Supply Chain Analytics
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Lecture-04
Supply Chain Planning

So welcome back friends. So far we have 3 lectures on supply chain analytics and we are developing a frame work in which we can understand that how the analytics part and can help us in improving our conventional supply chain. And we are also understanding in the course that the evolution, the challenges of supply chain and what are the important decision making areas in the supply chain management where data driven analysis, data driven information can help to improve our decisions.

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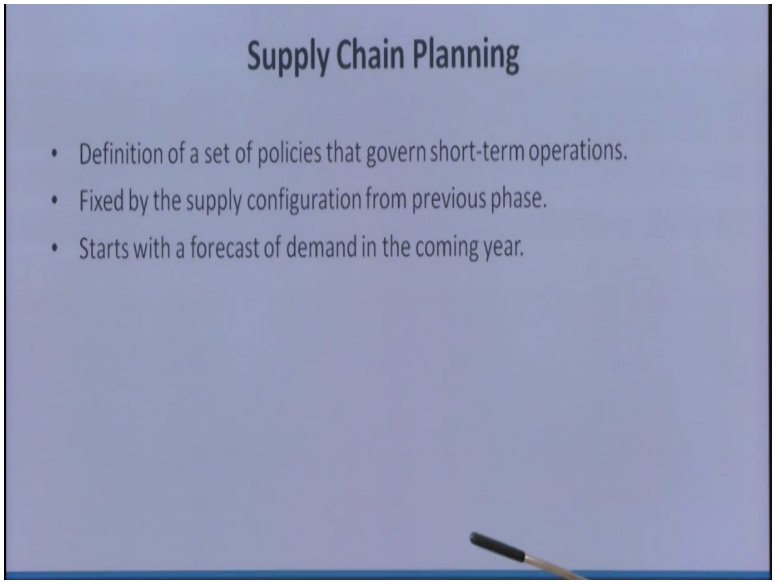

So in our third lecture we are discussing the different decision faces of the supply chain. In third lecture we also discussed in detail about the strategic level of decision making. We discuss that what is the strategic decision and in what many different factors you take those decisions. We discussed decisions related to location of the facilities, decision related to size of those facilities, decisions related to mode of transportation, decision related to information system.

So we discussed all these things. We also discuss that strategic decisions are long term decisions. And you have to be very careful in making those long term decisions. Because changing those long term decisions involve huge amount of cost, if I develop a factory in

Uttarakhand, but tomorrow I feel that it is not very economical to have this factory in Uttarakhand. Now I should have this factory in Sikkim.

So you on your own can understand that this decision is a very expensive decision. Shifting the manufacturing base from Uttarakhand to Sikkim will involve huge amount of cost and ultimately this cost will result into poor profitability of your supply chain. So you have to be very very careful, but at the same time we want enough flexibility in our strategic decision making also.

And for that purpose the role of analytics is going to be very very important. Now let us discuss in this lecture another faces of the supply chain decision making and the second face which is also known as technical face a supply chain planning.

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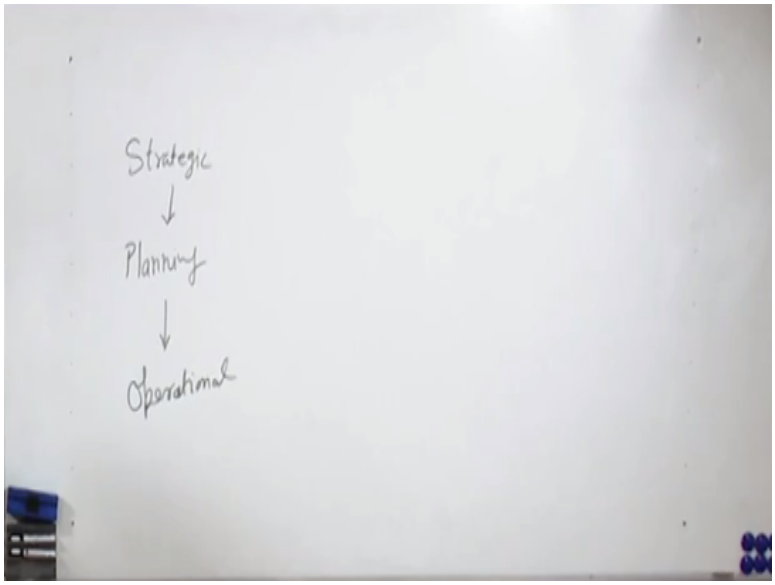

