Indian Institute of Science
Bangalore

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Global Supply Chain Management

Lecture- 25
Supply Chain Design – part2

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So we have will go through the step 5.

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We have finished four steps in terms of the global supply chain formation so let us look at the feasible configurations what we did was after mapping the supply chain we looked at the supply chain strategy what are the kinds of innovations that are possible and we looked at a water all the supply chain risk that they face so we are now ready to look at what are the feasible supply chain configurations for implementation in other words we have we have done our homework in terms of the various for our vertical for our company.

What are the kinds of suppliers we need who are the logistics providers which countries are we in and we also have information on the suppliers financial this one which resources they have which countries they are in what are their governments what are the delivery mechanisms and so on so once we have this kind of information that is possible then we could now use this to identify what are the feasible supply chain configurations.

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So for the product of your company relative knowledge product solutions or value chains identify the partners companies and countries for goods information and financial flows and also the risk of coronary you should identify the suppliers if you write it get the logistics providers you should identify the suppliers of information and also the financial the bands and others and so on use the ecosystem information of partners of your partners while addressing the race in other words you should do this Co called multitier risk management.

Multiyear risk management is you should not only know about your suppliers but their suppliers their suppliers and go up to the mines and this could be a failure for the government or a back or an earthquake and so on so there but there could be any kind of problems that can occur so we should lose the ecosystem information on this map the supply chain processes including methods of collaboration and also for ensuring partner loyalty it is very important when you are outsourcing that the partner large loyalty should be ensured.

It is not only expected but we should ensure that the partner loins how do you do it besides join joint ventures or you have common conferences joint conferences with them looking whatever so whatever you do then it should be ensured poverty one has to be highly careful about this map your supply chain for each customer order how mitigation strategies for operational possible attacks failures and so on.

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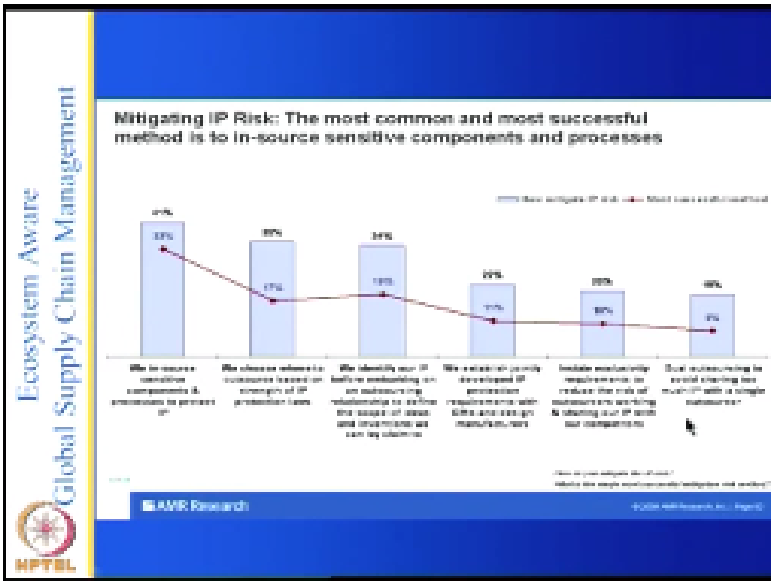

And how do you mitigate risk when there are several ways in which in this AM our research gives you this so we insert sensitive components and processes to protect IP so in other words you do not outsource very sensitive critical components and so on that is what forty one percent of the people say and we chose where to also based on the strength of IP protection laws and we identify our ITIP before embarking on outsourcing relationship we established jointly develop the protection requirements with contract manufacturers and design manufacturers.

In state exclusivity requirements to reduce the risk of outsourcing dual sourcing to avoid sharing too much of IP with single sorcerer so basically you have several methods of mitigating IP risk that is why jewel sourcing to various kinds of protection and so on so basically how to mitigate out to IP risk and the most successful methods are given here this so in other words nothing is easy you connect you cannot avoid any risk but the several ways in which you can try to mitigate and be prepared to do it.

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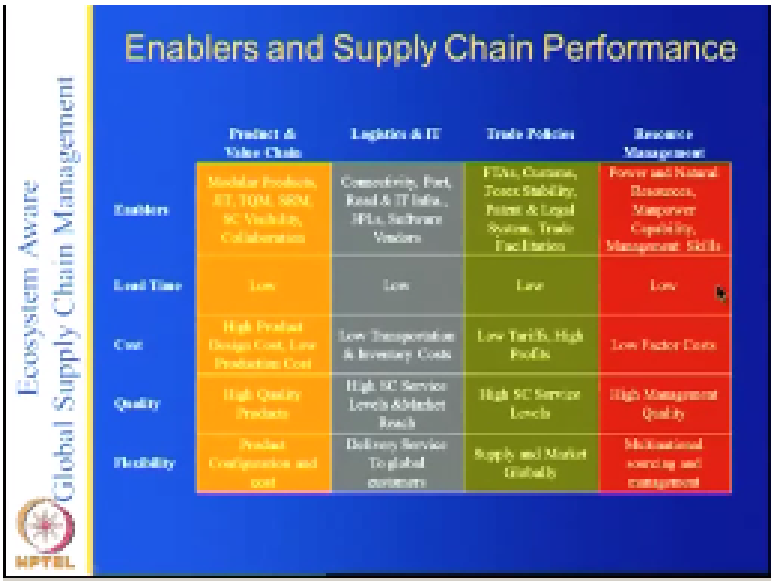

So and then also you should do the you know map the enablers and the supply chain performance what are they given this and in here are some standard enablers for supply chain logistics IT trade policies and so on but for your vertical for your vertical if it is oil gas these could be very specific and generic you should you should map those things for example here I said module of products JTT and QM and so on and logistics IT connectivity and so on so if you are using oil and get gas then it could be something different you may need some asset specific requirements and trade policies and resources and management and so on.

So basically it is very important that you map this and find out what are the enablers for this and then of course you can see what is the lead time and so on how do you what are the enablers to make your lead time low at each point and so on and cost quality flexibility and others whatever are the relevant performance measures you and what are the current enablers if you want to change them if you care if it is possible to change them in terms of the delivery mechanisms and choice of partners joints of suppliers choice of countries you should do that .

So that and these enable has become very important in other words we are translating whatever the ecosystem this one what we have into something is specific to which that will affect your performance of the lead time and cost and so on so when you are trying to get to your feasible supply chain configuration then you should first map this and then use that.

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And when do we have at what do we have at the end of the supply chain formation phase so we have we said there are two steps in supplies and design the first step in supply chain formation what is supply chain formation you collect all the players that you have when their countries their ecosystems and all that this is a phase in which you collect all the information and app all the supply chain configurations you do some kind of a higher level performance measurement higher level risk assessment and so on now this is a part of the strategic studies that any particular company should do should be doing.

And the ecosystem map various Network partners including manufacturing logistics and IT their countries regions or locations that is what we have make that the ecosystem places the innovations that are possible to make it big in the industry the value chain architecture without so store one a ship details so this is a strategic phase w
ith a lot of information collection and it is data Dominator now based on this data you could do a lot of analytics to find out which is the supply chain and so on.

