

Logistics & Supply Chain Management

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Lecture 23 : Principle Streams of Supply Chain

so hello dear students welcome back to NPTEL online course on logistics and supply chain management so in the last session we discussed about the supply chain aspects when we are talking about the product industry and then how it is different when we are handling the services right and the major challenge for services industry we have seen in terms of the customized services we have to provide because customer is very much part of your production process right but in case of your product supply chain customer is not part of your production process and the other very big advantage in production supply chain is that we can utilize the you know free time and produce some inventories and later on whenever there will be demand we can you know push that inventory into the market so that smooth supply chain can be ensured but on the other hand we have seen this is as big challenge in your services industry when you know when for some time there is no customer at your you know shop and then suddenly customers are coming and then you need to manage the big queue because in that way may be you are limited with your resources as well you cannot open those many temporary you know service channels so that it can be moved very quickly right so in that way it is again big challenge so now we will continue our discussion on supply chain main concept and we will see what are the principle streams of supply chain management. So, again I am Dr. Vikas Thakur, Assistant Professor, Department of Humanities and Social Sciences, IIT, Kharagpur. So, under this session we will spend couple of sessions on this discussing because this is again very important part where we will again divide the complete supply chain into three parts right. So, first stream we will see. So, if I will highlight with the diagram again very basic diagram again and again I am plotting here we have suppliers.

here we have manufacturers co manufacturers here we have distribution network which is reaching to our end customer right so first stream talks about this whatever we are doing here that is your first stream right second stream talks about this manufacturing things manufacturer co manufacturers all will come in second stream third stream talks about you know how we are delivering the finished product not only delivering in between how we are storing how we are distributing shipping all those things under the third stream right so this concept you need to keep in mind while we will go through this session that we have divided the three this supply chain into three different streams right So, we will discuss the concepts under each stream in that way and then towards the end

we will discuss some other key concepts related to supply chain management and obviously like we are doing we will end this discussion as well with small case study. So, already I talked about your all these streams you can see this as your first stream then your this is your second stream and this is your third stream. We will see quickly just I will introduce. So, procurement supply and sourcing management.

the name suggest that means how we are acquiring the goods and services so while you are acquiring the goods and services you need to source you need to purchase you need to ensure the smooth supply of the supply chain these are some of the objectives and the other objectives are when you are ensuring that acquisition of the resources in terms of your goods or services right you need to optimize the cost that is first point how cheaply you are getting your resources that doesn't mean you need to compromise with the quality you need to maintain the quality level as well and then you need to be efficient as well and then you need to ensure that a smooth supply can be ensured through your this first stream right if anything goes wrong with your suppliers so how you will you know come up with your contingency plans and maybe you will find out some alternative or if you are having multiple suppliers only then that can be implemented talking about your operation material and production management simply again says whatever we are doing in house that production floor where all the supplies are coming we are storing in the storage we are ensuring the quality of the incoming we are moving step by step those you know inventories to the production floor as and when required may be all the model we are not preparing right now we talked about in every product category we have different models right so if we will talk about iphone iphone 15 is coming so iphone 15 mini and then iphone 15 with the you know standard capacity then you have with enhanced capacity pro version and those many things are there as per the screen size and then if you will talk about automobile industry as per the engine capacity color all those things fuel you are using right the technology you are using so in that way those different models you are preparing may be on the same production line where you are repetitively you are changing from one model to other model or may be you are having some few dedicated production lines 2 3 production line to produce may be 8 or 10 models because one dedicated for one model production line assembly we try to avoid because that much you know demand is coming from the market or not we need to ensure so otherwise that capacity will be unutilized so that we need to ensure through your production process whatever is happening within that production floor till we are packaging that product and our outgoing quality control department is saying that as per sampling we have checked and this final product is ready we can ship it then up to that we will see the second stream how it is working right and then talking about the third stream which is you know connecting your manufacturer with the end customer is your through your wholesaler, distributor, retailers and then you are storing in between so all those things will come into picture your transportation part, warehousing, inventory management how you are

