

Modelling and Analytics for Supply Chain Management
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Lecture 58

Designing the Global Supply Chain : Tax advantages (Contd.)
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Modeling and Analytics for Supply Chain Management
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Week 12
Designing the Global Supply Chain: Tax Advantages

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Hello, and welcome to Modelling and Analytics for Supply Chain Management, and we, as we have mentioned earlier we are in the final week. And in the first lecture of this week we had mentioned about the first stage in designing the supply chain network for a global supply chain.

What did we mention in the previous class? In the previous class we mentioned that just like marketing, all supply chains today are global supply chain because you are looking at procuring from the cheapest source and from the cheap, rather I will say, from of the cheapest reliable source.

So, that is why, and you see Africa earlier, the companies were not too keen for procuring from Africa other than the mineral deposits. But overtime, companies have realized that Africa is a very great source for raw materials as well as with ocean surrounding the entire African continent, water transport is also available as well as cheap. So, more and more companies are turning towards Africa for supplying raw materials.

So, in the first phase of the previous lecture, we have mentioned about how taxation or taking advantage of taxation, less taxation rather, in certain countries, I repeat, taking advantage of lesser taxation in certain countries how you are building up a supply chain. We gave you the example of a company called High Corp and we gave you the example that High Corp has a customer, High Corp has a factory in Sweden, sorry, France, High Corp has a factory in France and there is a customer in France also.

But if you directly send the products here, that means you are directly selling. So, selling means you have to pay tax. So, what the company does? No, it does not send it through this route. Instead what it does is, it does a material (())(02:32) transfer to a country called Belgium and from Belgium it is sent to the customer as a sale. Now, Belgium has very little tax.

So, basically, Belgium is now the fulcrum or the center for supply chain trade as per this diagram. As per this diagram, Belgium becomes the center for trade. So, now they can easily say that Belgium can be developed as a hub. Belgium can be developed as a hub and this hub has primarily been developed because of tax advantage, because of tax advantage. So, this is the first thing that we learned.

And if you notice that this is again the first step of building a global supply chain. See, this should have been within the country but it is going to another country. So, this is happening. So, now, our job today is to continue with this model. So, now we will take another example, this time the China example, Asia.

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Example 2: China

- An Example of Taxation: Detailed View 2 :: ASIA: China
- A company based in China (Customer Company) orders some machinery from High Corp Sweden
- High Corp procures machinery from a Supplier Company in China
- The Supplier Company in China gets the product manufactured by a local manufacturing company owned by some individual (EMS Factory)
- So ideally, the Local Manufacturer can directly ship to the Customer Company, both being located in China

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What is it? Let us see. There is a company based in China, a company based in China, who orders some machinery from High Corp Sweden. High Corp is the company in Sweden. So, there is a company based in China who orders some machinery from Sweden.

Now, but this High Corp Sweden does not manufacture the product in Sweden, this High Corp procures machinery from a supplier company in China. This High Corp produces a machinery from a supplier company in China, but the supplier company in China gets the product manufactured by a local manufacturing company owned by some individual. So, ideally the local manufacturing company can directly ship to the customer company, both being located in China.

Let us see. Let us try to understand this example again. There is a customer company in China. The customer company asks Sweden to supply, the Swedish company asks its supplier in China to supply the material. The supplier in China is asking a Chinese manufacturer to manufacture it.

So, a customer in China wanting to buy ordering to Sweden but the Sweden does not manufacture it. Sweden asks the Chinese supplier to supply it. This Chinese supplier also, now this supplier company, Swedish company is asking the supplier company to supply

it, but this supply company is just a trader. He is not manufacturing anything. So, he is asking a Chinese manufacturer only to manufacture it.

So, what should be the logical flow? The logical flow, if you notice, the logical flow should be this Chinese manufacturer will manufacture, send it to the supplier company. The supplier company will send it back to the Swedish agency, High Corp and the High Corp will send it back to the customer in China. But does it happen that way? It can never happen. It would be a foolish thing to take the product around all these places. So, what do you do? Logically, you should just send it to this customer. But that is not done, why? Because of tax.