So this is basically an important thing when people talk of big data this is the kind of big data that you need for the supply chain design so this contains the textual data it contains the data or the countries it is contain opinions of experts and several things now how do you select suppliers using this you can use analytical hierarchy process you can use machine learning this one and so on so there are several methods genetic algorithms to everything that is available or optimization techniques that are available now those techniques are not the ones that are important all this homework.

And the collection of data is the one that is important so that is the first step so once we have finished the first step we get into the second step of this one before that there is what is called project planning now it depends.

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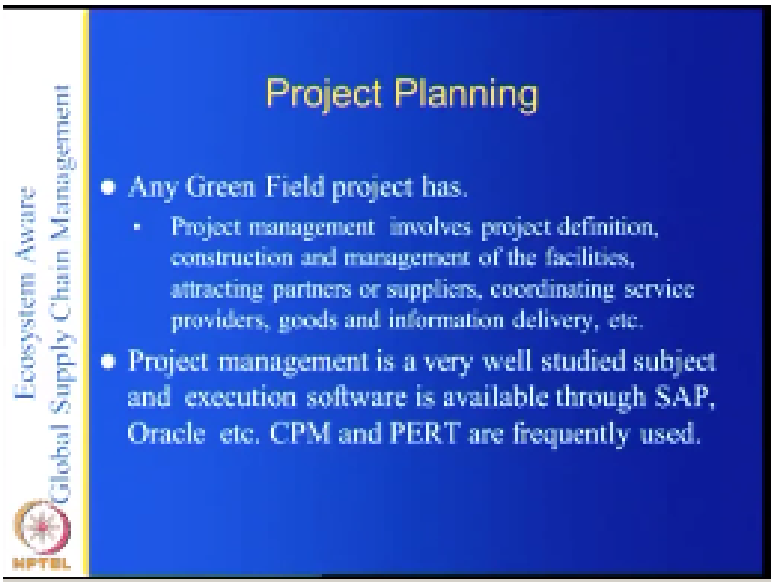

That whether you are talking of the green field or your talk of an existing this one in other words what do mean by green field if you are if you are if you basically are want to invest in a new country you want to build factories and you want to select suppliers under your selectors selected suppliers also want to build their assets in the particular country then you are dealing with project management which involves construction management of facilities attracting partners suppliers coordinating service providers goods and information delivery.

So this project management is very well studied subject and there are a lot of some this one available on this but you have to be extremely careful when you have to deal with any land acquisition problems and so on and also source of problems in other words people should not protest Agnes to your entry into this and also you should be able to negotiate with the government with the social groups and so on so the kind of talent that is needed for negotiation is different in this particular case.

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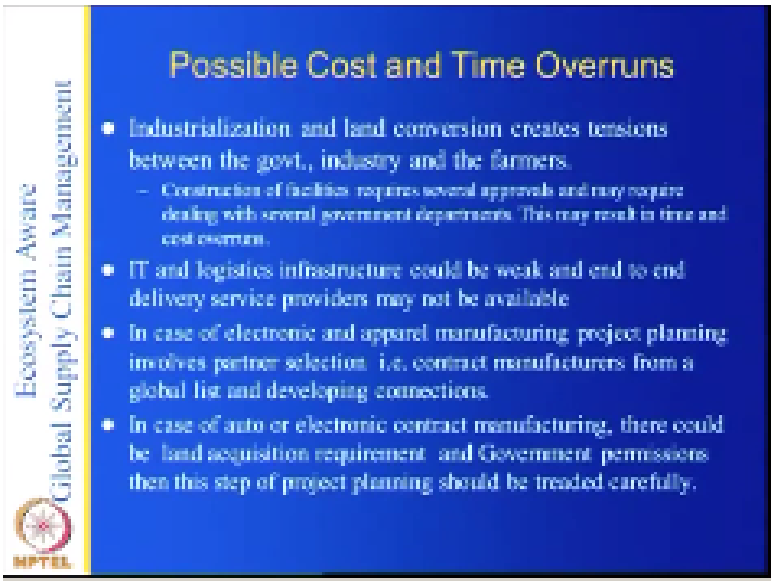

So possible cast and Tom time overruns so basically your industrialization and land conversion three tensions between the garment industry and farmers because in 51 percent of in land in India is called table so some small farmers they basically warn the land and the government has to have lost to take it away from them and give some compensation so it requires several approvals and may require dealing with several government departments and this may result in time and cost world ones.

IT logistics infrastructure could be weak and n2 in delivery service providers may not be available in case of electronic and apparel manufacturing project planning involves partner selection contract manufacturer from global list and developing connections in case of auto there could be land acquisition requirement and government permissions then the step of project planning should be credited carefully.

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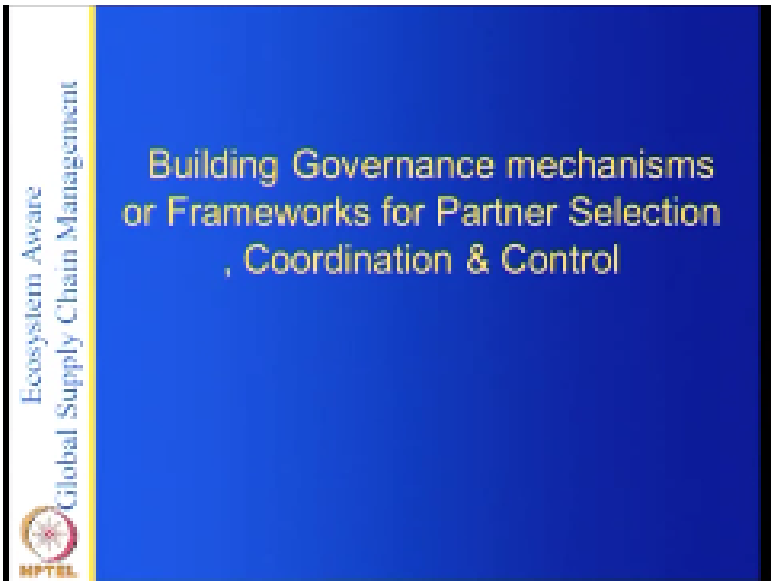

So basically that is what it is and so on so importantly if I said to say that that at the end of the first stage of project of supply chain formation you have all the information that you need now you have to build governance mechanisms or frameworks for partner selection coordination or government so this is a please remember the what we are doing is a design now design is not to a specific company or in this one it is a generalized design it is a methodology or a framework that we are trying to develop here.

So this is a framework for partner selection coordination and control so what we did so far is to have a list of players for each of the items that we need for the manufacturing I comes like suppliers of a particular component for services including logistics audit finance and so on so you have all the players in all the countries where you require that you have a list you have also what are the kinds of innovations that are possible in this you are you can outsource you could do whatever.

And also you have you have all the risks list of risk that you may face during in a short period of time the risk profile may change of countries and companies and the banks and so on but as of now at that time we are talking of an ordering at that point in time then we have those risk profiles.