So supply chain strategic decisions are at the top, that strategic decisions when we come to a specific implementation part you have supply chain planning and finally when we move to execution of these things it is the operational level decisions, so now we are at this level of supply chain decision face that is the planning face. So here you develop a set of policies that govern your short term operations.

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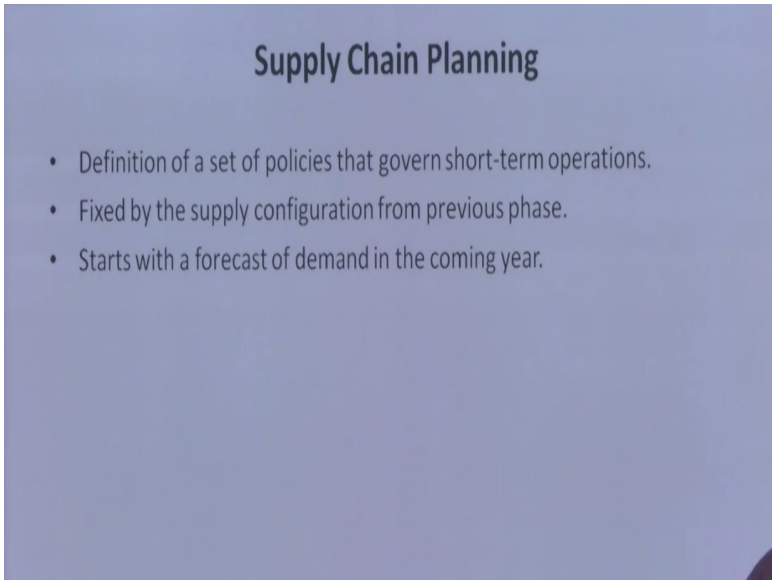

As I discussed the scope of strategic decisions is long term. The scope of planning decision is relatively short, so you develop a long term road map, you have decided that I have to build a factory at Uttarakhand. Now in how many years you are going to build and in that 4 years of his plan, 5 years of his plan, or 3 years of his plan, you develop some kind of 6 months annual targets for yourself. That is the part of your a set of policies or short term operations.

Then this is the planning face is largely govern by the previous face. Previous face is your strategic management, so the planning face is largely govern by the face which is previous to its. So previous face that is the strategic face gives you the broad scope and within that broad scope you have 5 year planning and from that 5 year planning you draw the annual budgets. So it is like that you have one umbrella study.

And within that you identify the scope for short term objectives. So the configuration of planning is determined by the previous faces. And the starting point of the planning is very interesting now here the role of data comes. For these 2 things I do not find much of the application of data driven analysis, but now you see the starting point of planning is the forecast for the coming year.

And the forecast the demand forecast is one very important part of the planning exercise and here comes the role of data driven analysis, data driven decision making that how are you doing the forecast?. Normally we do forecast based on the previous years data, but now a days we require more predictive modeling, we require that type of analytics tools which can help us on the basis of some data which is not has happened so far.

But may come in the future and that change in planning approach is only possible with the help of supply chain analytics. So this forecasting point of which is the starting point of your planning exercise requires the deep knowledge of data analytics and there are large number of forecasting methods many of you may already be aware that these forecasting methods like the very popular is time series analysis.

The time series analysis is all based on my historical data, the previous years data, but now we will see that how we can do predictive modeling, how can we do this analysis based on the future data. So that is the important part where data analytics will play every handy tool for us.