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• But, internally, in China, you have border controls and the products, if moved between districts or provinces, have to be declared at each border of the district and/or province and pay taxes there (as if you are moving products across countries)

• So you pay multiple taxes Similar to situation in India before introduction of GST

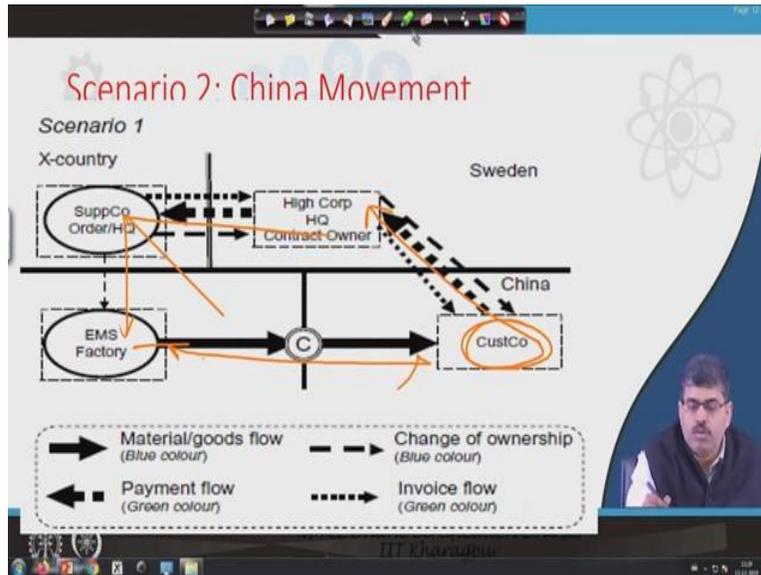
LOCAL Taxes

So, what do you do? But internally in China you have border controls and the product, if moved between districts or provinces, you have to declare. And you will have to pay taxes there. So, a product moving from one province to another, one province to another, you are paying what? You are paying to, you are paying your local taxes. Just like India some time back. You are paying local taxes.

So, what model did we had? Here was my customer, he has ordered to Sweden. Sweden has asked a supplier to supply who is in China. This supplier is just an agent, so this supplier gets it manufactured in China. So, ideally, the product should move this way but

it is foolish. So, what it should do? It should move this way directly from this customer premises there, cannot be done because there are so much of local taxes that will be loss making. So, what do you do?

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This is what you do. This is the model that was there, I mean this is the, what we were showing in the diagram. Here is a customer company who orders to the Swedish company. This Swedish company asks a supplier to supply, this supplier asks a Chinese factory to manufacture. So, ideally, it should go directly to the customer, but it has lot of taxes. So, what we are saying is it should not go by that route.

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• So the products are shipped to Singapore from China and then shipped back to the customer in China

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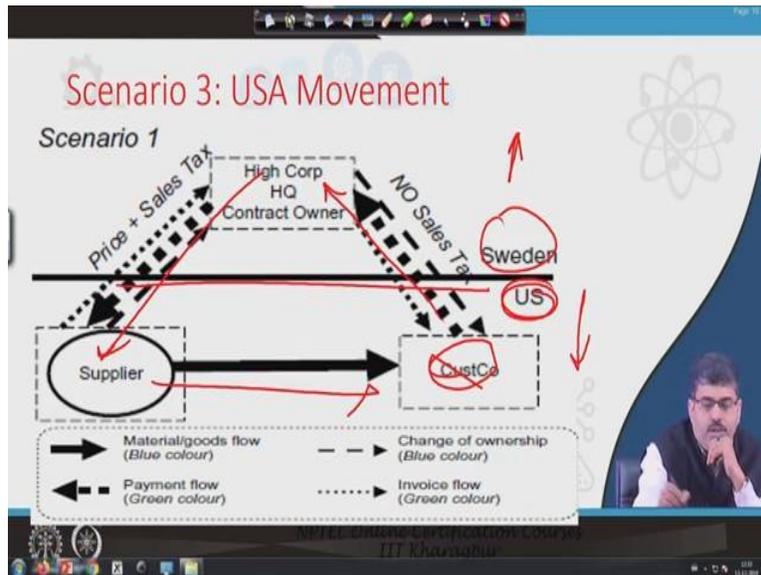
So, the products are shipped to Singapore from China and then shipped back to China. So, here is your product, so here is your customer in China, customer in China. Here is your Chinese manufacturer. What are you doing? You are sending it to Singapore and from Singapore it is being sent back to the customer in China. What is Singapore? No tax or very, very less tax. No tax or very, very less tax. So, this is another model.