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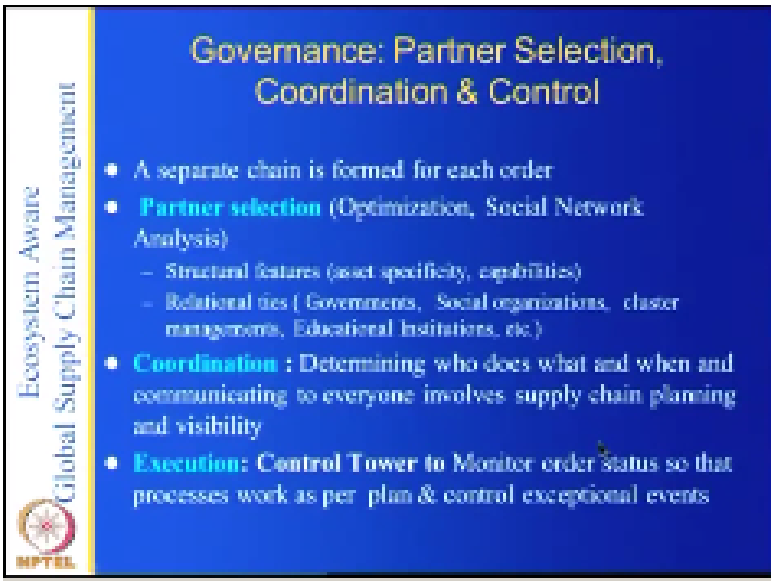

So governance partisan action on coordination a separate chain is wrong for each order how do you do the partner selection in other words you have this list big list that we have from that you have to basically select the partners for the particular order so how do you want to do it you want to minimize the lead type you want to minimize the cost or you want to maximize the quality what is that you want to do depending on that you could do social network analysis you can do optimization you can do whatever to select the partners.

So and there is a structural features that you should also remember that your suppliers may have some asset specificity and you may require some special capabilities so you should see that your suppliers have those structural features and similarly the relation of ties so human business requires that your suppliers have some ties it is not just the product you are looking for you are looking for a social relationship in that country so if they have government connection social organizations cluster management education institutions etc.

Those ties become important for you so does your supplier has the structural features they knowledge for and for manufacturing of the product that is promising and also the social capital so you look for that and then try to select your partner and once you select the partner determining who does what and when and communicating to everyone involved like and planning and visibility this is standardized things once you know your product once you have selected suppliers once you product is standarderised you know the capabilities of all your suppliers

Then how do you plan this is the ERP systems and then supply chain planning systems of I 20 SI SE PE oracle and all that you have this software that is available and also there is the supply chain visibility that is possible using the sensor network RFID tags and so on there is the execution now this is an important part that happens execution is control tower monitor order status so that process is work as per plan and control exceptional events now this is a kind of a new thing although it exists in several other contexts like Power Systems Airlines and so on.

But what the supply chains it is a new thing now supply chains are used to think that you have planned and things will happen as per plan but they do not have an aspirant plan that is because of globalization along supply chains only the nature of disruptions which are not mitigated and several other reasons it is important to have a control tower which monitors the order status and the process is work as per plan so you have to basically when you are trying to build the next part of your supply chain design you have to have Tunes optimization tools or whatever you have to based on your requirements.

You should select your partners for the order on hand the order is a dependent on where the client is you may want to minimize the minimize the cost or maximize not a quality or whatever and you also do the supply chain planning coordination and also we would have some facilities for execution.

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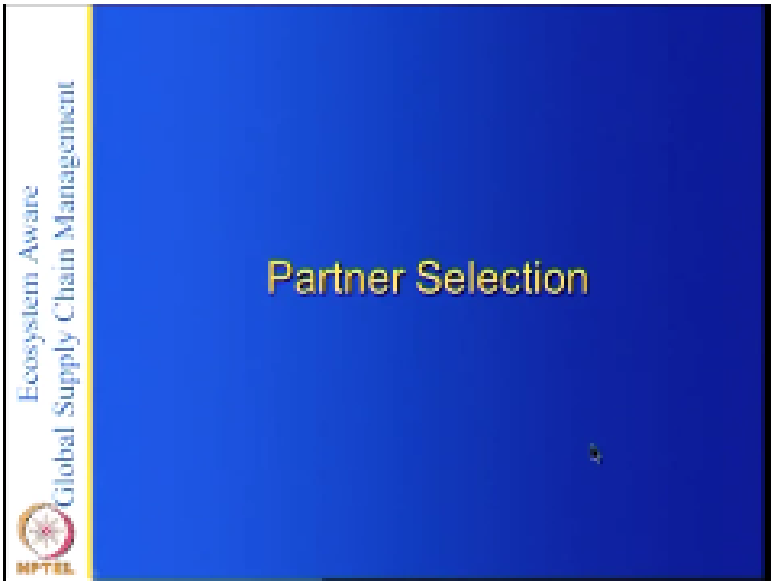

So let us look at the partner selection.

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The partner selection we identify suppliers for various components or services from all over the globe that is what we have done already we shortlist them mention only criteria mentioned such as location country's policies delivery cost assets facility risk proneness innovation capabilities technology sort of sophistication of hard and soft infrastructure so we are looking for hard and soft technology sophistication etcetera an optimization transaction cost analysis virtual networks several other things are used in the used in the pre-selection view selection process.

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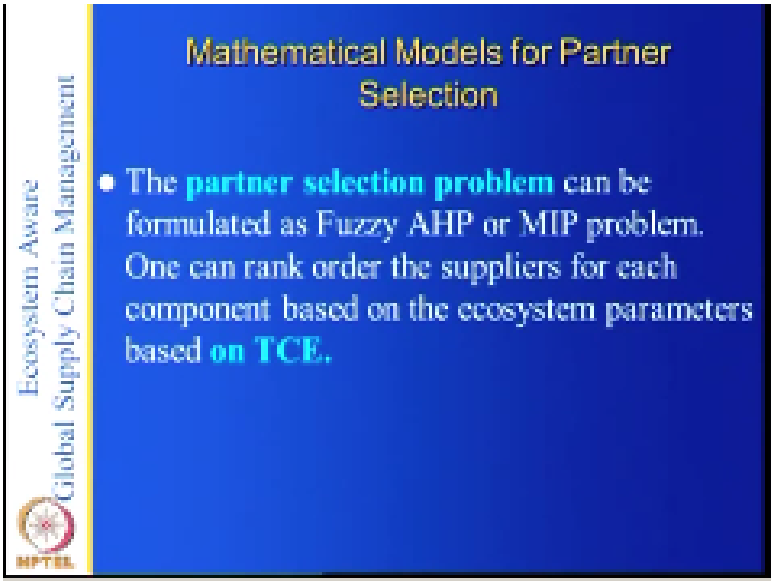

So what are the mathematical models the partner selection problem can be formulated to using fuzzy AHP or multiple multi integer programming and one can rank order the suppliers for each component based on the ecosystem parameters based on the transaction cost economics.

