this usually comes into some kind of an optimization problem and coordination determines who does what and so on this is typical supply chain planning problem and execution is we were to build a drubber or monitor the order status so that processes work as the plan and control exception events so building the control tower or designing the control tower. This will monitor all the things that happen in the supply chain so that the execution is perfect so these are all the things that that you need to do in the design stage.

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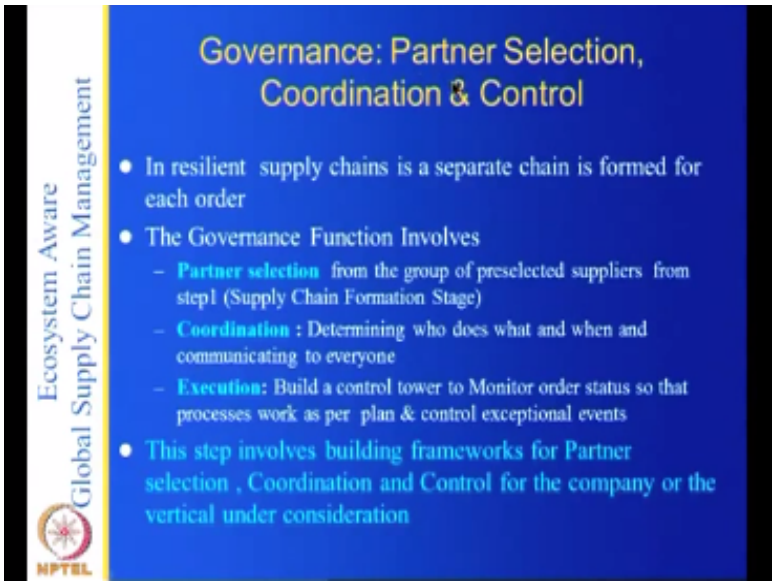

So what is global supply chain formation?

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It is basically this step is crucial now when you are doing this approach our formation for example you are dealing with Apple stores or auto and so on you have to have domain knowledge of the vertical and the companies they are products capabilities reputation for quality delivery and corporate and political connections soft skills or negotiation of acquisition of exits partner selection risk assessment and talent recruitment.

And then you should this chapter is crucial or for all this and in a mature markets dispute over a set acquisition can turn we get involving long-drawn negotiations or abandoning the project one has to be careful is that people try to ignore but in a mature markets it can you know when we work trying to you think everything is going on you plan go ahead you order your missionary and so on but the land and building are not ready and they enter into a dispute so then you get into problems of you know negotiation and all that and sometimes you win sometimes. You have to abandon the project go elsewhere so one has to be extremely careful in this step.

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So the five steps are.

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Map is supply chain ecosystem for the industry vertical for this one I made these are the five steps that we have. And step one.

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Map the supply chain ecosystem for the industry vertical.

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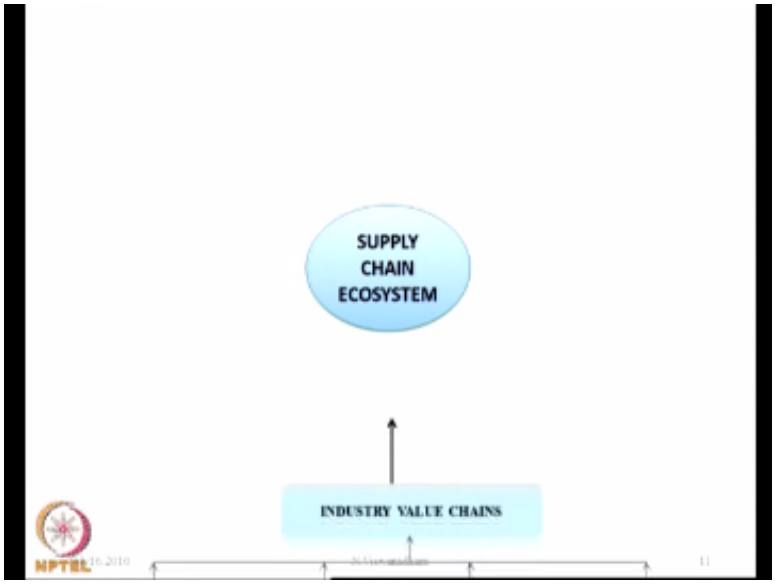

That we have you here is of course the industry value chain suppliers manufacturing distributors and retailing and you have the resources which is infrastructure foreign direct investment in s foreign investors and ports airports industry clusters human financial natural resources also you have the institutions like customs export another regulators quality control environmental social financial and trade issues and you have the delivery mechanisms like logistics transport and logistics parks excreta.

So basically you can for your industry vertical you this is a generalized supply chain ecosystem but for you and your industry vertical for example if it is auto then you can map the auto one and if it is safe food you can map the food one and then these things the regulations and the resources that are required on the delivery mechanisms they particularly the 4 if it as an electronic supply chain you may want you i want a delivery this one if it is books supply chain and you i want home delivery you want to a delivery and so on so basically these things depend on the vertical that you have.