What is the difference between the earlier model and this model? Earlier model, your manufacturing country and the customer country was same, but the manufacturer was the same company. Here the manufacturer is not the same company. Manufacturer is an outsourced one, outsourced.

So, outsourced company is not sending it directly to the customer, outsourced company is sending it to hub in Singapore. Title of the goods are changing and from Singapore it is changing, sent back to China. In that way what is happening? All the taxation between the customer company, manufacturing company to the customer, all the taxes, you are gone. So, this is another way of looking at it.

Let us take USA. A US customer orders a product from Sweden. High Corp can get it delivered from their own manufacturing facility in US, you have a manufacturing facility, assume. But that will mean a direct sales and sales tax will be levied just like the first model which is non-deductible and non-refundable. So, you have a product High Corp, High Corp can get it delivered from their own manufacturing units but that will be in a direct sale and so non-deductible and non-refundable.

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So, basically that is the diagrammatic representation. So, it is a customer company, order in Sweden. Sweden asks this High Corp US to supply, you can supply directly. This is USA. This zone is US, this is Sweden. Sweden is up, US is this zone.

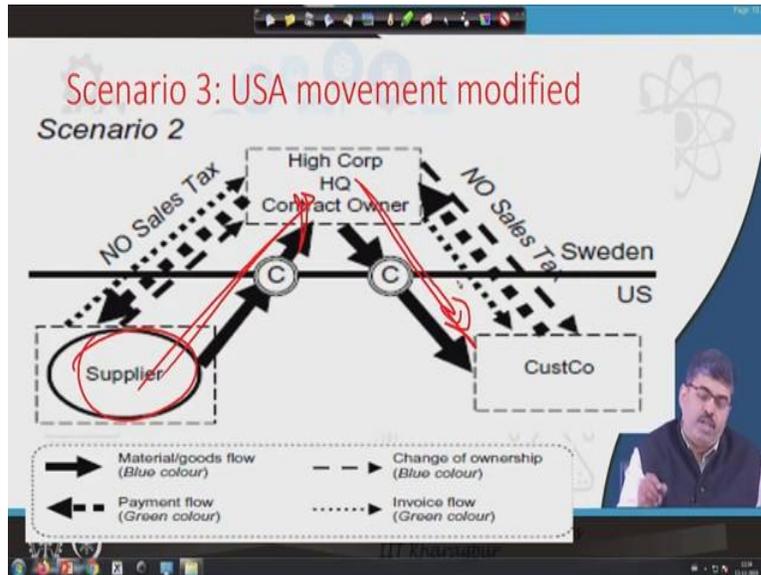
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- Because of the non-deductible and non-refundable sales tax in USA, the product will be shipped from the High Corp's USA factory to Europe and from there, back to the customer in USA
- This will mean high transportation cost and customs clearance in Europe
- But still the cost is less than the sales tax payable in USA

Because look at it what is happening, because of the non-deductible, because of the non-deductible and non-refundable sales tax in US, the product will be shift from US factory to Europe and from there back to the customers in US. This will mean high transportation cost and customer clearance, but still the cost is less than sales tax payable in Europe, as I was mentioning.