fulfilling the order and distribution design whether you are doing doorstep delivery or your customer is coming to your location picking up the product or customer is placing the order online or customer is physically visiting your store but you have to deliver the product at the customer doorstep so many different models are there again we will talk about that distribution how we will design the distribution network and each distribution is having you know effect on the cost is one part and the services provided to the customer on the other part So, we will see how we will when we will discuss different those distribution options network options. we will see somewhere how we are you know going more responsive so cost is also increasing and then we are if we are decreasing the responsiveness so you can be efficient in that way so that we will discuss this is all about all three major streams when we are talking about the supply chain so under first stream these are the three basic concepts we will try to touch sourcing management procurement management and supply management so first you need to understand this the flow i have designed first is your sourcing and it should be the first step only because sourcing is developing your stakeholders developing your supply chain this is the basic difference when we are talking about sourcing and procurement sourcing is you are setting up your suppliers for long term right then comes once sourcing is done then you come to your procurement part purchasing part then you will come repetitively you will keep on placing the you know purchase orders with the your sourced partners right and in the end you will talk about the supply in the first stream how smoothly you can ensure that supply chain so these three steps we will discuss for the first stream let us talk about the sourcing management so obviously we need to identify assess and enlist the suppliers this is first step of your sourcing so before going for that long term strategic relationship with your you know sourcing partners are not only one day activity or one year or ten years activity as long as you are in that market maybe you will try to continue with the same kind of sourcing partner because it is not efficient and effective as well when we are talking about when we are quickly changing the partners right because when you are doing this maybe today I am your partner tomorrow if you are leaving me I will be partner with someone of your competitors right so then you have already shared your recipe with me so then in that way you can see how it can adversely affect your you know way of processing the things or whatever secret recipe i am having the access to right so that is one important thing and then obviously once it is done you have to ensure the cost efficient acquisition of the goods or services whatever you are doing so usually for sourcing we are doing the tendering procedures listed sources we are asking them to you know float their tenders and there they are highlighting all the terms and conditions, the terms related to pricing, terms related to delivery, terms related to quality and other things. So, there they are mentioning. So, this is again important step when we are talking about tendering procedure in sourcing management. So, if you have sourced you have prepared that list carefully right after meticulously you have done the homework then it will provide you competitive edge as I told you this is your strategic movement this is

your strategic movement anything strategic that means long term effect on your competency will be there in the final market.

So, in that way you have to ensure right. so types of sourcing quickly we will go through outsourcing obviously we discussed when we talked about outsourcing the logistics for first party second party third party fourth party fifth party sixth party logistics we discussed right outsourcing when we keep on doing those things we are adding some extra services which being provided from those logistic partners. So, in case of outsourcing when we are thinking that we will go for outsourcing for this particular operation. Let us say packaging is something I am not very good with. So, let us outsource this packaging.

let us say on our this pen if we are manufacturing this marker screen marker pointer so you are printing your brand name on this pen right so printing I am not expert in that I am manufacturing electronics goods but printing is something I never heard of I am never been there how things are done let us outsource this right now if you are outsourcing that means every time you will manufacture this pen you will ship this pen to printing agency whosoever is your partner and then again you know transportation why don't we call them in house they will set up one facility in our production plant and then we will do that is another kind of outsourcing still it is outsourced but that company now has moved within our house right and they are doing that obviously for getting those facilities we will charge them but this is one model of outsourcing when we are talking about outsourcing we go either for backward integration or forward integration right backward integration let us say this is manufacture we are here manufacturer backward integration that means now we will acquire our raw material suppliers right so that is backward integration let us start producing our own raw material we are tyre manufacturer why we are taking steel wires from the steel manufacturer let us take the direct ore from the core and process that ore and will manufacture the steel wires as well this is another industry right. So, we start acquiring our suppliers not acquiring or you can start setting up your own supply units. So, this is backward integration when you are going for back supply chain forward integration like earlier what you were doing you were selling your product through local retailers or maybe big bazaar or maybe some other trading partner wholesaler distributors are there now you are setting up your own supply chain like dell is doing dell is directly selling to the customer where customer is visiting the dell store room they are giving their specification dal is designing as per that and then shipping ah giving you delivering you the final product right so that is forward integration anything you are doing with this forward supply chain that is forward integration in sourcing is example which I talked about that in house let us outsource to someone right but that was internal party here internally if within our manufacturing facility let us say we are