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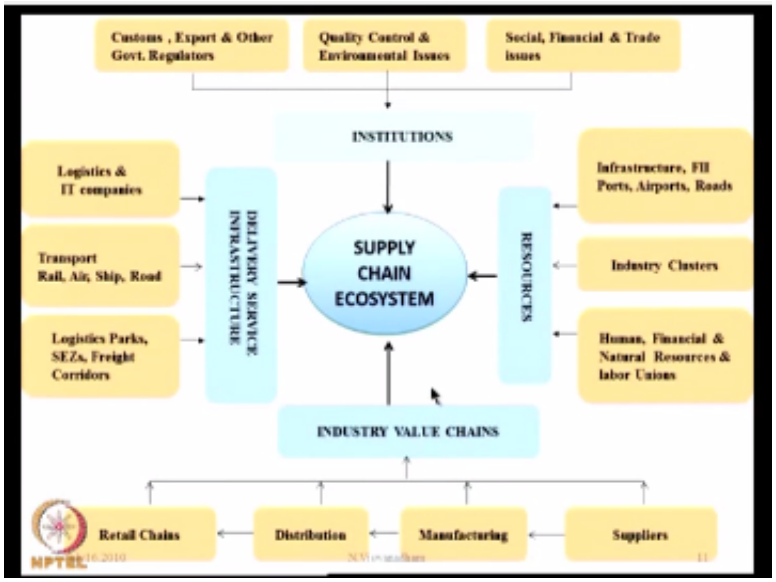

So step two is horrible at the supply chain strategy.

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So let us look at what is the supply chain strategy here?

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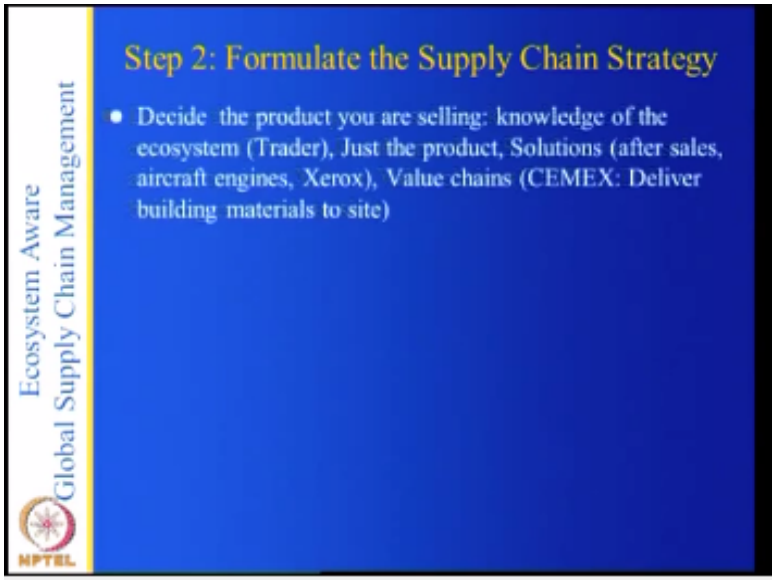

So decide on the product your salad in other words are you selling the product in its in its form or their knowledge of the ecosystem in other words you know in situation if you are a trader you do not sell any product you are just orchestrating and what you have is your knowledge and connections or the ecosystem with the government with the other people and so on you can sell the just the product you can also sell the solutions like after sales aircraft engines for its all

answer ox for example aircraft engines are never sold they are basically at least into for the area products.

And these are called power by the ever so the aircraft engine manufacturers are paid for the other the aircraft engine runs in the aircraft is the aircraft is not flying they are not paid so if the engine is under repair they are not paid so it is up to the aircraft engine manufacturers to be on high alert and make its engine engines on operative each time I ever minute and similarly croc cells not separating machines but they sell get a search for page and so on so some acts and others they sell value Saints deliver building materials to site.

Rather than submit so there are several innovations in terms of the business models that you have so you should decide what you are selling and depending on that other thing else depends innovations and products and processes and other ecosystem items to build the blockbuster industry subject to infrastructure constraints so in other words you should look at your ecosystem and what are the kinds of things were the vertical under consideration what are the innovations that are possible deregulation of the airlines or FedEx courier services Southwest direct routes rather than hub-and-spoke Tata nano.

Which is S1 clusters digital delivery home delivery but what is that that are the innovations that are possible this could be new to the market kind of innovations they need not have to be new to the neoteric world kind of innovations so in other words these could be practiced in other countries by other companies so but you have to get them get them working for your word go for in your country and identify the strategic areas for partnering or outsourcing in the value chain including the risks of partner weather.

Which are you going to do everything yourself or are you going to do outsource some of this so basically maker by decisions local or low-cost country outsourcing foreign direct investment or outsourcing in other words if you are doing foreign direct investment then you are going to have your own plants in the low-cost countries are you can outsource you can have joint ventures you can have several other things so what is that you are going to do this is a strategy that you need to oh no this one we are going from the start here and then sometimes if your company is operating you may want to you might want to start in the middle.

But the point is that is why we are calling it supplier and redesign you have already a design you have an already operations you have a strategy but while going through this kind of procedure then you know you can you can see how you can improve yourself or change things so that you are more competitive.

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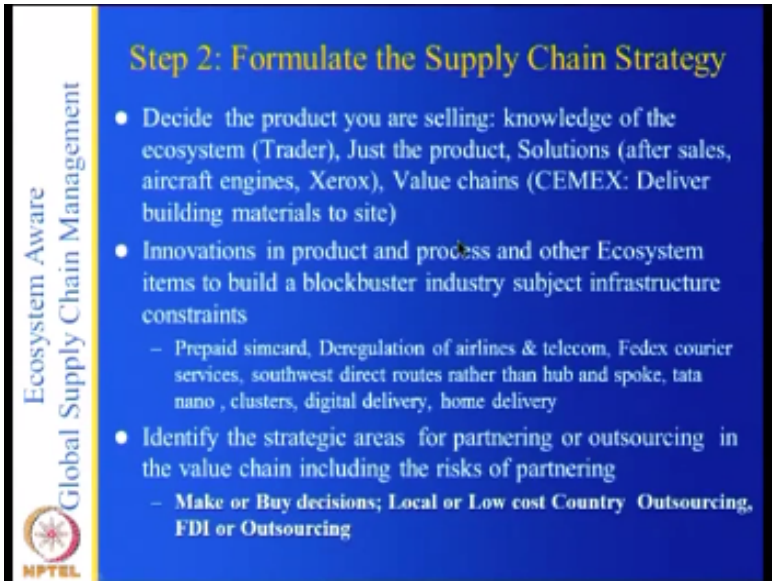

So there are product innovations.