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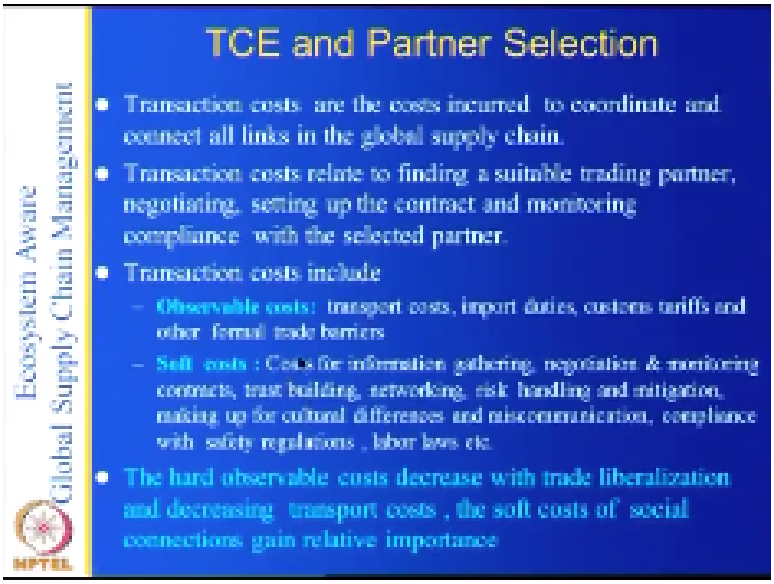

So what is the party see you and partner selection transaction Cassidy cars occurred to coordinate and connect the links in the global supply chain what are the transaction costs they are the cause record to coordinate and connect all the links and the global supply chain they

relate to finding a suitable trading partner negotiating setting up the contract and monitoring and compliance and so on the transaction costs include observable costs which are transport costs import costs customs and so on and soft costs.

So basically if you look at this one we have already incurred the soft cause in negotiation in basically getting all the information and so on and this so what we have basically look at now since we have we have already inquired into this off course in the supply chain formation stage what we have to do is they look at the observable cost and partly if you for a specific supplier once you selected we want more information then there are the soft costs associated with this and the whole observable costs decrease with trade liberalization and decrease in transportation Kathy soft cause of social connections gained importance.

You know this is where once they trade liberalization and the WT will come into effect the transport costs import duties and so on they are basically well regulated but the soft costs they take gained importance that is where I think the importance of the supply chain formation consider this one when you are talking of the transaction cost then the soft costs are observable cause all the soft costs most of the soft costs they go into the supply chain formation stage and that is where one has to one has to spend time and effort and cause so once you have done that exercise then the transaction partner selection becomes easy.

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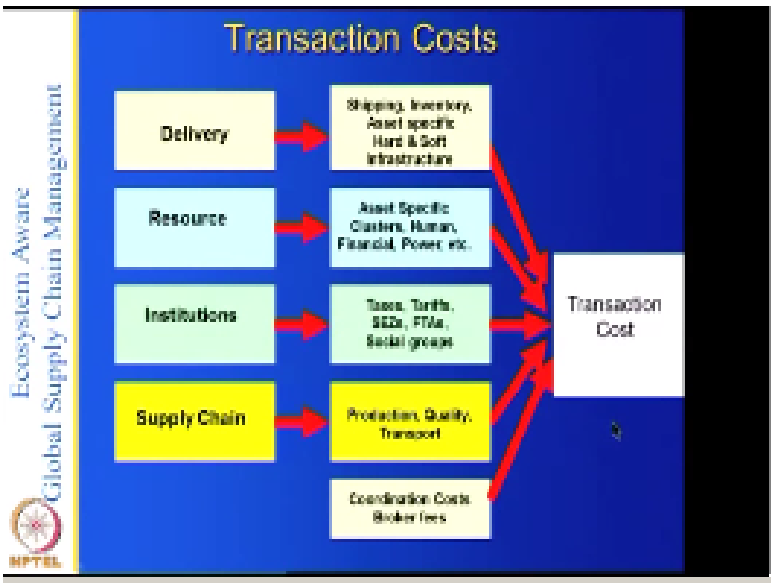

As we see here the transaction costs are or given here there could be a set specific and so on you can calculate the transaction costs based on the delivery resource institutions and so on and once you have all these things then you can select the particular supplier.

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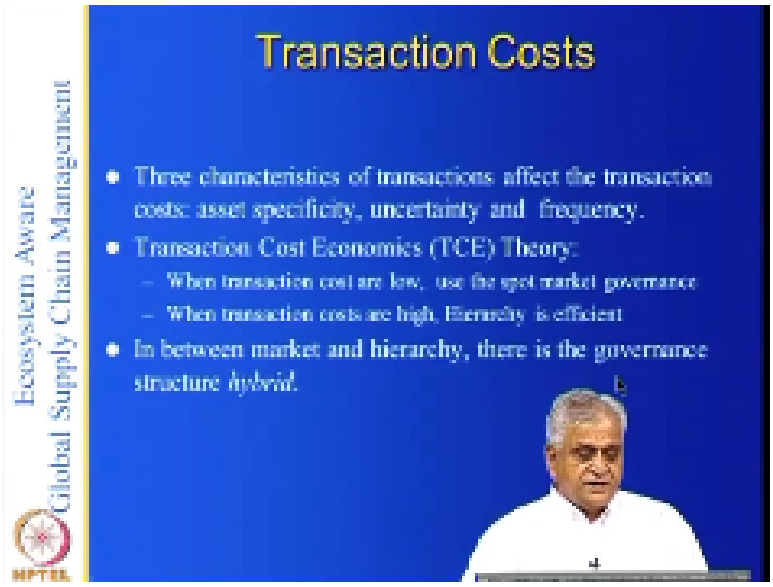

So three characteristics of transaction cost effective Tonya asset specificity uncertainty and frequency now transaction cost economies theory when transaction cost of low use of spot market governance and transaction costs are high hierarchies efficient in other words when your transaction costs are high dealing with somebody in some others this one then you better do it to yourself when the transaction costs are low you outsource it now here with what we are trying to do in the supply chain formation stage.

Is to look at all the transaction costs and find out per each supplier for each component who are the basically less transaction card suppliers that is what the supply chain formation stage looks at which looks at not only the cost innovations risk and so on and based on all this you try to select rank order the suppliers so supposing you look at hub if you do it yourself armature case and if the lowest transaction costs of the lowest of the low record or high rank order one or higher than yours then you better do it yourself.

So basically it depends on the governance when you want to do outsource or you want to do it yourself in between market and directly there is the hybrid this one.

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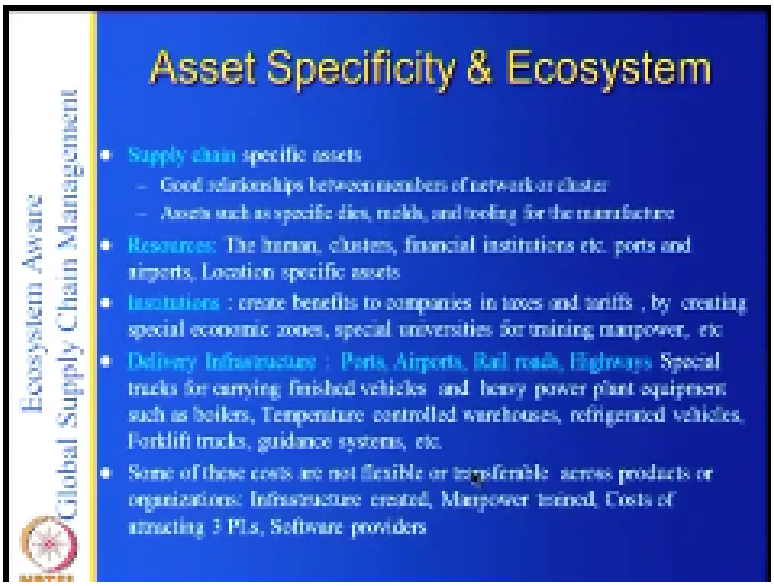

So asset specificity supply chain specific assets good relationship between the members of network and cluster SS such as specific dies and so on resources now this is this is a slide we have now tried to look at what are all the assets specific ecosystem in other words the asset specificity is not less for the supply chain it can come to the resources in other words the human clusters financial institutions etc and the ports airports location specific assets these become important depending on your vertical.