manufacturing home appliances now plastic part is something let us say we have the molding facility as well where we were producing earlier the molding components let us say if we are a phillips manufacture we are having molding facility may be other earlier we were not manufacturing our products under Philips brand right now so earlier we were just in our molding plants we were supplying to Hevels we were supplying to L&T we were supplying to all other players in the market all the plastic parts which are you know produced in our molding machines but now we realized we have molding capacity right let us start our production so within house you are outsourcing your all the plastic related components production to the molding plant plant 1 is molding plant plant 2 is your where you are assembling the you know produced in our molding machines but now we realized we have molding capacity right let us start our production so within house you are outsourcing your all the plastic related components production to the molding plant plant 1 is molding plant plant 2 is your where you are assembling the those products right your home appliances where may be this is not only one component you are using for manufacturing that appliances may be many other components coming from other suppliers but that one component your plastic components are coming from within only near sourcing is when you want to implement just in time that can only happen whenever product is required you can ship that so many of the organizations they are setting they are asking their raw material supplier to set up their production houses near to their facility and they are ensuring that we will feed you large enough orders so that economies of scale can be utilized and you will not be in loss that you have because it is strategic relationship as long as both suppliers and manufacturers are in profit only this complete supply chain can survive right it cannot happen that that suppliers are running under losses and manufacturer is still making loss that cannot survive for long run right so not only just in time sometime what is happening i have seen visited one two wheeler industry i think tvs what they are doing for you know if they are using lights and glass all that in their bike so you can see the product is very fragile that component is very fragile and if you are transporting through you long distances may be scratches may be there these kind of things can happen so what they are doing they are asking their glass manufacturer or the light manufacturer to set up their facility near to their production house so that that just in time can be insured and the quality can be maintained of the product low cost country sourcing this is usually happening if you see your high cost countries are like you know European nations or US kind of thing so or if we talk about garment industry specially where you know most of the players even Walmart kind of players they are setting up their you know production facility in Bangladesh Bhutan or Nepal these kind of cheap locations right so in terms of how much you are spending for producing one unit that also china is also has become because of their policies that is not low cost as such right but their policies are that they have you know lower down the charges for entry for foreign players this is how they are boosting up their economy so many different policy measures are there but yes low cost country if you are getting to

produce that product you can you know save on the production cost global sourcing like we discussed this whole global is one market place so you can have access to range to new range of skills and resources so in terms of if you are sourcing markets you can also source right so not only indian market you can go foreign market and then foreign suppliers lighting solution china is best known for providing the lighting solution even small single LED you can just imagine we are using in torch or we are using in automobile industry right any electronic appliances we are using at home we are using at least one that light emitting diode right where it is giving the indication whether it is on or off like that right. so those small components are also coming from china so they are so good with that manufacturing you can leverage on that and cut the cost right and then quality also they are promising that now earlier they were known for quantity but now they are moving towards the quality as well right so prime subcontracting here we are not sourcing everything some part sub assemblies we are outsourcing very small example again let us say for your manufacturing washing machines so in washing machine you are using one obviously one board electrical board like circuit right where you are putting all the electronic components just to control the functionality of the washing machine right so many different electronic components you are putting on that board but you are good with the manufacturing you never seen any soldering facility how we can go for that and even if you are doing that you can just imagine that board is printed circuit board where you are putting all the electronic components if anything goes missing whole machine will stop working so it is small pcb but is equally important it will not turn on so what you will do with that big machine if that small pcb is not turning on right so let us outsource this to some other company who is specialist in this field and we can enjoy their services. Captive services operation again example of you can you know partially you can acquire or wholly you can sometimes go.

So, in that way you have more control over the quality as well and security issues, but yes that economies of scale you need to keep in mind whether you will be able to generate that much demand or not. professional services like if you are coming to me I am lawyer those services you are outsourcing you cannot do that of your own but some people they seek for special permission where they can you know fight their own cases that provision is also there with some limitations manufacturing like the example I quoted Philips is not having any manufacturing unit but they have the control over those co-manufacturers who are producing product for the phillips right most of the home appliances are being produced by their co manufacturers so vertical integration forward and backward integration i talked about when you acquire your suppliers it is your vertical integration under backward integration when you acquire your forward supply chain distribution supply chain any player your transportation agency you acquire or you start your own transportation center right so then it is forward integration vertical integration is this and horizontal integration is when you start acquiring Philips will start

acquiring Havel's in the same industry you acquire your competitor that is horizontal integration but in supply chain context vertical integration is our concern few or more suppliers obviously if you are having only single supplier what if something goes wrong with that supplier and on the other hand you have two three suppliers or may be n number of suppliers many supplier that means that quantity will be shared among all those suppliers so that means you cannot feed large orders large order you can feed when you have only one supplier but the problem with one supplier if anything goes wrong at his facility any disaster happens or any maintenance related things happen so then that means your whole production line will stop So, I am not never supporting single supplier and never supporting too many suppliers. I am just supporting may be 2 or 3 suppliers and then we can feed the large order as well. We can negotiate on that quantity. cost also quality also if something goes wrong with one supplier we can shift to other suppliers and that supplier can take some time to rectify the errors and again come up with the strong promises right this is how we can build up the strong relationship with all the stakeholders so few suppliers should be there joint venture maruti suzuki you best example where you can leverage the supply chain of maruti here in india and suzuki you can leverage the technology of that virtual enterprise sometime online you know companies are there which are doing the survey and all those things mckenzie if you are going for hospitals industry they are doing survey and then you can find out their you know their information their findings their reports can be very very helpful when you are designing your insurance product related to healthcare industry you are designing healthcare services you are designing healthcare stations right facilities so those kind of things also you can leverage on that coming to second part under this now sourcing is done now we will start you know purchasing the quantity from your sourced partner so this will help you to you know ensure on time process and continuous monitoring will be ensured right so So, after doing all the homework we decided these many 2 or 3 suppliers will be there then we need to go for the cost also we decided and how we can be more productive with our stakeholders.