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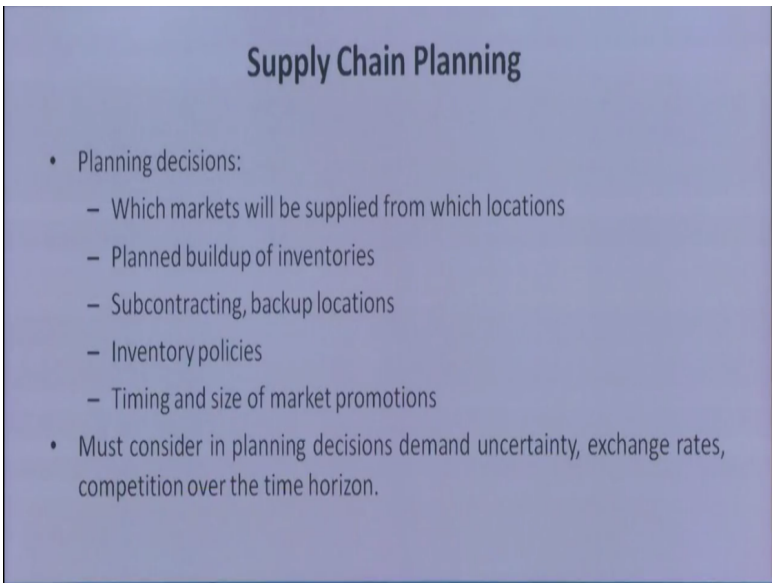

So the type of decisions which we take in the supply chain planning face. So which market will be supplied from which locations?

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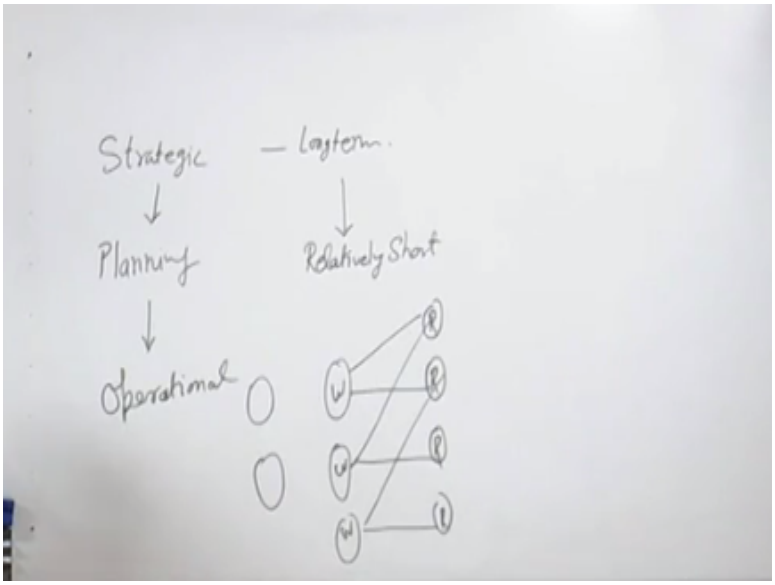

So we had that picture where you have this kind of network, you have so many retailers and you have different wholesalers, so you take a decisions that from which wholesaler to which retailer, these type of decisions are taken in the case of planning. Then what are the inventory levels. What are the inventory levels, individual facilities are going to have. What are the inventory level available with these wholesalers, what will be the inventory level with individual retailers.

So far you all must have observed that in our conventional setting retailer are independent to take decisions about their inventory level. Wholesalers are independent to take decisions about their inventory level, but when we are talking of supply chain we feel that the different parties, the different entities, different players involved in supply chain they should not be independent in these types of decision makings, these types of decision makings which are affecting the total profitability of the supply chain.

And therefore the decisions related to inventory are not by the individuals rather these are the planned decisions about the inventory that which stage will hold how much inventory. So that is again a very important supply chain planning decision we take and this decision of plan build up inventory is based on real time data which we have already discussed that what is the meaning of real time data and how it flows into the supply chain.