Suppose a you are doing I you this one to import oil when they when the ship containing oil comes and it should have specialized equipment and a refinery nearby and so on so basically the port where it was it becomes a set specific and also in some of these R&D and so on you may require human expertise particularly in biotech when acquire PHDS if you ever an IT then you may require well trained programmers and so on so it depends the resources could be could be also a assets specific institutions for example summary governments create benefits to companies in taxes and tariffs.

For example special academic Jones special universities for training manpower and so on you know India has a lot of triple I tease for information technology degrees and so on so here when you are selecting a particular supplier in a country you should also look at what are the special economic zones there if you save on them if you can in you can either do FDI their foreign direct investment or equal outsourced to a partner in the special economic zone who can export to you.

So they are basically that is dependent on that and delivery infrastructure roads airports railroads highways and special stocks for carrying finished vehicles and heavy power plant equipment such as boilers temperature controlled warehouses in finishing 10 vehicles forklift trucks guidance systems so these are all become highly as at specific and for example container for iterations and also you know container handling and having trucks to carry containers from the port into the city and so on.

Some of these cars are not flexible or transferable across products or organizations infrastructure created manpower trained cause of attracting 3PLS software providers these are not flexible you cannot transfer to somebody else so what happens is with the asset specificity of things you are stuck with that particular product and so on so the supplier is creating all these facilities who have to create all these facilities for you so he may demand a contract saying that look I have created all this for you so you should probably stay with me and have a long term contract or do have some other some other wave or try to make of the money that is spent on the ESX specific is system.

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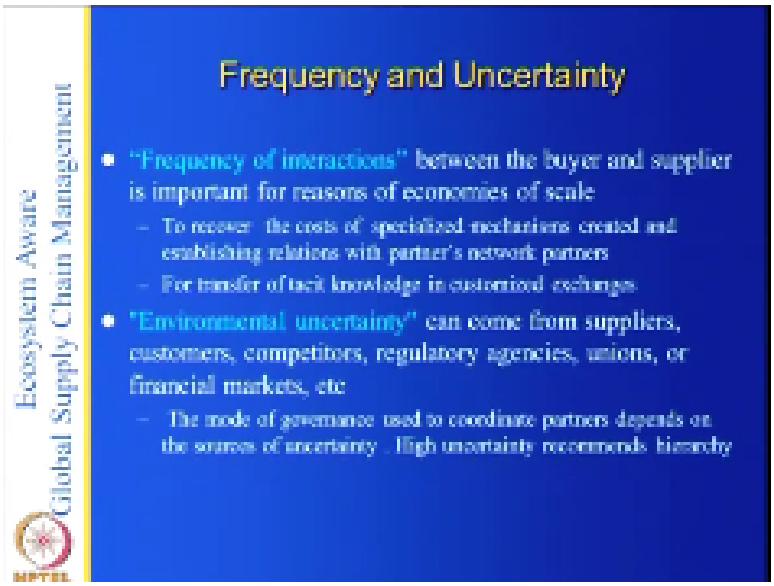

So there is what is called frequency and uncertainty a frequency of interactions between the buyer and supplier is important because that will create the economies of scale if it is a onetime transaction for one year then you know it may not be worth the while to require costs or specialized concerns created and established relations with partner network you spend a lot of money and effort but this is where if you compare a trailer with a particular manufacturer who

is trying to build up relations if you are a manufacturer you are doing it for your own sake and your orders will be maybe three times four times.

As he is over a year once a season but on the other hand we did trader he does for several people and several countries so that is where he can get the more frequency an environmental uncertainty can come from suppliers customers competitors regulatory agencies and financial markets at mode of governments used to coordinate partners depends on social sense of uncertainty so if you have high uncertainty then you better do it yourself in other words if going to any other country it creates a lot of uncertainty.

The for example in ALND or RND everybody does it themselves that is because once you get out of this country then I out of your hands you may lose whatever you have the intellectual property and so on so basically it all depends on what the uncertainty interactions and so on so.

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What we have next is the coordination that is the partner selection so why is the partner selection important you have a list of all the players in a global supply chain and injuring the partner selection you use either analytical techniques or heuristics or previous experience or data analytics to find out for that particular order who are the suppliers and be depends on your as a specificity here and so on you can find out the use transaction cost analysis to find out what is the what is the total cost and you can minimize selector supplier from that and you can also minimize.

The risk take the exam is another things into account the second this one in the under the governor's is the coordination, coordination is basically supply chain planning it is you have from your order you have selected all the suppliers all the logistics providers manufacturers and so on so you have the we have the path for your supply chain now for that part you have to basically do tell people communicate with all the partners tell them what they should do what is it which of the product they are building what are the specifications and what are the timelines who should do what and well so that is coordination.

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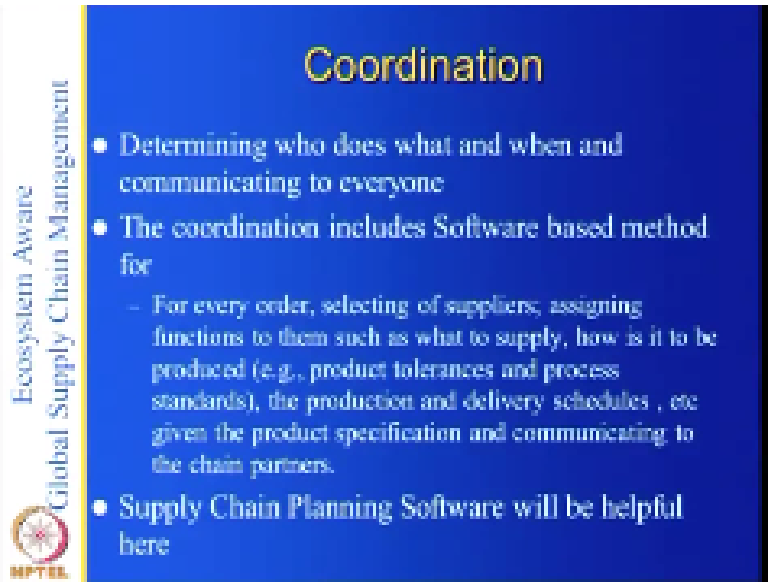

The coordination includes software based method for it determines who does what and when communicating to everyone for every order selecting the suppliers assigning functions to them such as what to supply how is it to be produced for example product tolerances and process standards and the production and delivery schedules given the product specification and communicating it to the chain partners so this is typical supply chain planning issue so you buy while doing this you may take into account the capacities of your suppliers because if you require more capacity than basically you may have to go to two suppliers and so on so basically the kind of contracts you have everything matters here in terms of coordination.

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Then of course this is a standard supply chain you have software from Oracle software from ERP and others and there is a lot of supply chain ability that is and there are any number of methods including internet email and two to communicate with the partners and so on and the next one is building the control tower now this is the otherwise called the execution now we had dealt with the partner selection where you are using all the optimization algorithms and so on to select the partners to minimize the cost or minimize the lead time and so on you have all the information from the previous step of global supply chain formation.