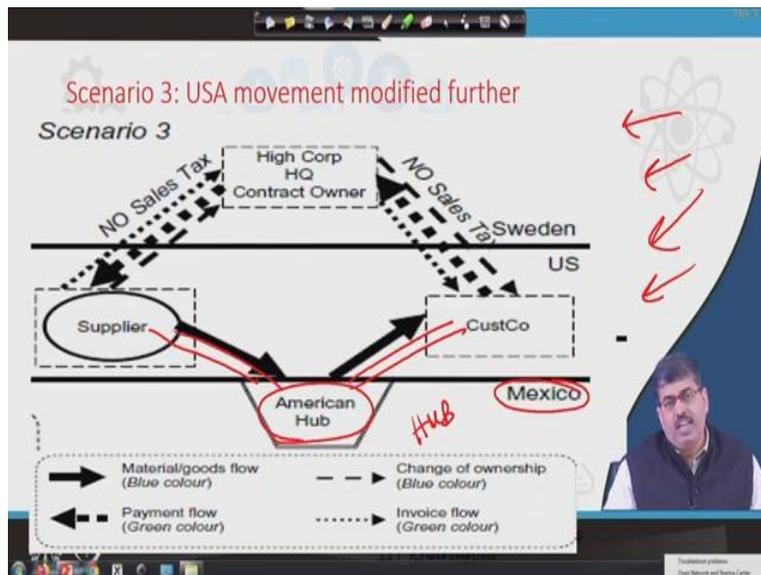
So, do not send it directly, send it to Europe and from Europe send it back. This is the another model. So, you see everywhere, so here you see not a hub as such but here you see your supply chain is being designed taking care of the tax advantage. So, global supply chain. Got it? So this is the, as we were saying this is the first step in designing the global supply chain. Look at the taxation rates across countries. Clear?

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Let us go to the next one. Let us modify it, as we were mentioning, the product will go from the supplier to some country in Europe and from there it will be shipped back. Go to Europe, from there it is shipped back. So, you see, all this is being done to just take advantage of taxation in different countries. It is like your stock market.

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Now, we are modifying it further. We are modifying it further. What we are doing? We are saying that no need to send it to Europe, very near home we have a hub which is in

Mexico and then send it to Mexico, from Mexico send it back to US, from the factory send it to Mexico, from Mexico send it back to US. So Mexico is a hub, Mexico is a hub.

Now, why this? You see, I want to spend 5 minutes here on this. You see, this Mexico, America faces some problem of influx of people from Mexico into US because Mexico is a poor country, so osmosis occur from a region of lower concentration it goes in to a region of higher concentration.

So, people from Mexico go into US and that has its own socioeconomic dimensions. So, US is trying to do something about this. To put it bluntly, US wants to stop this influx of people from Mexico to US in search of a better living. So, US is understood that if you can provide income. Why do, why will people leave their homes and go into an unknown country, unknown land, because you do not have money to feed yourself. That is why you are going out in search for work, in search for a better living where you can feed your family.

