

Modelling and Analytics for Supply Chain Management
Professor Anupam Ghosh
Vinod Gupta School of Management
Indian Institute of Technology, Kharagpur
Lecture 57

Designing the Global Supply Chain : Tax advantages

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Hello and welcome to week 12 of Modelling and Analytics for Supply Chain Management. We are into the final week. And what have we done till now? If you look at the entire diagrammatic representation of supply chain, we have basically started off with demand forecasting, from there we have moved on to supply selection modelling, from supply selection modelling we have moved on to see once you have selected the suppliers, you have to decide on how much quantity you will buy and at what time intervals.

So, this was our inventory planning, so, inventory planning and all the modelling available for inventory planning, we have covered in this course. And after inventory planning, we have moved on see, once you have decided on the quantity, once you have decided on the supplier, now the products have to be, the raw materials have to be moved from the supplier side to the factory.

So, this part is your transportation modelling. So, we have designed the transportation system, we have designed the transportation modelling, we saw how, how, what is the road capacity, what is the maximum vehicle capacity per hour, etcetera, etcetera. And after the transportation

modelling, we then came up to risk analytics and then we came up to co-ordinating the entire supply chain using different mathematical techniques.

So, basically, we have traced the entire supply chain using different nodes, looking at different nodes, NODES, different nodes, and then, modelling at each of these nodes and analytics at each of these nodes. So, up to this we have covered. Our job in this week is to bring everything together. So, long we were doing it in compartments, we were doing it in compartments, our job today is to bring the entire system together and design the global supply chain.

See, if you look around us, any product that we see, today is global. And that is why if I can borrow from marketing, if I can borrow from marketing, that is why we see that all marketing today is international marketing. So, similarly, all supply chains today is global supply chain because when your market is global, your supply chain cannot be local. So, designing the global supply chain becomes a necessity.

Now, if you look around us, let us take a simple example of the jackets, the winter jackets that we wear, the fabric is made in one country, then they are all sent to China for stitching but in China the zippers, the zippers are purchased from Japan, because Japan is known to manufacture the best zippers in the world. Then they are stitched in China then again they are moving round the world.

Let us take the flower supply chain, flowers are grown in Africa and India, from there they are sent to Amsterdam in Europe, that is the hub, Amsterdam airport, and from that airport, it is now sent to all European countries as well as USA and Canada. So, you see the flowers are growing in different portions of India and they are being sent to US. What is important here is, what is the global nature of the supply chain.

And, also if you notice very carefully, when you were kids, if you had flower plants in your house, you have noticed that flowers bloom in the morning and by evening the flowers basically shrink. But here when you are speaking of the global supply chain, the flowers are blooming in the morning, that has to be exported, that will go to Amsterdam from India, that will take time.

Similarly, from Africa also, the flowers are coming to Amsterdam, that is taking time. Then from there, it is going to all over Europe and America and there the products are kept in different

departmental stores in the shelves and it has to be in the shelf, it cannot be sold over night. It has to be in the shelf for 5, 6, 7 days to enable them to be sold.

So, you see the life of the product has to be long enough so a flower that you saw in your house when you were small, you were a kid, that whammed in the evening, that shrunk in the evening, that flower has to be very very blooming. In today's marketing world for at least 10 days. So, you see, the global supply chain has along with its so many other dimensions brought in this aspect of product management also. And vice-versa. Product innovations and product life enhancement has brought in a tremendous advantage for supply chain.

Now, you can go global, because your product has an extended shelf life. So, it is a two-way benefit. Because of the products' extended shelf life, you can design a global supply chain, and because of the global supply chain, your product has to be, or has to have an extended shelf life. So, if you look at global supply chain, your global supply chain emanates from this aspect. Your global supply chain emanates from this aspect. This was example of flower.