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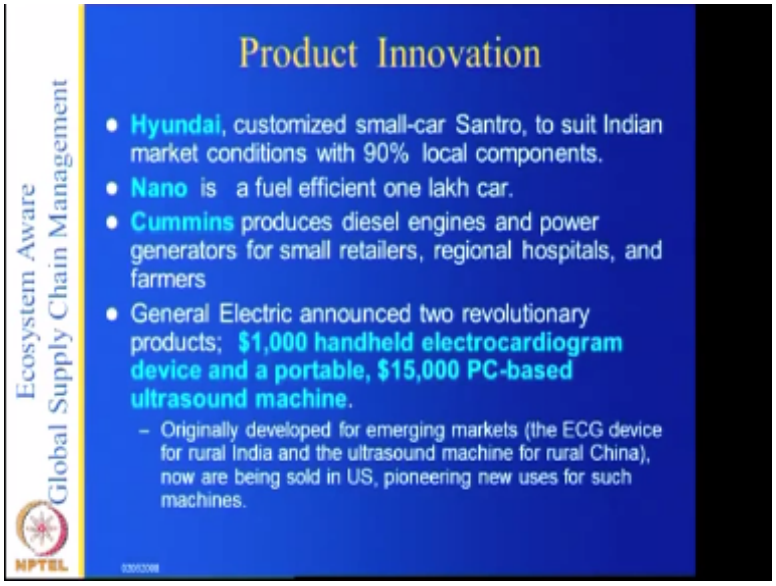

For example in Hyundai customized small central to south Indian market nano is a fuel-efficient 1 lakhs car when i said one lakhs is the price recall so and that is the one and commence produces diesel engines. And power generators for small retailers regional hospitals and farmers so because there is the power shut downs in India along so this is the one that is power generators are very popular in both households as well as in business and General Electric announced to revolutionary products $1,000 handheld electrocardiogram.

I had a portable 50,000 pc-based ultrasound machines so basically these are all used even now in the in the sand this fortunately developed for mature markets the ECG device for rural India and the ultrasound machine for rural China but now is being sold in U.S. Pioneering. New uses of such machines so once you have machine you could do something so these are all product innovations although done for the energy market you know some of them sometimes these can be transferred this can be used even in developed markets to do is.

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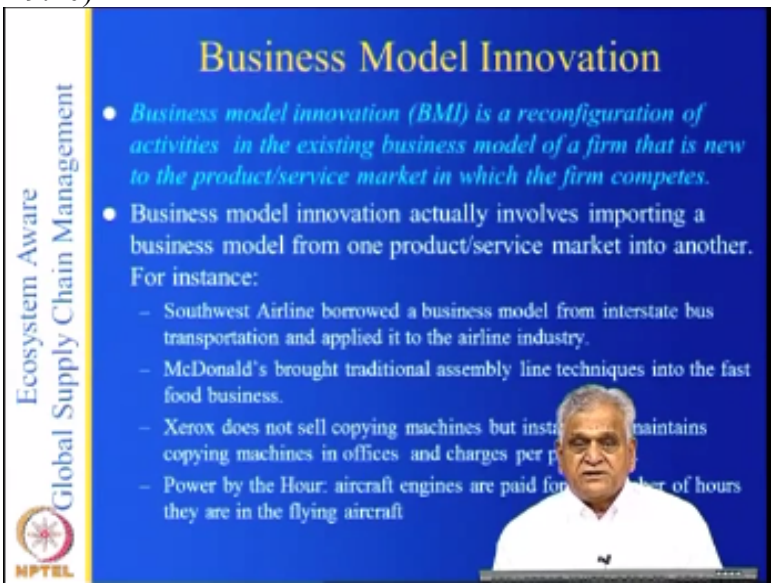

What is called a business model innovation so business model innovation is reconfiguration of activities of the existing business model of a form that is due to the product service market in which a firm competes. So the way you compete in the format different to you may one thing is to sell a product that is one way of doing it the second thing is you know you can sell a service in other words in a syringe is selling Xerox machines.

Who sell their pet charges so for example ,instead of selling servers and other equipment so on for storage you can you can lease the space on the storage in cloud computing so this can lead or several examples of these business module innovations southwestern lines for example when it started when the airlines were deregulated in the United States Southwest Airlines barn a business model from interstate bus transportation and applied it to airline industry well you can applied here in India and so on McDonald's brought traditional assembly line techniques into the fast-food business.

So basically if you want to save us some time and so on then you have a menu-driven service and like it local looks like an assembly line Xerox does not sell copying machines but installs and maintains copying machines in offices and charges on per page basis and power by the other aircraft engines are paid for the number of hours they are flying in a flying aircraft so where were these kinds of business model innovations you have to find out which one suits you best.

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And use innovations and regulations the government's have deregulated the telecom industry and made many positive policies allow private and foreign shops to this one created special economic zones to attract equipment and other manufacturers allowed foreign players to participate as manufacturing and service providers and so on so companies should use these to advantage I am just giving you an example of the government my deregulate this one but what

happens is the companies should use this deregulation to their advantage for example if there is a way FDI possible.

But or then you should go to that country where telecom is deregulated and you should lose the special economic zones and we should basically you participate in manufacturing and service industries so when you are selecting a supplier or when you are selecting a country a location then it is important what are the possible innovations that you can use even the government regulations.

