Logistics & Supply Chain Management

Professor Vikas Thakur

Department of Humanities & Social Sciences

Indian Institute of Technology, Kharagpur

Lecture 27 : Supply Chain Operational Views

Hello dear students, welcome back to NPTEL online course on logistics and supply chain management. So, in the last session we discussed about few challenges coming in terms of either your demand uncertainty or supply uncertainty right. So, we talked about some of the mitigating strategies how we can counter these uncertainties throughout the supply chain. So, that the smooth flow of the material or the supply can be ensured throughout the supply chain from the starting point to the end consumption point right. today we will talk about some of the operational models of supply chain which will ensure how we can you know integrate all the stakeholders all the activities in one chain so that these uncertainties can be minimized and the overall effectiveness and efficiency can be improved right so under this we will discuss the very basic model of supply chain that is core model and then we will discuss about your elements of the supply chain operational model what are those elements then we will talk about these two different perspective of supply chain one is your cyclic view another one is push pull view and we will discuss about some small case as well and how these three different operational perspectives will help you to you know meet all the challenges which are coming through your supply chain right so we talked about supply chain uncertainty or demand uncertainty which can come through your supply chain .We will see how this core model offers a comprehensive framework starting with your first supplier suppliers of supplier through your manufacturer distributor warehouses and then finally to the end consumer so complete comprehensive framework will see how it will help you to mitigate those uncertainties and then the other perspective which i talked about process and cyclic view where we will view all their supply chain activities as a kind of you know cycle of some activities right and each cycle is happening between the interaction of any two stakeholders one cycle is happening between customer and distributor distributor and manufacturer another cycle manufacturer and raw material supplier another cycle right so that is another perspective we will go for so let's talk about quickly the supply chain operational reference model given by supply chain council who has given so many different tools to improve the you know supply chain processes over the time right but this core model is the basic building block for you know build your distributors systems quickly quickly and with performance because it will include all your major processes through all the stakeholders and these five major processes in terms of plan, source, make, deliver and return the final product and when we are implementing these five

major activities throughout all the stakeholders we will keep tracking your five performance measures reliability .

How reliable is the delivery how quickly we are responsive to the customer demand how agile our supply chain is to you know flexibly handle all the demands how efficient we are with the minimum cost we are delivering and finally how we are managing the assets? whether it is working capital management or other asset fixed asset you are managing throughout your supply chain you are using right So, plan is obviously planning, scheduling and coordinating resources to meet customer demand efficiently. So, this is usually we are using this for manufacturing purposes which depends upon when you will get the demand in size then you will start planning these activities and then you will go for scheduling for all the processes. this process will be done at what time and how much time you need to run that particular process that depends upon how much that particular product is required in the market right source depending upon that you are sourcing the supplies materials and in that sourcing you are negotiating with for the quality for the quantity and for the price right basically for this and then for the delivery as well right how quickly you want how many orders you will be placing lot size what will be right so those kind of things make then it is the within the manufacturing organization it can be the supplier organization as well where they are getting raw material from somewhere else and doing the making part converting their raw material into their finished one that finished one may be the raw material for the next organization right so manufacturing assembly or product how you are producing finally we will talk about the distribution network how we are recording the orders from the customer how those recorded orders are processed through the warehouses right and then how we are keeping the inventory in the warehouse and how we are ensuring the final delivery of the product return if any product didn't customer did not like returning back how will manage that how will resell that will keep quickly on the selling shelf so that again we can consume that in the market repairs if any coming how will address that recycling or disposal of the end used product after the end life how will ensure that so you can see we have these players where suppliers of suppliers are there this supplier is getting supplies from first supplier and these we can consider for our company if we are manufacturer these are the major raw material suppliers right so we are getting all the supplies from these suppliers and then in that supply chain our customer is there customer may be your distributor retailer retailer is also your customer in that way or you can say here the distribution network all the players included in your distribution network right and then finally customer and where you are consuming see all those five steps we are using here we are using here we are using here but here we are using two steps because suppliers the supplier will deliver or maybe if the products are not ok will be returned back. right but if I'm taking about supplier the second stage supplier who is doing some value adding activity in that raw materials received from the first supplier then he will what we will do