It is not only if your sourcing partners are productive in that way you will get the supplies with minimum cost right. So, procurement process can be defined as a process responsible for overseeing and administering all the activities involved in acquiring the material, product, goods and services which are required to ensure the smooth operation, efficient operation, effective operation within your production facility. So, repetitively you will procure. So, what are the fundamentals? while you are going for procurement you need to understand first your purchasing portfolio purchasing portfolio will help you to understand what are the products you are buying what are the quantity you are buying in what orders you are how frequently you are buying number of lots you are buying right size of the lot what you are buying quality what is expected so if you know all these things you can be in better position to negotiate with your raw material supplier if you are

feeding them large order like what walmart is doing Walmart is saving huge with their raw material suppliers because they are having limited suppliers and they are feeding continuously large orders. When you are feeding large orders those economies of scale you can reduce you can negotiate the price as well that is one thing you need to know organize your purchases then once you know the portfolio of purchasing right then you can organize in that way that I will require, let us say, for one month I need three deliveries, load 1, load 2, load 3.

I want this much size load 1, this much size load 2 and 3. you need to organize your purchase when the purchase order will be initiated right when you will generate the PO when purchase order will reach to your sourcing partner how they will process everything that information what is required quantity and then variation in the component what is required so that also you can organize Then you need to control the inventory in terms of either you are talking about finished goods or raw material or semi-finished goods that you need to control through procurement process only. If you are keeping too much in your semi-finished inventory that means you need to push that inventory first in the market right. Otherwise you never know anything will come like what happened with BS3 petrol engine and BS4 diesel engines when in Delhi completely phased out. So, then there was a rush among two wheelers, four wheelers to sell those products with you know 50 percent lesser price.

So, that you need to keep in mind. Procurement function must be included in product development is this very very important part. Whenever you are coming with your R& D team and you are developing new product, if you are including your procurement team into that, what extra benefit you will get? See, procurement team is having better idea which material will be beneficial. they can analyze the performance the quality the quantity the you know price as well right so then they have the access how many raw material suppliers of that particular material are there available easily available can we do the just in time with them can we ensure the quality with existing raw material suppliers so it will include in r and d so then then it will be very beneficial when we are going for commercializing the same you know the product right risk management and introduction of performance indicators so during smooth procurement is happening you can avoid the risk of going stock out in your inventory So, in your store always you are maintaining the inventory and from the store always the smooth supply of your raw material is going to the production lines. So, that you can ensure through your when whenever you have that minimum safe inventory with you.

Identify your customer needs obviously through R and D only then you will design your product while you are operating. your customers are giving the inputs what are the

requirements look outside your market sometimes for some solutions you need to give you know out of the box thinking so then you need to come up with some new solutions so whatever your competitors have been doing even the best players in the market have been doing if that is not sufficient enough you need to think out of the box then manage and prioritize relationship with your vendors your stakeholders your suppliers only then long term relationship are possible ensure collect spend data now this is important you need this is we have so many different softwares to you know to do your spending analysis right how much you are spending there in your you know now in mobile also when apps are coming those apps are fetching data from your paypal paytm or upi whatever you are using and then giving you in the end of the month giving you the complete information this much you are spending in purchasing the grocery item this much you are spending in your you know traveling around this much you are spending for getting the fuel this much you are spending like all on your clothing items, this much you are spending for your household items. So, whatever you can do the spending analysis and then you can say I am getting the maximum material from this. In industry how this spend data analysis is helpful? If repetitively I am giving, feeding many large orders to one player, why do not I enjoy that negotiation power with that player? So, that analysis we can do. This is one point.

There are so many other things you can do with this spending data. So, you can improve your efficiency and effectiveness. And then, if you have that data, you can be at that negotiation position. what are the steps quickly we will go for procurement first you will identify the source and plan how much inventory you need to purchase then you will choose and select the suppliers out of supplier 1 supplier 2 supplier 3 I will pick supplier 2 this time or may be 60% order I will give to him may be then rest 20% I will give to him rest may be 20% I will give to him right why 60 percent because this supplier is very responsive price are very less quality is always high or we are doing that vendor rating we are rating all our vendor we will see one session on vendor rating if we will get time so how vendor rating is helping us to find out which uh order should be given to which supplier right and then negotiating the contract here we are discussing the quantity terms we want the quality terms we want the payment how payment will be done usually we are saying after receiving the material within 90 days you will get the payment . These 90 days are required to you know check inspect the incoming quality right and then invoice will be generated will be passed through accounting section will be passed through then and finally payment will be done right this is how it is being done or if any conflict is there how this will be done how it will be negotiated then actually you will place the first order .