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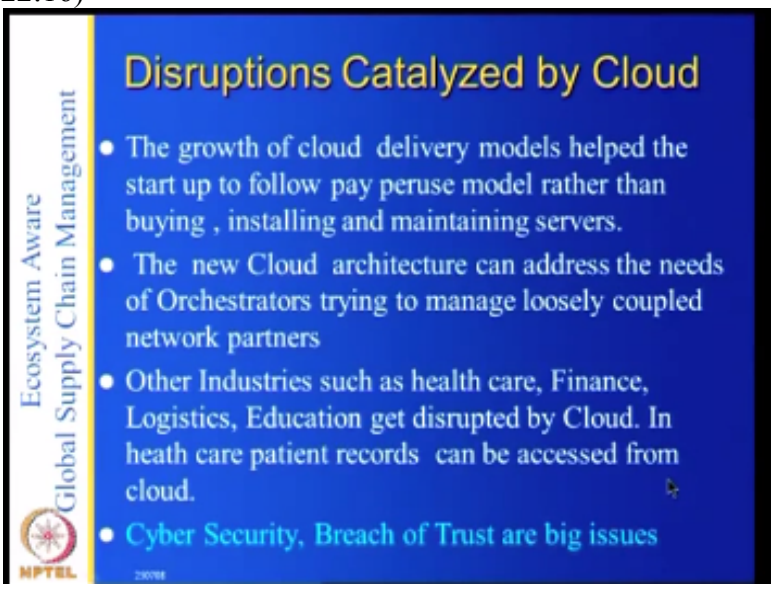

And their disruption so the cloud comes in a big way groans of cloud delivery models help to start up paper use modern rather than buying installing and maintaining servers the new cloud architecture can address the needs of orchestrators trying to manage loosely coupled networks so one thing that happens is if you do not want to manufacture anything if you want to do your service only kind of thing then it is possible you can use the cloud architecture as an Orchestrator another industry such as healthcare finance logistics education get disrupted by cloud in health care patient records can be accessed from the cloud.

You know the cloud is something which is being used this one for example if you are an Orchestrator all your information can be can be in the cloud and you can use and all this big data that is collected by the clouds are routinely serviced all the players then you can use analytics to find out to plan for ,your services so I will circle the breathers such in our big

issues and grout that is an important thing because this is a concentrated your database at one place so now cyber security.

In other words if somebody hacks into their your data then you will have problems of this one and also breach of trust your cattle .I or a cloud operator has to be trustworthy and they should not share your information with others either by design or I by mistake.

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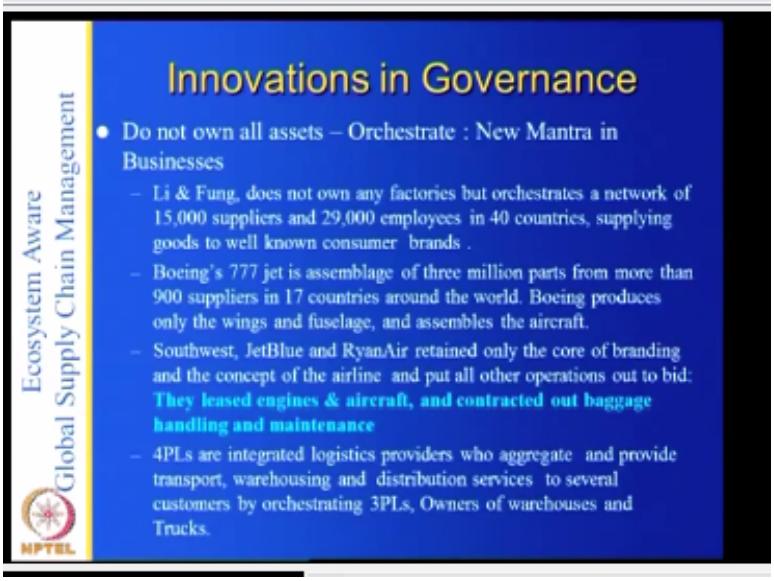

So there are innovations in governance of this one and in other words are what is how do you want to govern this particular thing so we want to do not even essence orchestrate new mantra in business and this is one way of doing it but you may not be able to switch to this governance model right away unless you outsource a lot of it if you are a manufacturer and your competencies or design manufacturing and all that you outsource to the suppliers you outsource to do the dealers and retailers and so on.

You can also outsource all your manufacturing you keep design and so on and you just orchestrate so that is an example softly and form who does not want any factories but orchestrates a network of 15,000 suppliers 29 and thousand employees in 40,000 40 countries supplying goods to well-known consumer brands that similarly boy in 77 get a semblance a 23 million parts for more than 900 suppliers in 17 countries southwest JetBlue rayon a rate and only acquire branding and of the airline and put all other operations for bid.

So they lays an engine aircraft and contracted out baggage handling and maintenance so here what happens is for example the fourth party logistics providers they are basically one nothing

and but the aggregate and provide transport warehousing distribution services to several customer orchestrating the three periods so the point here is that when you have studying during the supply chain formation stage it is important you look at all the aspects of what are happening what are the risks we will going to face from each of these suppliers.

And they request what are the innovations in governance you can make what are the innovations that you can make in products processes and business models and so on.

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So that is step two and in the step three is select possible intentions for the factories DCs based on the investment climate so in the first two steps you have basically said in this first step one you have map with the ecosystem, so ecosystem gives you an idea of the entire vertical or your own company your resources that you are using the government's you are in and also the delivery mechanisms that that you use but then in this step two what is that you are doing you are basically saying the supply chain strategy.