he will plan for the supply and his plan will be you know replicated from the plan of the manufacturer and then planning after planning he will source that this particular vendor I will get these many supplies these many lots or quantity then we will make that may be convert that value adding activity I was talking about will be done here then we will be delivering to the manufacturer deliver right if any damage is there will go again that will be supply from the manufacturing unit will be supplied by the supplied back to the supplier right this is how complete cycle is working within the manufacturing organization also the complete cycle same all five stages plan how we are making the plan here strategic planning from the retail chain how they are saying about the orders how many we need to you know distribute the inventory to that particular market so that will be coming from the distribution channel who is serving in that particular market accordingly we will source these many raw material components we require we will make we will deliver and same cycle will be happening with the distribution network as well where they will be you know making here distribution network is a kind of thing that may be packaging or some other kitting kind of services you are doing that is kind of making you can consider right so and then finally the end customer again will source will purchase from the distribution chain or through online whatever it is and then if it is not ok will return back So, this is the supply chain operation reference model which is basic for all you know supplies, but we will discuss about what are the limitation of this basic model.

Quickly we will talk about four piece of this model, she is talking about major elements. First is performance which we talked about in terms of reliability, how reliable your supply chain is to deliver the particular quality and quantity to the particular market. responsiveness agility with minimum cost and how efficiently you are managing your assets so that you are exhausting the full capacity of the warehouse full capacity of the container who is shipping the product manufacturing facility productivity is very high with minimum output you are getting the maximum output those kind of performance measures you need to track right process what are the processes these are the obviously whatever activities value adding activities you are doing is backbone of this can be of any framework right so here also these activities we need to ah we are looking here towards the standardization process how we can standardize the plans sourcing make it's not that every time we are getting the plan from the distributor and manufacture started you know developing new vendors so it is not always it is happening sourcing means once sourcing is done the repetitive purchasing will be there right then practices method technique tools which we are using you know in that way so that we can optimize the whatever activities we are doing if we can optimize we can reduce the cost and we can improve the services level in terms of the minimum delivery time we can ensure and people because all the stakeholders we have seen suppliers of suppliers suppliers manufacturers maybe co manufacturers distribution chain and end consumer how we can collaborate as a team and

how we can ensure the continuous improvement when we are talking about the employees working within the organization we are talking about the raw material suppliers who are working in collaboration with us to upgrade their technology to upgrade their skill is our responsibility because if we can upgrade them they can provide the quick flexible supplies with maximum quality and reducing the cost right so this is how you can see the scor model is based on these four piece right we already talked about performance measures practices we need to ensure people how we can retain sustain for longer term and can you know upskill reskill those people every you know people in terms of long term assets right so and then processes how we can standardize those processes so that we can reduce the overall operational cost right so talking about scor performance matrix different parameters are there but if we will divide all those different club all those different parameters in into some categories we can have these four categories supply chain reliability can be one which we talked about right these four categories reliability means product are delivered in correct quantity and right condition right that quality is not degraded when you are shifting or handling or storing the product in your warehouse simply . Responsiveness with what speed you responded to the customer query it's not only delivering with speed it's delivering the services with speed if anything goes wrong with the installation how quickly your the best engineer is visiting and then how quickly he is addressing the queries at the customer end right then supply chain cost this will be only minimized when you are maintaining you know efficiency throughout the network of delivering the product from the starting supplies to the end customer and asset management how you are managing your working capital working capital if you are investing too much keeping inventory so that means that you are not efficient in that way managing your working capital how you can minimize the inventory is one example of you can manage working capital right so fixed assets so whether you need this much warehouse capacity or you are you know consuming extra capacity in that terms may be extra resources so that you are not you know in that terms asset management is not done efficiently some of the advantages of scor model you can apply this through the entire supply chain we can use these measures for benchmarking the practices we can develop the metric and we can after developing those performance measures we can align all our activities as per that metric right. and then common repository which will work as a common you know in terms of performance measurements or in terms of tools that we can use.