Take the example of the shoes that you are wearing. Where is the design done? The designs are done in Europe and US. Where are the shoe soles made? The shoe soles were made in some other countries in South East Asia. The shoe uppers. Where the shoes uppers are made? Upper, UPPER, that is the top cover of the shoe, where are the shoes uppers made? Mostly they are made in Vietnam. The shoe soles are made in Malaysia, Indonesia, etcetera. Where are they pasted? They are pasted along the rim in some other country.

So, you see, design in one country, manufacturing in two-three countries, final assembly in another country. And then they are passing through the Singapore port. And then again being distributed through Amazon, etcetera to the whole world. So, you see a truly global supply chain. So, what I want to say is, as we mentioned all marketing is international marketing, similarly, all supply chains are global supply chains. We cannot think of a product whose from raw material to finished product sales, it is local. We cannot think up today.

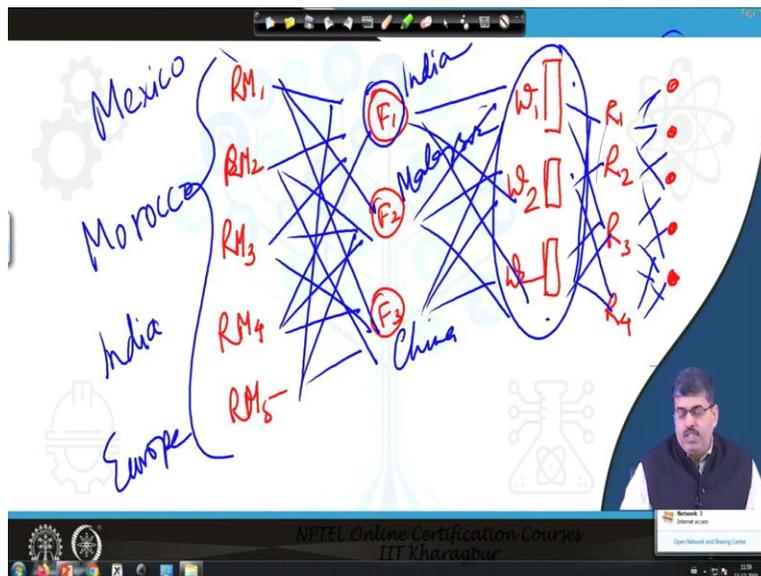
You have gone to buy sweets in the sweet shops. You buy Rasgulla, you buy Sandesh, you buy so many other sweets. It seems local because manufacturing locally, but where is the milk coming from? Milk for the sweets and the Rasgullas, Sandesh and the Rasgullas, the milk is

coming from Gujrat, Amul. So, you see, these are examples of that your supply chain today is not local, your supply chain is global.

Medicines is another example. If you see, Africa imports most of its medicines which is to say that a set of countries is exporting medicines. So, again, it's a global supply chain for medicines and this is a huge market. Because your entire vaccination programs which is very very important, your entire vaccination programs are based on availability of vaccines which inter alia is dependent on a global supply chain for medicines. Some of these medicines have to be taken in freezers, some have to be temperature controlled, so many dimensions.

So, you see, so again, I am repeating, today it is a global supply chain. No supply chain is local. We hear that a glocal, that is global plus local. We will say that it is still, it is a global. Because if you model a global supply chain the same model applies to a local supply chain. So, it is global. So, this is our agenda, how to model a global supply chain.

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Now, if you see, and if you, if you consider whatever we have mentioned till now, you will see here are customers like you and me and these customers are being served by different retailers and these retailers are being served by different wholesalers. These wholesalers are being served

by your factory. These factories are being served raw material from raw material supplier 1, raw material supplier 2, raw material supplier 3, raw material supplier 4, raw material supplier 5.

So, you see, if you look at this in this manner, this, all arrows moving from all directions. All arrows moving from all directions to go to the factory, from factory this is the movement. So, this is what we are talking about. This is a supply chain.

What we want to say is, that these raw material suppliers, one is in Mexico, one is in Mexico, one is in Morocco, that is Africa, one is in our own country India, and the other may be somewhere in Europe. So, they are coming to different places. Where are they coming? Here is my plant in India, here is another plant in Malaysia and here is another plant in China. And who are your market, assume, again, one wholesale unit in Europe, one in Asia, and one in maybe in US, America. And your retailers. So, this is the global supply chain.