Once the first order copy is generated there you are documenting every term and condition in that first order This is another step accelerating the order. Let us say, now

like the example I quoted that two wheeler industry, BS3 engine, petrol engine were phased out. They started selling on 50 percent lesser cost. Well, let us say still our raw material suppliers are maintaining some inventory related to BS3 engines. so that means they should be able to accelerate that inventory quickly to the production line otherwise that will be cost to us if they are supplying after 10 days it will be difficult us to again assemble that and push in the market again.

We have to lower down the price right or this is one scenario another scenario if suddenly one supplier something goes wrong second supplier should be able to accelerate the order should be immediately you know providing the services if our forecasting failed sometimes and we are getting large order. We should not stop saying that we cannot feed after that we should be able to do that right so that is one thing then receipt and inspection of the purchase once it is done we will inspect that material and then if it is ok we will store that and then move to the production line after that only invoice and payment will be done and we are doing this on time so that relationships can be managed .This is one complete cycle how the procurement is happening so you can just see one example of procurement management where construction company what are the supplies required right so you need cement steel and all those other things you require to you know electrical wiring electrical equipments all those things are required when you are coming up with you know new project right so you need to ensure that smooth supply only then the that construction can be finished on time right it's not only the tender will get the person who is giving the minimum quote no So, the delivery of the project is also very important and in that way project delay is major concern the project management industries are facing these days. So, if we will talk about procurement versus sourcing I just talked about this is the first stage where we are developing the you know supply chain and procurement involves procuring goods and services here focus is what are the supplies here focus is who is making those supplies right that is also equally important part right and then leverages supply chains to ensure a steady flow of inputs .Supply to the organization sourcing is concerned with building and managing the supply chain which i talked about procurement is primarily concerned with already running supply chains are there procurement is just ensuring the smooth supply but sourcing is building up new supply chains right so now after ensuring your sourcing is done now purchasing you are repetitively you know placing the order with your sourced partners now the third step under the final step under your first team is supply management it's the name suggests that you need to ensure the smooth continuous supply of the goods products whatever you are you know taking from your suppliers now see to ensure the smooth supply you should have proper integration with your suppliers integration means technologically you should be integrated so that quick information can be shared if any higher demand is coming from the market that should be immediately shared if there you

are feeling that there will be sudden drop in the demand then the supplier should not produce excess inventory raw material that also should be communicated.

So, this is one important element to ensure the smooth supply because smooth supply is targeting our this concept of we should not stock out and we should not have excess stock. this will be ensured through your proper supply management . It is very much function of your pre production logistics and inventory management where we are targeting our resources whatever resources we are using should be supplied smoothly to through our your first supply chain first stream right what is the role of supply management identifying sourcing negotiating and procuring a service or good that is essential to a company's ongoing operations right so .Whenever it is required you need to identify out of the listed sources you will pick the best supplier always not you will pick the best supplier because you need to retain the suppliers which may be performing bad on some parameters of price quality delivery they are struggling to ensure the smooth delivery but then again i told you those few suppliers you need to maintain two three four suppliers then few word is very subjective maybe for one industry few is maybe if you are as automobile industry you are outsourcing tyres from MRF. So, then only one you know you will use in all the models you will use only one in one product category.

If you are using Bridgestone tyre may be for other product then you will use that, but then if you are talking about some other thing. if you are using fuel pump or fuel filter then it can come from 2-3 suppliers right. So, that Bosch you are buying from Bosch or some other supplier right. So, that means this fuel supplier again subjective related to your nature of the industry we are dealing with. Then formulating a strategy for developing and maintaining a relationship another very important with the supply management because your supplies will be ensured and your suppliers are only accountable for ensuring those smooth supplies utilizing technology and procedures that will help you to integrate better with your suppliers and then we need to consider the theories of supply and demand so that we can you know fix that price and we can ensure that smooth supply is happening and demand is also generated in that way.

So, that we will ensure through your supply chain process. So, these all are the three major components when we talk about the first stream. In the next session, we will start discussion about your second stream supply chain. So, these are the references for this complete topic of supply chain three streams. So, these are the references you can refer.

That is all for this session. Thank you very much.