We can standardize this whole process so that because it is repetitive in nature everyday we need to plan everyday we need to source some material convert that material into finished one make deliver and then everyday returns are coming back you can see how many times you are returning the product from purchased from amazon flipkart and all that so if I will say again this is the plan the overall picture and then we are sourcing and then we are making here we are delivering and then finally the return may happen see the

very basic disadvantage of scor model is it cannot be applied to services industry right so see make and deliver and return return is not at all possible in services industry right if you took services from some airline industry or hotel industry even if you are not satisfied with the services after consuming services you cannot return those services but if i am not satisfied with the quality of this writing pen i can again if it is in warranty period i can return it back but you cannot return the services in that way right making and deliver cannot be two different stages in the services industry you are making at the same time you are delivering so services are something that if you are going to again very common example of you are going for head massage to the barber shop so then making and delivering is happening because customer is part of that supply chain sourcing also sometimes product you can source but services you cannot prepare half services before reaching the customer and then you are delivering your services so whatever you are manufacturing services that will happen in the presence of the customer only right so this is the very basic limitation that scor model cannot be applied as it is to the services industry complexity this because all be we are applying all those five stages for all the players and it may be difficult to align all those things for all the stakeholders already supply chain is very complex where you know as a distribution partner you are not having single retailer . You are having you know different online platforms amazon ebay hand flip card and you are walmart all those players are there from where you are purchasing you are purchasing through local shops you are purchasing through maybe one stop solution market you are purchasing through my personal own website so that means already supply chain is very complex one size fits all approach it is also very difficult because the requirement of each products are different. right so these stages source making delivery planning all stages cannot be applied to all the market lack of flexibility because now we are fixed around five areas only so what about if something unexpected disaster happens that is not taken care in this model talking about limited scope already i told you services industry it cannot be applied and then we are never talking about sustainability social responsibility all those things we are not taking care we are taking care of the major activities which are required to run your business and then because information is required to process this accurately so then source of information accuracy of that information is again big challenge quickly you can go one example of scor model you can see now there is no such concept of local market and we are talking about digital supply chain online retail platforms right that means this is a kind of platform where may be if i am the manufacturer or seller maybe i will never meet my customer because as a customer you are purchasing order from flipkart i am delivering through flipkart and then it is how you are consuming the product right so this is again a kind of you know that how you can implement here in e-commerce how you can implement your scor model just to you know integrate your suppliers customers and contract partners throughout your supply chain right .only then when you will be able to integrate your scor model will work perfectly because in that way you can quickly share

the information . when information is shared quickly and on the same information all the stakeholders are making decision it will be more aligned right so ah this you can see data can be easily analyzed in e-commerce and because the basic requirement of scor model is that you need timely data process data accurate data so e-commerce market electronically you can share the data right but yes if you are talking about yes those you need to align all those goals of your distribution network your warehouse your inventory supply demand all those you can plan keeping in mind the scor model for if you are implementing that for all the stakeholder but some of the challenges when we are talking about the online platforms see fast delivery right low cost easy pay methods available and efficient customer support how you will ensure that we are not talking about the after sale services right in terms of and then we are not talking about the payment methods how these can be integrated in the scor model so that you can work these models can work efficiently with the you know supply chains so talking about the second perspective process and cyclic view of the supply chain so cyclic view of the supply chain will it is a kind of you know different cycles are there within you know that supply chain series of cycle we are taking care of and then how this we can understand in a better way with this example you can see this is the complete supply chain right from here the product is flowing.

So, we identified four different cycle first is procurement cycle that is happening between the supplier and manufacturer. when your procurement will start when you will place your order with the supplier that and then manufacture cycle you distributor will place the order then manufacturing cycle will start between distributor and manufacturer. replenishment cycle will be between retailer and distributor and finally customer order cycle will be between customer and retailer so these four cycles are there which are you know happening these cycles are series of events right so let's talk about any cycle what is happening actually series of event usually what is happening marketers or sellers markets the product this is the first step marketer markets the product then what happens next buyer places the order second stage this is cycle i am telling about cycle buyer places the cycle then marketer you know records the order then next stage is shipping of order next is buyer customer receives the order and next is if it is not ok return the order this is how it is happening so series of cycle so if i am talking about replenishment cycle this is series of cycle so this these steps can be replicated for all the players right we will see in detail what are all those cycles right so we'll see what are the different members in the cyclic view first is customer already i talked about customer is approaching to your retail outlet or whatever way you are you are providing the online app or you are providing through your organized retail stores or the you know segregated all those different unorganized retail sector customer will interact with your retail shops they will be you know giving their preferences and they will your retailer will record the order and will supply the order to the customer this will be the series of event you can just keep