This is what we want to say. Global supply chain means, global supply chain means that it encompasses so many countries round the world. Now, if you look at this diagram very very carefully, what are we saying, we are saying, what can we envisage in this global supply chain, one is, see I want to have a supplier in Mexico, oh sorry, you want to have a supplier in Mexico, You want to have a supplier in Mexico, let us see.

We want to have a supplier in Morocco, we want to have a supplier in India and we want to have a supplier in Europe. As we mentioned. But Mexico assume, assume Mexico has a very high tax, taxation. So, will you like to bring your, bring your, purchase your raw materials from Mexico? Answer is no. India has a decent amount of tax. Will you like to buy your material from India? Maybe yes. Morocco has very little tax. Will you want to buy? Yes. Overall Europe has very little tax, so will you like to buy? Yes.

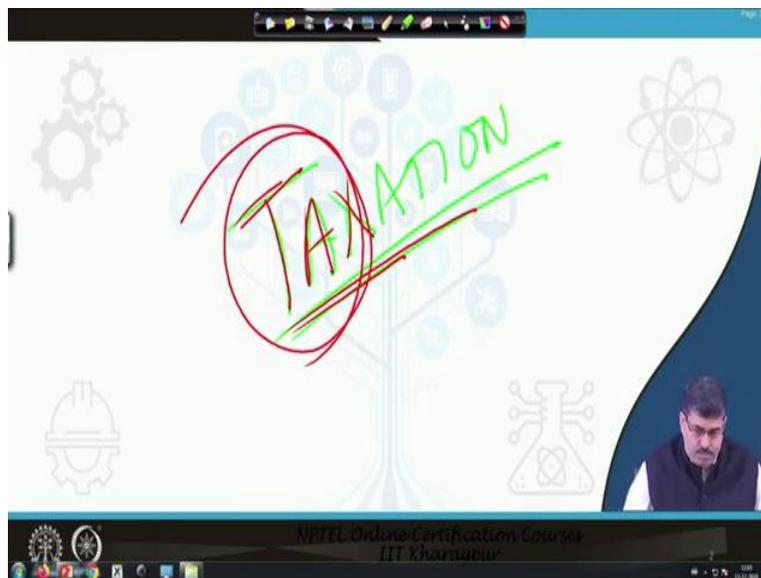
So, you see, number 1, number 2, look, look at the dimension, so you see, when you are designing the supply, global supply chain which is our topic for this week. When you have to design the global supply chain, first look at the tax, first look at the taxation issues. First look at the taxation issues. Now, so you see Mexico might be ruled down because of taxation.

Now, let us say factory, India, let me say, I will put a different color. Yeah. Let us say factory, India. Malaysia, and China. Now, you all know China has been the most favorable destination for all companies. Malaysia, favorable. India favorable. Now, let us put a different country with the very high tax. Let us consider the country with the very high tax, will you like to have your operations there, your manufacturing operations there? No.

So, taxation plays a very very important role in designing the global supply chain, which again same applies here, same applies here. Wherever there is high taxation, I will not use that model. Which is happening in India as you might have noticed, most of the consumers, now I will not say most but many consumers are shifting from the physical store to the online stores like Flipkart and Amazon. Why? Because their costs are less. Not taxations issues, but costs are less.

That means what? Customer or a company will go and use that channel, that distribution channel which has very less cost. Customers and companies will use that channel which has a very less cost. And taxation is a component of cost. Taxation is a component of cost.

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So, first lesson, lesson number 1 in global supply chain is that you will have to consider taxation. You will have to consider taxation. You will have to consider taxation. Now, let us see, how this taxation operates in the global system?