And you can use the information about transaction cost economics and all that to do this and the second step is coordination once you have accepted the order you have selected the suppliers now based on the information you have you can use supply chain planning techniques to do who does what and where now the issue you please remember is you may get several orders for this is not a onetime this one having done all the exercise on the global supply chain information who can you may get two orders 3 orders a day and each.

Each order takes a different supply chain route and for each of those orders you have to do the coordination now which are the suppliers it can be may sound suppliers in other words in the morning you may get an order for 100,000 skirts and you may go through a route like cotton from Bangladesh and so on and finally it is ironed in Mexico and then sent to United States and in the afternoon you make it an order another order from Reebok and that order may go through some other route for the same things.

So the orders differ and it depends on the capacity at that time and also the value this sweater from Wal-Mart view they may require a ten dollars in the same sweater from Macys it may be hundred dollars so the quality of this water should depend because when somebody is paying they do not pay for the same price so now once all this is done you are you have planned for it and your process is an order and everything is assigned and people are doing it how do you model monitor and control whatever is happening if everything happens as per plan then you do not require the control tower but it does not happen so there is a need for this.

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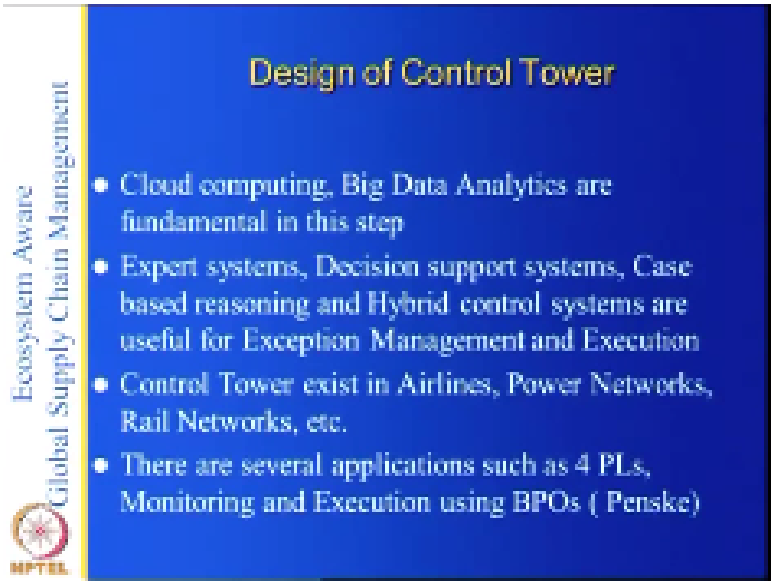

So design of control trouble what do you what is a control tower it is basically has the information regarding your process what is happening where you have that information and you have to collect the data of what is happening all the dates with quantities and the quality and so on and then see whether everything is happening as well as well schedules so you cloud completely in big data analytics are fundamental in this step now supposing you have all these partners in various countries they collect all the data.

You know I have collected in order of 10,000 this one I have I have done the dying of these items and then I have supplied and this data is stored where that these are all small players so you have to collect the data maybe it is on a cloud maybe it is not maybe you were to collect it to collect from their information is on spreadsheets and so on and have all this on a cloud let us assume that you have cloud on all these supply suppliers place there this one in the cloud and you have to use the Bechtel big data analytics to basically find out whether anything is going wrong or is it everything is according to orders.

You see this human thing anymore because with this suppliers if you are a big trader then you know you have several manufacturers dealing with the fourth 4000 ordered suppliers in all over the world to have a human decision-making to find out whether anything is going wrong of the elects becomes difficult so you have to pay out basically somebody telling you whether there be people kind of thing which where exception management is done in other words whenever there is an exception somebody reports that to you and you give the solution based on expert advice that is one way of doing it.

Another way is to take the data and then use expert system patient support systems case based reasoning hybrid control systems etcetera to follow exception management and so on so the point is if everything going is going as for the plan then that nothing to be done you just collect information and give the status normal but other hand if there is an exception supposing the quality of a particular supplier is bad then you have to basically expedite that either that fellow does the supplier does it again or you have to assign it to some other supplier we heard we do a some expediting and so on so.

Basically depending on the schedules the time you have you have to basically decide what to do with this so that is the kind of destination making that you control Thomas car but currently the control towers exist in Airlines Power Networks rail networks etcetera but there is the control towers for transportation that was is being talked about our global transportation control towers being is being talked about but not much in operation but the entire supply chain control tower is still a hypothetical this one although people are doing it in some pieces.

There are several applications such as for PLS monitoring and execution using VP was for example Penske logistics does this control tower execution using the BPO Genpack in India so for example what Penske does is supplies it transports the auto components from various suppliers in the United States to debt right for all the big three companies now then skip what it does it says the execution it tells which truck to pick up where and who is a driver and if something happens at this the driver just calls a 800 number and the BPO staff fixes that sometimes consulting the diversion all are by their behinds hindsight or their experience.

They may do it all by themselves so the point here is all that works the drivers there the through GPS on through drivers cell phones they are all being monitored remotely this happens the truck transport transportation happens in the United States but the monitoring is all done by a call center within a within India then when you have the call center there is human expertise

that is they are trained people then there may not be such much so much of automation that is needed.

But still if you want to if you want to use this store this data and learn from the experiences and use a machine learning techniques for future use then it is necessary to design the control tower properly so this is this is being talked about but not much to design of this one.

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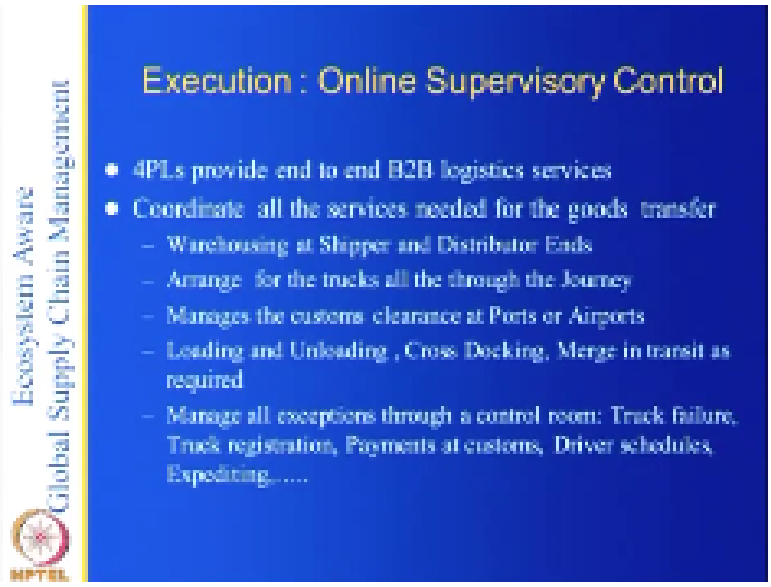

And of course the execution in terms of four PLS provide end to end b2b logistic services this is what party logistics services they ordinate all services needed for goods transfer warehousing a shipper and distribution ends in other words and arrange for trucks all through the journey you know if I am four PLS which I am acting on behalf of some client shipper then the shipper has no role in choose our choice of the trucks I choose the trucks and manages customs clearance at ports and airports.