these activities in mind right everywhere and finally what happens the change of ownership and entitlement because earlier the ownership was with the retailer now ownership is transferred to the customer second player is retailer retailer is purchasing from the distributor but retailer is managing the flow of the goods and services so involves the social movement and storage of raw material work in progress inventory or finished goods that depends upon the nature of the product whether it will be work in progress or raw material at the same moment retailer will process it will assemble it and will hand over to you as customer. then distributor is another player in that and retailer is placing the order with the distributor in that way distributor is you know aggregating demand from the all the local market where he is operating and then finally communicating this with the manufacturer right so services distribution is you know principally concerned with excess if you are talking about the services distribution is where the services center are located right so talking about that logistics transportation warehousing storage and inventory management are the key activities which as distributor you are doing manufacturer again depending upon whatever demand is there from the distributor he is process he is sourcing the raw material he is processing that raw material from the all the suppliers and then converting into final product right so manufacturing process begins with the creation of the material from which the design is made right and then finally the supplier is there who is the first extreme end of the supply chain and depending upon whatever your manufacturer is communicating the related to the demand he is designing his you know distribution network he is manufacturing in order to supply that product or raw material to the manufacturer so quickly we will go through all those series of event first is your customer order cycle that is happening between customer and retailer customer arrives like I told you in generic terms how it is happening customer is arriving here store so here the point is where you are providing the services so that means where you are setting up the retail center and goal here is to convert the customer arrival into order right so once it is converted into order customer order entry is done so after that you will be recording the order what is the order right and then the goal here is the quick entry of the order and then will be communicated to other supply chain as well that you have received order from the customer so that the manufacturing players, all the raw material supplier will get that intimation that how quickly we are consuming the product. Customer order fulfillment, then here customer order is filled and sent to the customer and again the inventory is replenished from where retailer will replenish the inventory from the distributor.

and then customer order receiving here customer receives the order he receives the ownership and receipt records are updated and payment is done right so finally the payment is completed second is replenishment cycle how it happens between the retail and distributor now retail order is triggered right because customer purchase the order so he will place the order with the distributor again the retail order entry so from different

retail shops all the orders are coming so distributor will combine all those orders will record all those orders and how quickly it is depleting the inventory will record maintain the order Fulfillment retail, so all those retail shops, if 50 retail shops are attached with one distributor, so it will fulfill the orders from coming from the 50 different retail shops and retail order receiving finally, all those 50 retailers will receive the order. So, this is again replenishment cycle, series of cycles are happening between these players. then the third is manufacturing cycle which is happening between the distributor and manufacturer so again order is arrived from the distributor then what production unit will do they will schedule the production for different models different products different variety they are having right so they will schedule the production accordingly they will schedule means So, what type of different products they are making how much lot of each product is required accordingly they are going to place the order with the vendors. Manufacturing and shipping once your production scheduling is done production is done. So, manufacturing and your shipping then you will be packaging the product and then finally shipping the product to the distributor.

or warehouses right and then finally it is received and distributor and your inventory is again replenished whatever inventory you consumed that is again now filled right and the fourth is your procurement order cycle which is happening between the manufacturer and your raw material supplier. So, again you can see here order based on the manufacture production schedule reaches to the supplier. Supplier now will supply schedule the production activity because they will also do something with their raw material and will provide you. Again manufacturing will happen packaging and you are going to ship that raw material for the manufacturer. at the next stage and in the end manufacturing unit is again replenishing the inventory keeping the updated stocks so that if any demand is coming from the market they can meet the demand so this is the complete procurement cycle so all four cycles we have seen which are happening between all those stakeholders as a series of event we can see these the second is push pull view of supply chain pull view of supply chain is when you are you know reacting to customer order so that means customer is visiting your site and then placing the order and then you are finally may be preparing the order delivering the order in terms of services you can say that right but push view is when you are keep on producing the things and whenever customer is coming you will keep depleting the inventory right from the inventory you are meeting the order so in that way pull process you can say is a reactive process because you are starting you know producing your things once your customer order is arriving right and push is already you are keep on producing the things and then based on speculations forecasting that this is going to be the demand and then let us manufacture this much inventory and then whenever the demand will be there we can consume that so this is push pull view of the supply chain it is important to set the push pull boundary right see here what is there if you will see this supply chain as one case we will talk about two or