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• Any business faces two types of taxes: Direct Tax and Indirect tax

• Direct tax are the Direct tax payable by the business (e.g. Corporate Income tax)

• Indirect Taxes are VAT, Excise etc. (VAT is not an indirect tax in the real sense of the term, but can be grouped under Indirect Tax)

• The Unit that adds value pays the tax

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This is in relevance reference to India. Any business faces two types of taxes: Direct tax and indirect tax. Any business faces two types of taxes: Direct tax and indirect tax. Indirect taxes are VAT excise, VAT can be indirect tax. Unit that adds value pays the tax. This is important. Unit that adds value, pays the tax.

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Example of Taxation: Within Europe

• An Example of Taxation: Detailed View 1

• Company: High Corp

• Headquarter: Sweden

• Products to be shipped to France to a French Customer

• High Corp has a manufacturing unit in France from where the products can be shipped directly to the French Customer

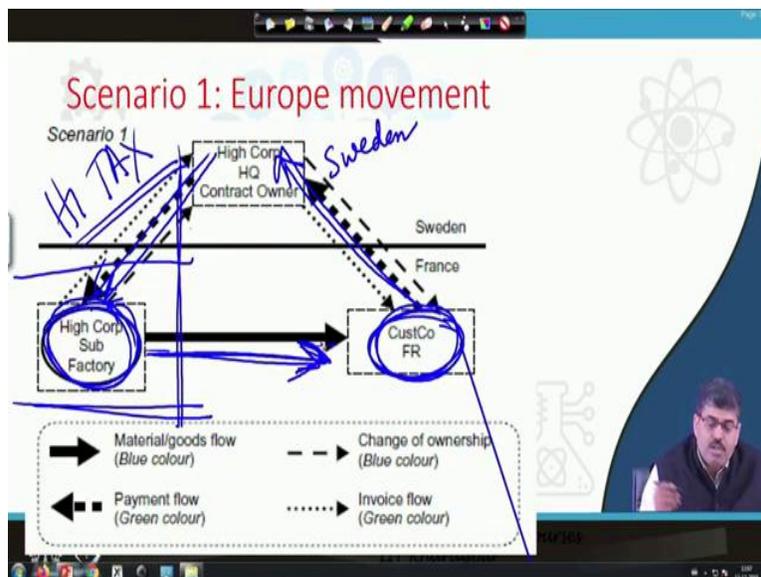
• An Example of Taxation: Detailed View 1

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Yeah, now yeah. Examples of taxation, let us take this example. Let us be very very careful or let us be very attentive, there is a company called High Corp whose headquarter is in Sweden. There is a company called High Corp whose headquarters is in Sweden. Products to be shipped to France. Where is France? Where is Sweden? Europe. Where is France? Europe. So, product is to be shipped to France. High Corp is a manufacturing unit in France. From where the products can be shipped directly?

So, the customer is in France, and the manufacturing unit is also in France. So, the products can be shipped directly to the French customer. Products can be shipped.

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So, ideally, ideally what we say the products can be shipped directly to the French customer. So, ideally, from the factory in France, the product should be shipped to customer in France. Agreed? Because the customer is, look at the diagram, the company headquarter is in Sweden. The company headquarter is in Sweden. Headquarters. The company has a manufacturing plant in France. And the customer is also in France.

So, what should be the model? The customer pays online or something, where does the money go? The money goes to Sweden, head office. Swedish head office orders the factory that look you send the goods to this customer; we have received payment. Simple model. Very very

simple model. The customer pays to the head office, head office instructs that look we have received payment, you send it to the customer. Because my factory is in France, my customer is also in France so you send. Very very simple model.

But there is a problem with this model. Maybe, maybe that this area, this France or this zone is a high tax zone, maybe this area is a high tax zone. So, if I send it here directly, I am paying lot of taxes. If I send it here, I am paying lot of taxes which was the case in India till some years back. Too much of tax. So, if I am sending here, there was lot of taxes. So, what do I do?