Managers loading unloading cross docking merchant transit as required and manage all exceptions through the control room truck failure truck registration payments and customs driver schedules expediting if it is needed and so on so if you are talking of these kind of functions then you can see the functions and importance of four REE controlled home.

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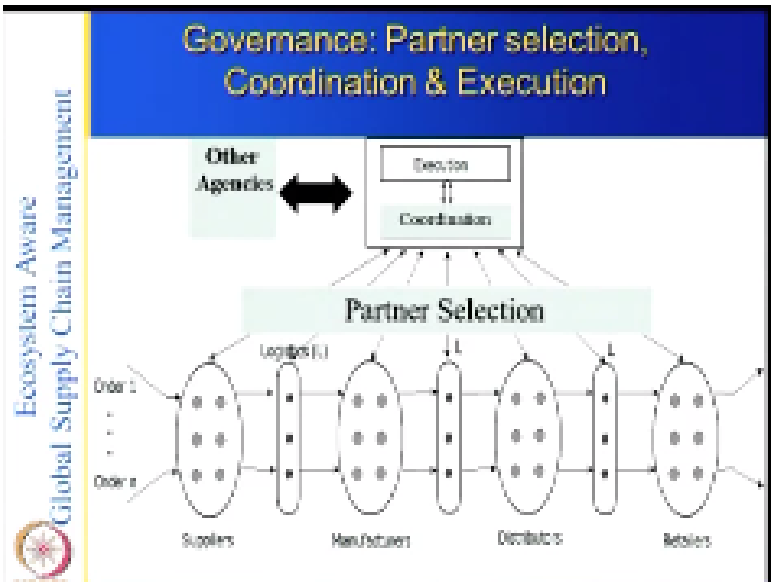

So this is the diagram which finally what we have here is this is the suppliers which are selected in the group formation stage and a logistics providers manufacturers and so on so all the power of should all the countries and for a particular order I use the part of selection where I use the algorithms that we have and the coordination is I tell who does what to all these people for that particular order or if there are several orders to several orders to several people and finally I usually control tower for execution.

So this is summarizes this diagram summarizes the governance which is partner selection coordination execution so the supply chain design has basically two parts the first one is the supply chain formation which includes the five steps that we have mapping the ecosystem to finding the final configuration and the second step is the design of the governance and which includes partner selection coordination and execution design of the algorithms and so on so this basically gives you an integrated supply chain design procedure which is valid for not only global supply chains but local supply chains as well but does where this kind of thing exists anywhere the answer is no now.

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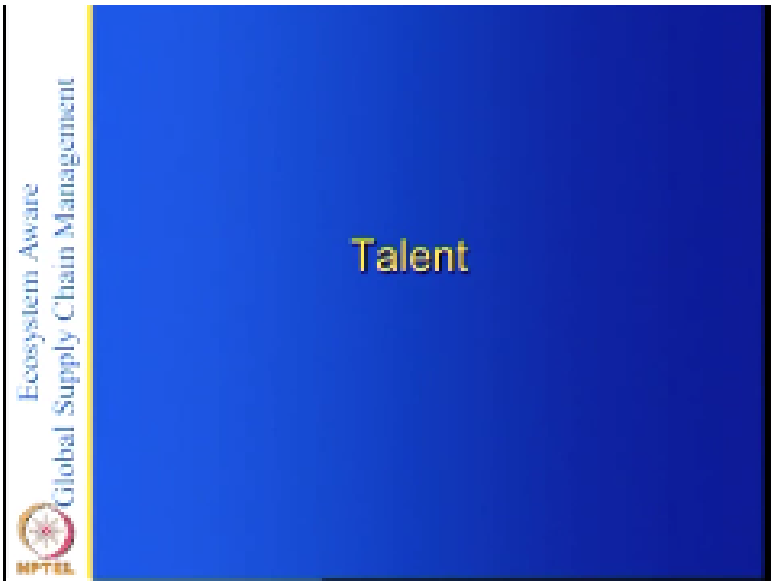

So basically that is about the global supply chain design but what is the kind of talent that you require here now you are having two steps the first step is global supply chain formation the second step is the partner selection monitoring the coordination monitoring and control and so on so.

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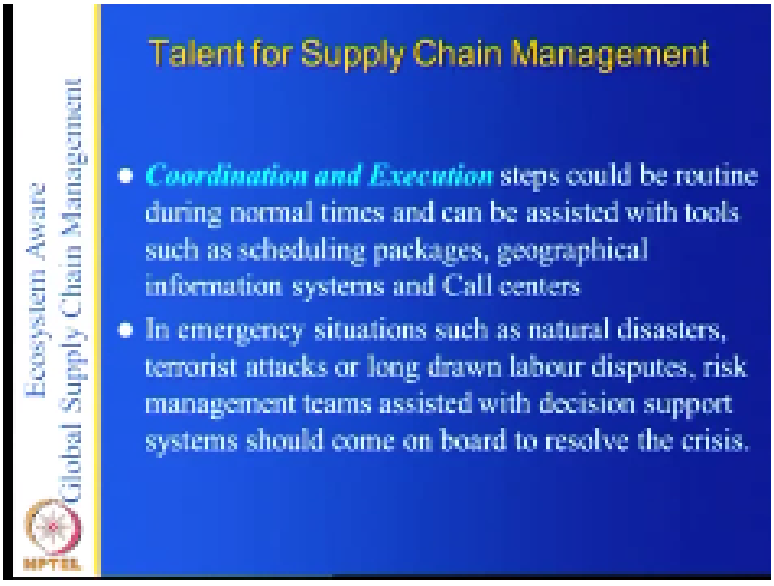

But the talent for the talent soft skills are in the execution abilities connections domain knowledge needed for each step in the supply chain design is difficult the talent needed for the

group working on supply chain information is more knowledge and data intensive and requires domain industry knowledge political and economic factors of the countries and regions strategy formation innovation and risk evaluation and finally use of analytical techniques for location selection and group formation.

So it is not just running the software it is not running supply chain software what it involves is much different and project management requires skills to interact and manage with the government local communities local connections or knowledge will help get approvals quickly and resolve any dispute that may arise with landowners land local communities and labor unions and the talent that is needed for coordination execution could be routine during the normal times and can be assisted with tools such as scheduling packages geographical information systems and call centers.

Now when I say routine it is not that it is easy but it is normally done in the supply chain management this one like using this kind of packages or others so people use the packages like ERP and others and also there are some supply chain visibility packages or several other things which are available which can be used for coordination and execution but what is difficult is the previous stage which is basically at a quest now in earlier days it was not very important because you have strong or dense ties with your suppliers so they are usually local you know them you invest in them and so on so you need not have to worry much about that.

But if you have going global and if the markets are becoming volatile and if the countries on governments are changing their strategies every day then the supply chain formation becomes a very important step in emergency situation such a natural disasters terrorist attacks are long drawn labor disputes risk management teams assisted with this and support system should come on board to resolve the crisis because that is what education is about.

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So to say as people say Jack a similar number one same is applicable for companies and strategies what it means is basically any human being basically which is one is the destined to die the same is true for companies and strategies no company no design product process network ecosystem is a minute ecosystems change based on the resource availability Barry based on the technologies available based on the government the elected and so on all of them keep evolving and your designs products processes networks ecosystems first along a wall suitability to keep the global competitiveness so there is no shortcut here.