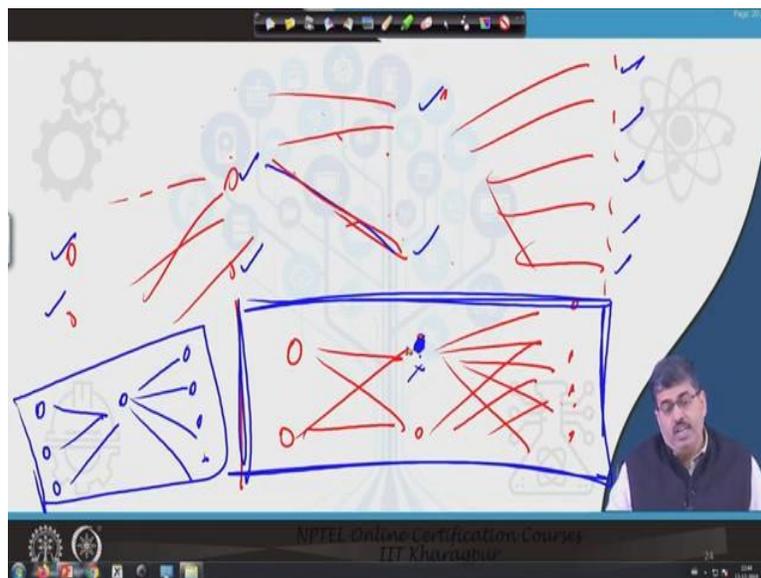
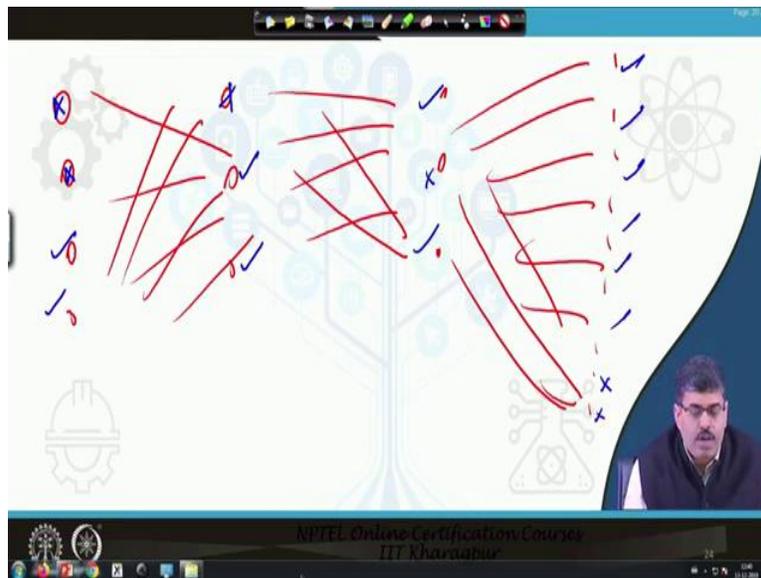
So, if you can provide that facility in Mexico, people will not come to US, people will be happy living there and that is why there is tremendous US effort to put in investments in Mexico and bring in, generate income for their populations so that these people do not shift to US. And that is the reason why America is building lots and lots of business hubs in Mexico, so that people get jobs there. And with agreement, with due discussions and negotiations, Mexico has somewhat been transformed into a very, very less tax country.

So, many companies will try to have business hubs in Mexico. And that makes sense, because it is very close to US just beside US. So, transportation cost becomes very, very negligible. So, Mexico as a business hub that is why Mexico as a business hub is growing tremendously.

So, you see designing the global supply chain, here it was not given to you. America developed this hub because they felt it in their nation's interest, socioeconomic interest but in terms of supply chain you will see Mexico as a hub is economically global design wise, everywhere Mexico as a hub is very, very beneficial. So, you see, global designing,

global supply chain designing and all, all have their own ways of looking at things. Now, look at another aspect of it.

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You see, we have said that we want to design this global supply chain, we want to design this global supply chain and everywhere this, this, this, that, this, this, this, that, everywhere this, this, this, that. This is the global supply chain. And we said that based on tax advantage, we are designing that we are saying these two are out, these two are in, out, in, in, out, in, in. So, according to this, you have designed portions of the supply

chain. So, what have you done? You have actually deleted the vertical line. You have deleted them.