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• Hence, Flow --- French factory to French Customer

• Problem with this easiest flow:

• Local taxes and VAT have to be paid by the French manufacturing unit of High Corp to the French Authorities OR High Corp Sweden has to register for centralised VAT in France if they want the Head Office Sweden to take care of tax matters

• But High Corp Sweden does not want to pay taxes to the French Authorities and expose their profits to the world

• High Corp French Unit ships its product to Belgium where it is registered for VAT (or there is no VAT in Belgium or products shipped to no-VAT country) and from Belgium the product is again shipped to France

Diagram: A box labeled 'Bel Unit' is connected to a circle 'M' labeled 'HUB' and a circle 'C'. An arrow points from 'Bel Unit' to 'C' with the handwritten text 'NO Tax or ↓ Tax'.

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The problem is, local taxes and VAT have to be paid by the French manufacturing unit of High Corp to the French authorities. Or High Corp has to register for centralized VAT in France, if they want the head office Sweden to take care of the tax matters. So, basically, you will have to pay tax to France but High Corp does not want to pay taxes to the French authorities. You do not want to pay taxes.

So, what it does? It ships its products to Belgium where it is already registered for taxation or there is no tax in Belgium. And from Belgium, the product is shipped to France. So, you shift, so, you are in France, you are in France, here is your customer, here is your manufacturer. So, what

you do, from France you are sending it to a unit in Belgium and from Belgium you are sending it back to the customer. Have you understood?

I am drawing this in a bit bigger manner. So, here is your manufacturer in France, here is your customer in France. I do not want to pay tax in France, if I send it to this customer in France directly, it is sales. So, I get, I pay tax. Because I am earning money. Who m I? Company. I have to pay tax because I am earning money from the sale.

So, what do I do? I do not send it directly to this customer. I do not send it directly. I send it to a place in Belgium, I send it to a place in Belgium and from there I send it back to this customer. Because I am sending the finished products to Belgium unit of High Corp, it is not a sale. It is just a material transfer. I am not earning money, I am just sending my products from one manufacturing unit to another manufacturing unit or one manufacturing unit to another storing unit.

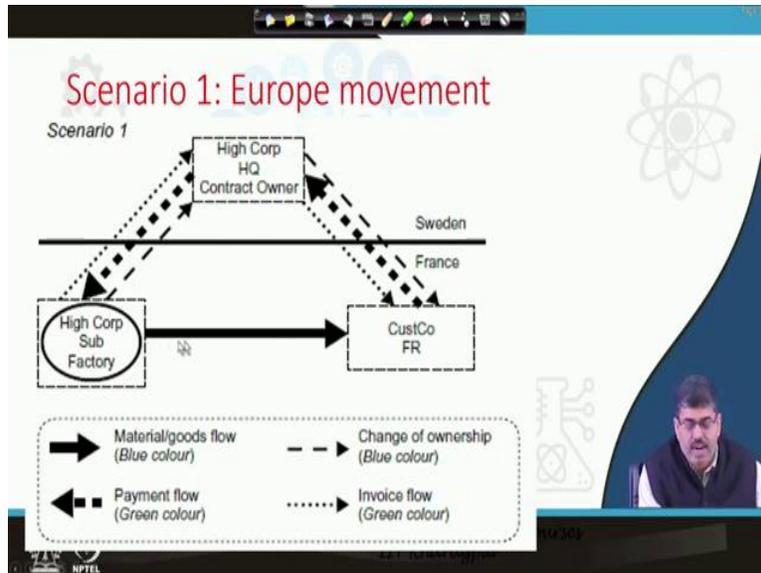
So, no physical sale, no exchange of money, no change in hand of money. So, what do I do? I do not pay any taxes. Now from Belgium, I am sending it back to the French customer. Who is earning money? Is this French manufacturing unit earning money? No? Who is earning money? The Belgium unit is earning money. The Belgium unit is earning money. Because customer is paying somewhere else.