What is supply chain strategy a pledge and strategy involves what are the kinds of you know whatever you what are you selling or you sell any product service or combination whatever and the second point there is what are the innovations that that your vertical is doing and others so our what are the kinds of Technology disruptions that are happening and it can be through cloud it can be through your product innovations people are producing small cars people are producing using mobile for their communications people are using only ATM.

No back branches these are all the kinds of things that these are the happening and look at you know governance innovations in other words you may have a hierarchical structure today or you may have some the structure functional or product oriented structure but then can you use how can you change improve your governance by basically using the new technologies in other words there are technologies for example, they are the information technology there are sensor networks there are other things which are coming cloud and all that can you use them to advantage in terms of innovations and what are the risks that are you going to face now step 3 select possible locations for factories this is based on the investment climate.

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So where are we going to locate your suppliers and so on so what the industry verticals study the parameters that determine the investment climate of nations and regions and rack or other regions you know everything depends on your industry vertical for example if you are in oil or if you are an auto then the day or investment climate is different and basically if you are if you are an oil you should be in oral Richard there should be shipping infrastructure and other delivery mechanisms and so on and it should be an expert in foreign exchange calculations and all that but on and also you should be prepared to lot of oil trade happens overseas.

So basically you should be you should be more than just transporting the oil from one place to the other or a logistics provider or managing your inbound logistics so they identify the asset specific requirements from the supplier in other words if you want to do you want to come some product ,which requires special machines so they become a set specific so every supplier

may not have may not have those kind of machines so in which case you need to donate a way use the SS specific requirements specify.

Those things first you should know the asset's specific things we are going to in the next slide that there could be site-specific they could be machine-specific and so on.

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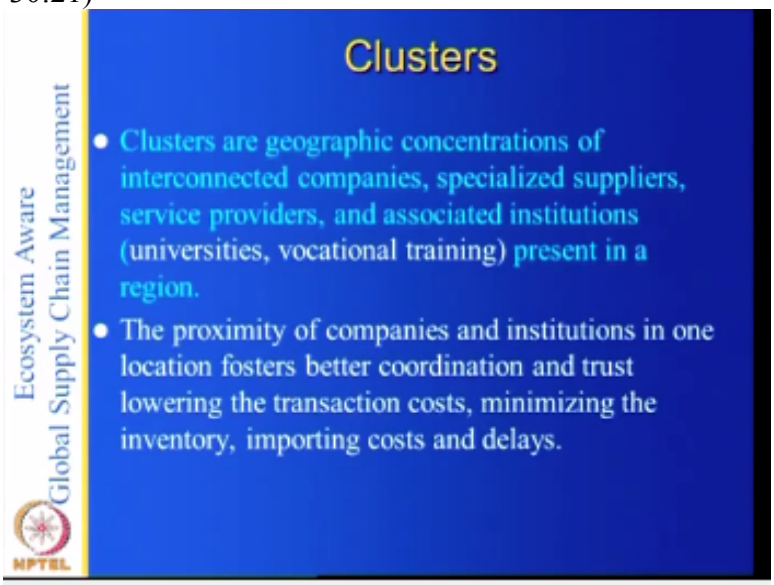

So and also what important on the clusters or geographical concentrations of interconnected companies specialized supplier service providers and associated institutions present in a region in other words these will provide everything provides it provided at one place and the proximity of companies and institutions in one location fosters better coordination so it is important to see that there is metal core National Trust lowering the transaction cost minimizing the inventory importing costs and delays and so on.
So since everybody close then you can basically transfer small amounts you need not have to keep inventory you could do follow just in time and several other factors if you are and if you are in the same cluster so there is an advantage of being in a cluster.

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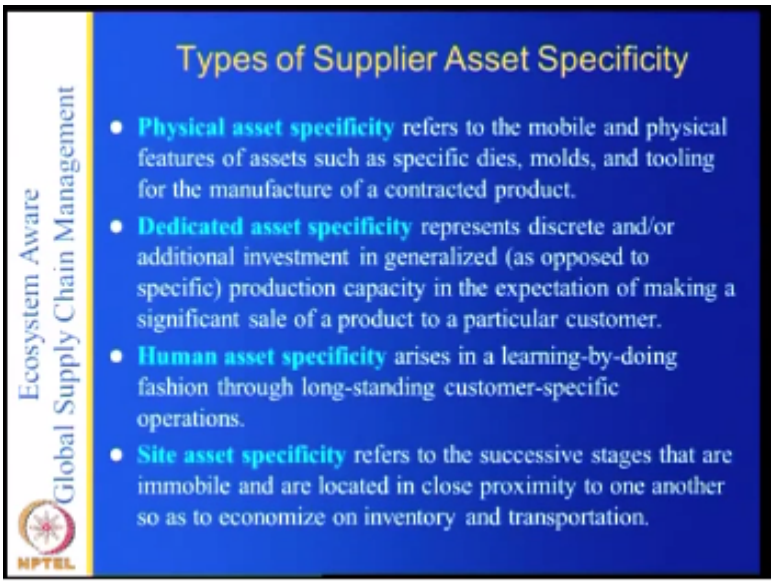

And what are the suppliers asset specificities that are this one you may require physical asset specificity which refers to the mobile and physical features of assets such as specific guys modes and tooling for the manufacturing of a contracted project so in other one who may require special to special machines and so on for your this one that is physical they are dedicated as represent specificity represents discreet under additional investment in generalized production capacity.

In the expectation of making significant sale of a product of a particular control now if you suppose a you are you are looking at green making your products green and you are making a product green then you who were trying to think that because of the green is going to be the fashion of the day then you are going to have a significant product demand in near future then you want to have you know what to do an additional investment into the production capacity well you may do it as you as the owner of a manufacturing.