three cases see customer order is arriving here and already what we have done we have procured the material we have manufactured the material and we have replenished the inventory with the retailer with the distributor all those three cycles are done here right and whenever customer is coming to me fourth cycle that customer order cycle is filled here right that means this push pull boundary we are setting here so any example you can quote here means grocery items where you are goes going to grocery retail shop and then they are having the inventory from that inventory they are fulfilling your order this is the best example grocery retail shop right let's take another example of So, you are building a house.

So, again if I will say the procurement cycle will be here. The second will be your manufacturing cycle, replenishment cycle and second is customer order cycle. see when now this kind of supply chain we obviously we need to depend the complete supply chain will be pull supply chain . In this case we were not having the complete pull or push supply chain up to customer order cycle we were implementing your pull process and beyond that first three cycles were under pull process but here i am talking about another example where the complete supply chain is your pull supply chain right because unless your customer is finalizing the site finalizing the contract with you you will not start your procurement what type of procurement is required in construction industry if you are building house construction for construction you need sand you need steel you need bricks you need wooden you need electrical appliances you need may be cement all those things are required you can see all those raw material you cannot purchase until your contract is not finalized your tender is not finalized right once it is done that means you recorded the order now you know the location you will start procuring all the raw material then you will start building the house manufacturing step by step foundation walling roofing all those you will be installing furniture electrical appliances all those things and as long as you are depleting the resources your raw material you will keep on replenishing that so this is a again example of pull supply chain where you will only react after receiving the customer order in between let's say if I can I set my boundary here or may be here yes if we are talking about dell supply chain let's talk about this is again very interesting what dell supply chain is doing customer is received coming to your retail shop and then you are manufacturing you are starting manufacturing that means up manufacture up to this it is pull process but here it is pushed because they are having all the raw material components whatever capacity you want SSD how much capacity you want right which you know processor you want right so that all depending upon your requirements already I have procured all the things are there in my inventory I will record your requirement for configuration for that system right your personal computer and then i will start manufacturing assembling within two days three days it will be replenished with the retailer and you can pick your order this is another example where we can you know extend the pull supply chain up to your manufacturer so see we have different types

of supply chains you this setting up your push pull boundary is very very important right although pull supply chain is very very difficult to handle because we are very uncertain unsure when the demand will come and then we are starting purchasing of the things so what we want we want to relax little bit in that way and we can how we can you know include some of the stages under push strategy so that we can maintain some inventory as soon as the order is coming we can start you know processing the order right so that is why inventory is in those kind of cases very important to meet immediately your demand right so i think this is pretty clear now how you can set the push pull boundary there is no unique you know approach where I will say that this industry you should go for this structure only, but depending upon your analysis up to what you can go for push industry and then you can go for pull industry right pull supply chain. so we can conclude here that any uncertainty or challenges coming in the supply chain on your way scor model is the very basic model if we are talking about a product manufacturing right where we can include all those stages make source deliver plan return right with all the stakeholders if planning is done at the distribution center that planning cannot be done in isolation with the other stakeholders So, you have to include your raw material suppliers, your manufacturers, your logistic partners all those should be part of your that your planning process and then all you know players you can see different cycle of activities are happening between all those players, but yes in that push pull view of supply chain it is important when you where you are setting your push boundary push pull boundary.

So, in that way, but some supply chains are kind of reactive supply chains you cannot even start thinking of planning even. So, once your you know the site is finalized your contract is finalized only then you can start planning how will start constructing the house. That is one example where you can see full complete pull supply chain is there. these are the references you can go further for already i have mentioned books right so you can go through these references for further details so that's all thank you very much