So, Belgium unit is earning money. And Belgium has no tax or very or very less tax. Very less tax. So, this is the first lesson in supply chain modelling. Global supply chain modelling, that is, if you get an alternate route, with zero taxation or very less taxation. The amount of tax paid is more than the transportation cost and storing cost. Then send it via a third country. The amount of tax paid should, per unit should be more than this transportation cost and storing cost in Belgium and further movement. And normally that is the case

The transportation and storing cost per unit is very very less. So, amount of, amount of tax, amount of money paid, so amount of money paid as tax normally is more. So, that is why companies send it to a country with no tax zone and then send it back to, then send it back to the customer. And this no tax zone is basically what you call as a hub in supply chain. And most of the companies are actually having these hubs, no tax zones.

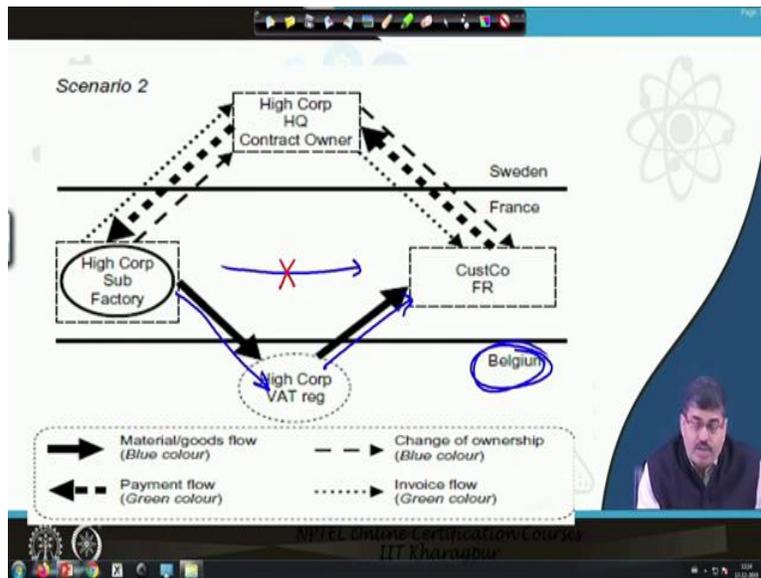
Most of the countries, sorry, most of the countries are having these no tax zones, the export processing zones and all no tax zones. These are all enabled because every country wants to do business. Wants to get hold of this hub. Because lot of employment happens in these hubs. So, this taxation is the first enabler to global supply chain. Taking advantage of taxation. So, you send it back to this place. So, what are we wanting to say?

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This was your diagram? What are we saying? What was the earlier model? Earlier model was you send it directly to the customer, remember what did we say? Oh sorry, oh oh oh, you send it back to the customer. You send it back to the customer. This was the earlier model, the first model, directly send it to the customer, directly send it to the customer, pay to the head office.

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But in the new model, what are we saying as we just now mentioned, in the new model, we are saying that do not send it directly to the customer, do not send it to the customer, do not send it. Do not send it to the customer. No. what you do instead is, what you do instead is send it to a third country where there is, Belgium, where there is very less tax. And then send it back to the customer company in France. And because you are not selling directly, you are just only doing a stock transfer to Belgium, you are paying no tax or very very less tax. So, this is your model number 1. This is your model number 1.

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Scenario 2: China Movement Modified

Scenario 2
X-country

Sweden

China

Singapore

SuppCo Order/HQ

High Corp HQ Contract Owner

EMS Factory

High Corp Hub

CustCo

Material/goods flow (Blue colour)

Change of ownership (Blue colour)

Payment flow (Green colour)

Invoice flow (Green colour)

Example 3: USA

- A US customer orders for a product from High Corp (HQ: Sweden)
- High Corp can get it delivered from their own manufacturing facility in USA (so USA to USA)
- But that will mean a direct sales and Sales Tax will be levied, which is non-deductible and non-refundable

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Now, next model is basically the other versions of taxation, other versions of taxation. We will take the example of China and the third model we will take another example from the US. From the US. That is the Mexico model. This we will do in the next session. Thank you.