But you need to have the suppliers also do their capacity expansions so dedicated asset specificity it represents the additional investment in production capacity with the expectation that you are going to make it big XD human asset specificity it requires learning by doing fashion with long-standing customer specific expectations so in other words for example all the software providers these companies both in India and abroad they basically take graduates and then train them in and all software languages as well as in programming and others they have their own institutions.

Where people are trained so in other words this is this is a specific asset that you have to create and it costs money but you are doing skill based training for this so this is this is the kind of training or use your supplier are going to do it well he may do it but here it will you will charge you so but he may charge it but you may import all the specific skills that you do have and site-specific SAS specificity site asset specifically refers to successive stages that are immobile and are located in close proximity.

To one another so as to economize on inventory or transportation supposing you have a port where you want to send all your goods so if you want to have a distribution center near the port so that what you will do is to get manufacturing site nearby and from them and get all your suppliers to supply have a supply hub near the manufacturing or near the DC and transport wire report so to do all this that means somebody here your logistics provider has to build a warehouse or your suppliers as a suppliers need to have a supply hub near your manufacturing facility so these are all becomes site-specific.

What happens once you build and if situation changes then you this may not be may not be useful so there is a risk associated with this with all this for example, if you build a warehouse and if the demand drops the warehouse becomes empty so if it is I specific a temperature-sensitive warehouse then you know you have invested a lot in the in the air conditioning or other temperature such do things and those things may go waste.

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So that is also what is called global competitiveness indicators which require attention. You know these are you so basically to look at the country where you are in and the competitiveness indicators or national policies for openness in trade and market you know when you are looking at your supplier you are looking at also his ECO his or ECO have a eco system now one of the things are the ecosystem of the supplier is the government's so the national policies and openness of trade and the markets.

You are not you are interested we want to get also something to them but what are the national policies of the suppliers so best practices of our international trade, so in other words you have trade facilitation and others or it takes one month or two months is it very expensive to 24 for transport and so on and do you have label and enforcement systems in case of problems do you have judiciary effective judiciary so that becomes an important thing infrastructure for a global economy do you have ports airports you have flight corridors and so on financial services for a cross-border.

Commerce now you have largely her to deal with one foreign exchange and transfers so you should have financial services for cross borders that is the banks on either side which will deal with you or this one well of course you need human capital so if you are looking at Global Competitiveness indicators like this all those things become very important so when you are selecting a supplier or you are selecting a place for your DC or you are supplying a place for something then you should have a look at the country's global competitiveness indices the judiciary that is very important and their best practices in international trade because it affects your transportation costs and national openness and so on supposing they suddenly say.
They might turn protectionist then you would be in trouble so it is very important that one should look at the national competitiveness. So if you look at the national competitiveness industries.

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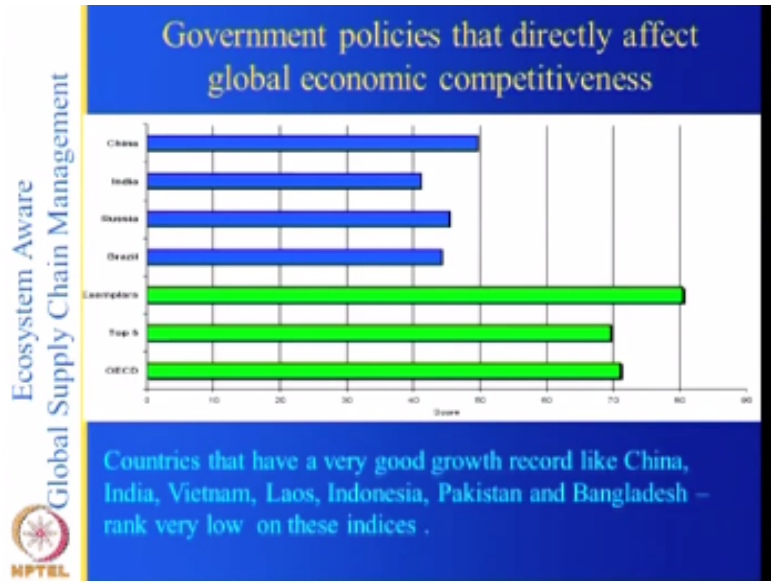

So there is a terror material available or information available on the global current policies and they are exemplars are eighty percent whereas if you look at top five exemplars' are seventy percent and OSD countries or seventy two percent but if you look at all the three countries like China India Russia and Brazil they are basically between 40 and 50 for example India is what if forty two percent and Russia is a little better 45 and Brazil is also 43 and China is fifty percent.

So I think you will find in terms of the policies these are example our countries and these are all the big countries where a lot of things are happening you will find countries that have very good growth record like China India Vietnam Laos Indonesia Pakistan Bangladesh rank very low on these indices and countries which ranked very high they do not attract much rate so there is some kind of a dichotomy here it is not necessary that you have a good auntie that you should have very good growth that what this diagram tells.

You is whether you can have this one the people who are doing this trading here are facing a risk they are taking risk here not as if you are in these countries the risk will be less so what probably is to their low cost countries the growth is high here and if you have good products you should have short-term investments into this in other words for a specific order if you are doing the apparel order or if you are doing electronic orders you should do very short to minimize your this one in other words you should finish your transactions within six weeks so that before any changes happen. So these are about national policy so that are important for this.