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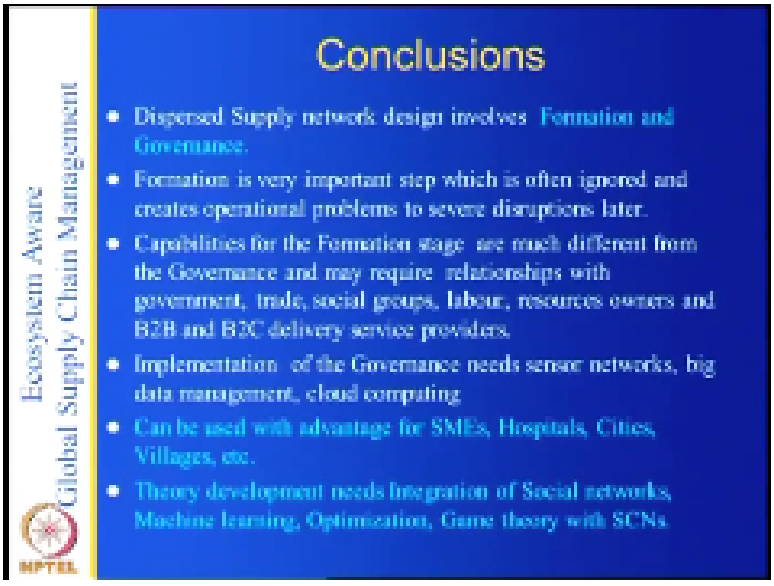

So what are the conclusions that we have dispersed supply chain design involves formation and governance there are two steps here and formation is a very important ship which is often ignored and creates operational problems to severe desperations later if you are not careful with the formation then you ignore the risks you ignore the government policies you ignore the financial status of your supplier suppliers and so on then you could get into problems later.

Capabilities for the formation stage are much different from governance and may require relationships the government trade social groups labor resource owners and b2b and b2c delivery service providers so the social capital for the company is much more in the supply chain formation stage than in the execution and coordination stage execution is typically professional whereas the supply chain formation is typically social implementation of the governance needs sensor networks or big data management control you know.

Implementation of the governance needs sensor networks make data management and cloud computing now what are the kinds of decisions you are going to make well we know in the supply chain case the decisions that we need to make and what then that depends on the day that decides the data you need you collect and once you collected the data then you can use it for your decision maker so the cloud computing basically stores all your data and it has all your algorithms and can be used with advantage for small and medium enterprises hospitals cities and villages I mean whatever we have said here is basically for supply chain networks.

But what is a hospital and in hospitals and they are sourcing and other things patients you can represent them as a service network draw their ecosystem and then represent how to design a service system for that so theory development needs integration of social networks machine learning optimization game theory with supply chain networks so suffice it to say that we have dealt with in this two lectures that the design of global supply chain networks and two important steps in this the first step is the global supply chain formation.

Which requires a lot of data collection and analysis and the second one is running your factory and which it requires partner selection for your order and then coordination and then finally execution the execution is a step which is not which is ignored and most of the supply chains today but it is a step that is very important to you.

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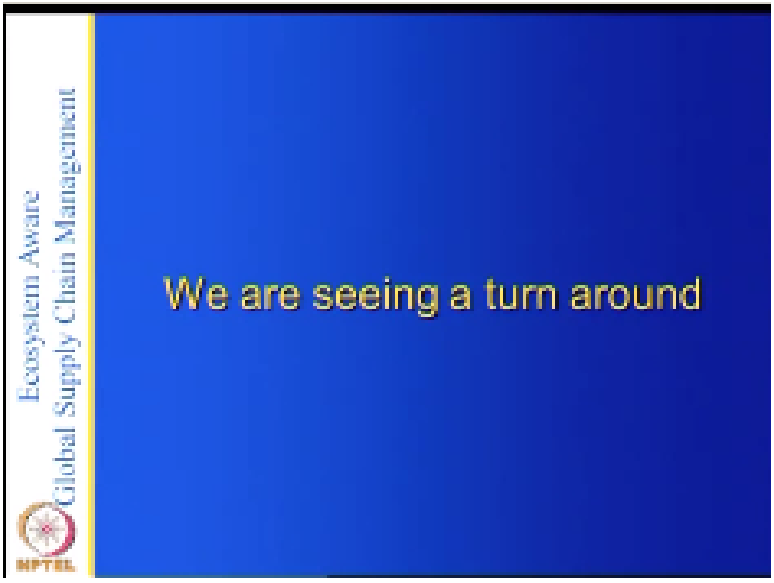

So that we can see the importance of this why we are seeing at all turn around.

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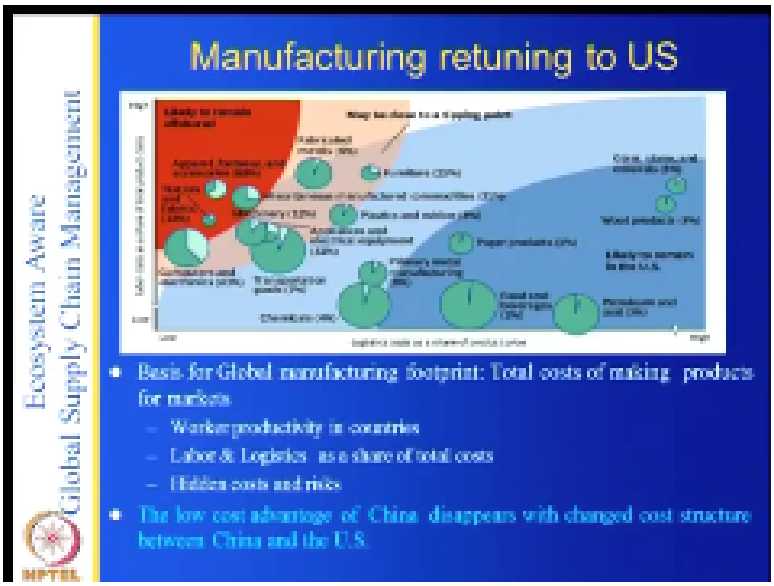

So for example manufacturing is returning to us this is for global manufacturing footprint lots of cars are making products worker productivity level logistics a share of total cost hidden costs and race so the low cost advantage of Jay no disappears which changed cost structure between China and the US so we are seen now rather words earlier there is a low cost country

advantage but now today we see manufacturing is returning to us so you can see the importance of the global supply chain formation that we are talking about.

As things change how then for certain products you can see here for certain products which are low end then still you food beverages and paper and wood products and so on their local whereas some of them are basically out source of all and so on so basically you can see that we are depending on the logistics costs as well as the labor costs you see that the whole the outsourcing phenomenon is changing a lot.

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So the future of global supply chains what is it an increase in the objective and subjective transaction costs from higher oil prices to buy local campaigns are murky protectionist protectionism government procurement in favor of local firms indicates that in the future supply chains will probably be smaller and more regional several companies such as going or restructuring their supply chains so I am this is these two slide show you the importance of supply chain design frequent supply chain redesign it is not that though you can design your supply chain and sit back and relax for years thank you.

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