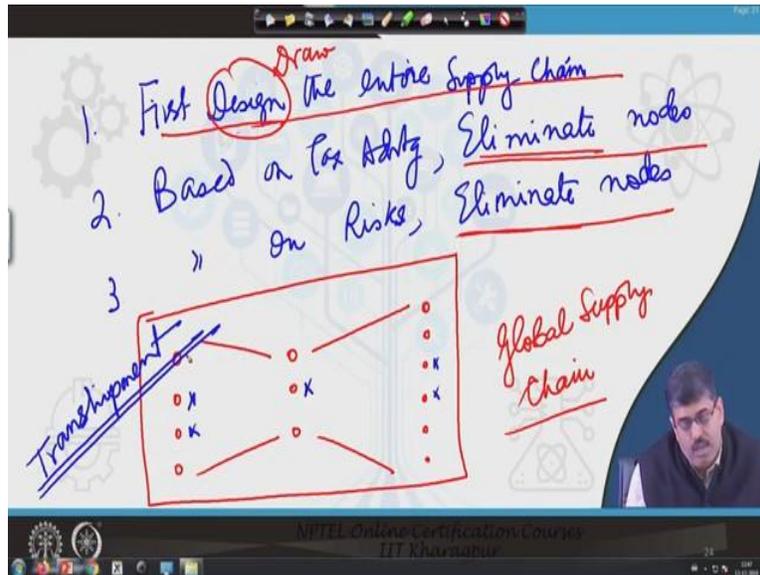
So, what has happened? You just see what has happened? Your supply chain has now become very lean and streamlined. Because of tax advantages you have removed certain possible locations of your supply chain. This is one. Now, go back to the risk module that we have studied. Based on, so firstly what has happened, your supply chain has become very lean. How has it become lean? Based on mathematical modelling, tax advantage is one.

Now, you look at the risk part that we have studied in one of the modules, it is the previous module, previous week previous module. Based in the risk suddenly we notice that this one is also a problem, because this still involves some war going on there out. So, now you are left with, let us say, only this much. So, your supply chain becomes further lean. So, what are we trying to do? We are trying now to bring in all the bits and pieces together, all the bits and pieces together and then model the global supply chain.

So, first we had the full blown system. We removed based on modeling, we removed the tax disadvantage countries based on risk module that we learned in the previous lectures, based on risk we have removed some other elements in the supply chain, some other nodes in the supply chain we have removed, gone.

So, a supply chain in this process is becoming very, very lean as well as based on sound mathematical logic, justified based on sound mathematical logic, et cetera, et cetera. So, that is the lean part of it, that is the lean part of supply chain, which so up till now what have we covered?

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We have said that for a global supply chain, we have said that for a global supply chain lesson number 1 is, first design the entire supply chain. Number 2, what will you do? First design the entire supply chain, then based on tax advantage, based on tax advantage eliminate nodes, some nodes, some points, some suppliers. Then based on risks, eliminate nodes. First design, then eliminate, eliminate. So, now what we will have? You will have something like a design which will look like this. Clear?

What will be our next job? Now, we will bring in all the cost components and see again from this, again from this, again from this which one will get eliminated. And ultimately we will come up with a global supply chain. So, in the next lecture, as a first step to this box, up to now is clear. We first designed the entire supply chain, or draw, I would not say design, let us first draw, the theoretical diagram, entire supply chain based on tax advantage, eliminate; based on risks, eliminate, eliminate these nodes, eliminate these nodes.

Now, we have a much more lean and thin supply chain. Now, we will apply, again we will apply mathematical models whatever we have learned, all those portions we will now apply and then there again we will see that some things will get eliminated. Some things will get eliminated. And then we will be able to finally design the supply chain.

So, as the next step, as the first step in the, to this direction, what we will have to do is, we will have to look at this diagram now forms the basis. You will have to look at something called transshipment that we will take up in the next module. We will take up in the next module.

So, right now, we will end here. So, what have we learned? We have learned as the first step to global supply, designing global supply chain, we have learned how to design the supply chain taking care of tax advantage and bringing in from the earlier module we have learned how to eliminate some of the nodes in the supply chain based on risks.

Then our next step will be to have this model, after elimination have this model, now apply mathematical techniques and further streamline the model to get the global supply chain. The first step to applying the mathematical models is developing a transshipment model which we will do in the next lecture. Thank you.