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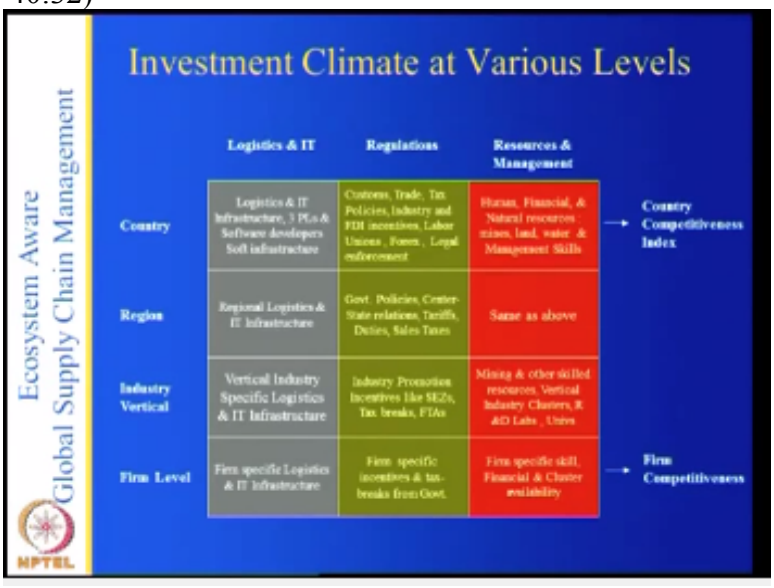

And investment climate at various levels you know you look at the country that they are in and what are the levels logistics and IT regulations resources and management that is the country Competitiveness Index which can which you can generate by looking at infrastructure 3pl software developers and software infrastructure and you can look at the customs to a tax policies industry FDI institute labor unions or an exchange legal enforcement and so on you can look at the resources human financial natural resources mines land water and management steps.

So these are all the ones that determine the country competitiveness so you can have a scale you can basically whatever is important to your vertical you can scale them up and add them so that you can get a score for a country for a particular supplier in a particular vertical at that time as you can understand that things can change for example the regulations can change the resources can become expensive so you should once the resources become expensive the logistics becomes expensive so if you are looking at short term then it is fine but if you are doing a longer term then these things could change very fast and regions you know if you are lucky and not a country.

Because of Malaysians the usual logistics and IT infrastructure whatever is relevant and government policies in other words a state government center state relations tariff duties sales taxes and these are all the same as above so if you take some states some states have more natural resources than the others sometimes you have more agriculture than then industry and

so on so basically you should look at for each state and then get what is called regional competitiveness index a state competitiveness index.

But you can have vertical this one vertical specific logistics and IT infrastructure as we said several times before if your vertical is oil and gas you need ports you need the kind of several other things were oil whereas the regulations are very heavy in terms of in terms of oil because you have to have relationship it with the countries who have oil and then the oil price has change every day a foreign exchange becomes an issue and binding that other still resources are needed for the industry vertical and clusters already labs and so on.

So the kind of resources that you need for the at the vertical level is different so you can have the vertical competitiveness index that for that but of course you can have at the company level you can't insane things and have the form competitiveness so in other words where you eat now look at the way you do in too much of homework before this it is important for this homework basically reveals under discussions brainstorming reveals what is good for you and what is bad for you so they put for you what are the innovations.

You can make and they back there and also it will tell you which one to avoid which country should we avoid and what field so it is very important that you make this kind of analysis on investment climate they own this and.

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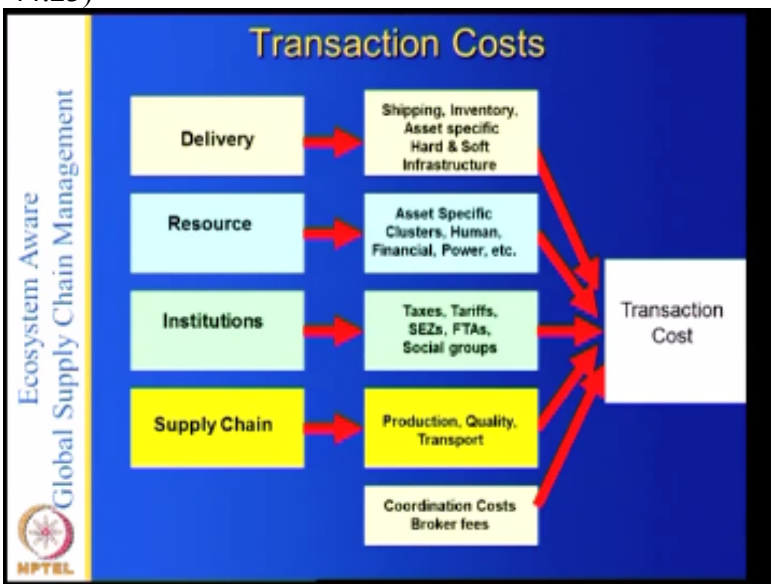

What are these transaction costs transaction costs at a production quality and these are the costs that you have and you have the delivery cost shipping inventory assets specific hard shaft infrastructure now for example in terms of delivery sometimes it has to be a set specific supposing. You know transferring big huge equipment or flight equipment like boilers and all that they have to be specially detected first is assembled and then we assembled at the purple is and they have to be carefully loaded on to the truck and from truck.

To the ship and then from there so you require a set specific inbound logistics for this kind of thing so you should you should be careful when you are doing liquid and SS specific clusters human financial power and so on so if you if you are in what depending on the business you should if you have say auto business then you have water clusters if you are an electronic then you have electronic clusters if you are in mobile business you have such clusters but these clusters may not be there in a bear country.

So one has to look at the SS specific resources and so on and of course the institution's effect on social groups but access tariffs and free trade agreements and so on and also you have called national cause or broker fees that happens so the search costs all these things a lot of such costs that are involved in the supply chain formation stage but there are companies which basically have people in various countries collecting information on that vertical which are the companies what are the trade policies.

What are the government this one which state is better where should I go this kind of things so that will gives you what is called the transaction class.

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So if you look at the push it the next step is identify on the supply chain ecosystem risks what are the risks that they observed supply chain ecosystem faces all possible social political environmental risks that may affect your ecosystem and the goods information and financial force estimator is and identify what it takes for the resolution this becomes this becomes very important and you have to make a list of all the ways that way that can come from only this one not only your supply chain from your resources the government's your delivery mechanisms and so on.

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So outsourcing France often. When you outsource there is the loss of IP when you outsource to somebody you have to basically train them or to use your software how to design your a

particular product and so on quality issues transport delays foreign exchange fluctuations energy cost escalation loss of course due to theft piracy and so on so there when you try to outsource and when you are doing something either during the process of manufacturing or during the transport there are several things that can happen in case of mergers and acquisitions all that is associated with a supply chain ecosystem must be considered supposing.

When you are doing mergers acquisitions with a particular company you naturally look at their financial another this one we should look at the supplier, suppliers and so on and then you should look at their government you may buy a particular company but or you may you made this one the government may have some hidden cross somewhere which will not allow you to function independent so one has to be careful in terms of mergers acquisitions and so on large scale and high degree concentration for example.

There are giant forms everybody thinks of big forms there is a one this one like DHL flexi tronix etc that they had five big firms but then what happens is when your firm which is located in various countries various where everything affects your company so you are and also if you have pluses like low cost clusters in China at requestors in India and these clusters become very highly vulnerable because they are all co-located and anything that happens like natural disasters or any terror strikes.

So basically they can they can get into right into problems so it is large scale versus dispersed this one of course it is very important if you have clusters if you have closed by a concentration then it is easy jewel in normal times but when disaster strikes and you will have problems so the supply chain risk.

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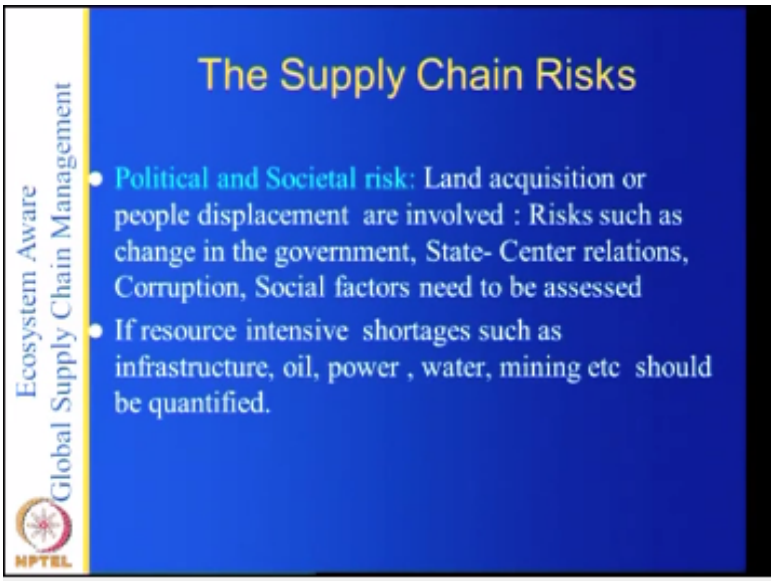

Or political and societal this land acquisition or people displacement or involved if such a change in the government state center relations corruption social factors these are also need to be assessed. So basically you have these kind of risks everywhere if resource incentive shortages such as infrastructure oil power what are mining etcetera should be quantified it which becomes highly important that you do.

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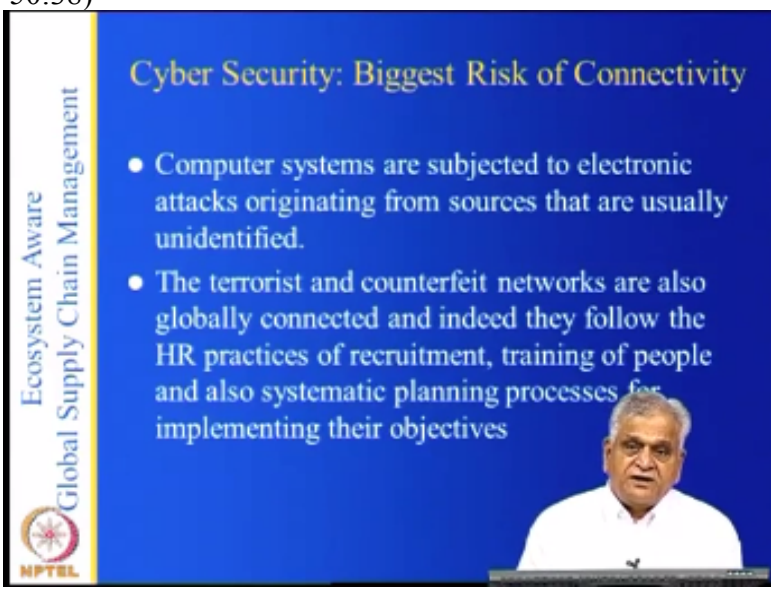

So then you have the cyber security the biggest risk of connectivity in other words. when you are connecting to the internet and you have a cluster which is or you have in a cloud platform which is operating audio which is storing all your data and so on then you have a biggest risk of connectivity. So computer systems are subject in electronic attacks originating from sources

that are usually unidentified you do not know where who is telling your data and so on the terrorists and counterfeit Laclos are also globally connected and there follow.

The same HR process of recruitment training people and also systematic planning processes for implementing their objectives so one has to be extremely careful because your rivals are also as good as you are better sometimes and they are doing in secrecy whether you plan everything and you plan the times and all that they are doing everything in secret way so that is where the desire comes.

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So I think in the next lecture. I will talk about the feasible supply chain configuration for implementation .

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