So that is a planning decision. Then subcontracting back up locations etc. Now a days we all know that all these activities of manufacturing, transportation, warehousing, retailing etc. the time of hold is no longer there. You require different partners in this process of supply chain.

From left to right you need so many different partners and when I am talking of so many different partners you many times subcontract your various activities.

Sometime you may subcontract your manufacturing activities, sometime you can subcontract your transportation activities, sometime you can subcontract your warehousing activities etc. etc. depending upon the nature, depending upon the abilities of your subcontractors etc. So subcontracting and back up location, how much to subcontract, to whom to subcontract and what type of products to be subcontract, all these things are very important and decisions about the subcontracting activities is also very very important planning activity.

Then inventory policy we have already discussed. Then timing and size of market promotion, that is also important. You see in supply chain many of us may argue that this is more related to marketing and less to supply chain. To some extent it is correct also, that timing and size of market promotion is a more marketing decision, but your supply chain must ensure that yes when there is a promotion the product is available in the market.

The point which I am trying to say that if Apple says that on 7th September 2016 iphone7 will be launched across the globe. Iphone7 will be launched across the globe on 7th September, so now when this company is starting to popularize the launch of iphone7. My supply chain must ensure that iphone7 is available secretly, securely to all my global retailers. So that is a very very important thing.

And like in India we have normally the movie releases on every Friday. Now every Friday when a new movie starts or released you need to ensure a supply chain that movie must reach to the respective cinema halls, to the respective theatres wherever it has to be screened. And you need to ensure enough safety, security, that there should not be any kind of theft of the CDs, or DVDs, or the prints of the movie.

And at right time it should be screened across all the theaters. So these are some of the points which are related to timing and size of market promotion. So you need to do promotion only in those areas where your supply chain can ensure timely availability of those products, and what time the product will be available accordingly you start the promotion so timing and size of promotion should be very much in sink with the our supply chain planning.

If supply chain planning and timing and size of promotion are not in line with each other you see the recent case of reliance Jio also. So when Jio is launched when Jio launch was announced so their supply chain ensures that the Jio sim card, Jio mobiles are available to all their distributors. So it is though on privacy timing and size of market promotion looks more marketing area.

But when we go deep into it, when we try to understand the cracks of this statement we will find that supply chain is very very closely associated with this timing and size of market promotion. Then at the planning stage though at the strategic level also but at the planning level also the demand and certainty, we already discussed this in the third lecture, the exchange rates when we are talking of global markets, the exchange rates, and therefore the third point which we discussed in the third lecture that is the fluctuations in the cost.

So that exchange rate changes in the exchange rate, the fluctuations in the exchange rate may also result into the fluctuations of the cost of supply chain. Then competition over the time horizon. The competition is also changing over a period of time. Once upon a time for American companies, American automobile companies, American electronic companies, Japanese companies used to be the big competitors.

But if you see today's scenario the scenario of 21st centaury Chinese companies are big competitors for American as well as to Japanese companies also. You go to Japan everywhere you will find made in china product. You go to America, you go to Walmart there everywhere you will find made in china products. You come to India you are very fortunate that you still find lot of made in India products.

But in America and Japan both these countries are facing very tough competition from Chinese companies. So competition is changing over a period of time. So your supply chain planning should also keep an eye on the changing competition over a period of time. Competition is more related to the strategic decision, but since strategic decision as I discussed earlier are long term decisions and competition is changing very fast.

Competition is changing very fast and the new players, new products, product lifecycles, all is getting reduced day by day and therefore the issue of competition, now how to handle

completion. This type of questions are coming more in to picture in our planning face of the supply chain.

So strategic you can take only once in a while decision with respect to competition, but daily how to change your supply chain planning for that purpose we need to take care of competition at the planning stage also. So these are the important decisions which we make in the planning face of the supply chain. Then we come to the third level of decision face that is the operational decisions which we do in the supply chain, so these operational decisions are related to execution of the supply chain.

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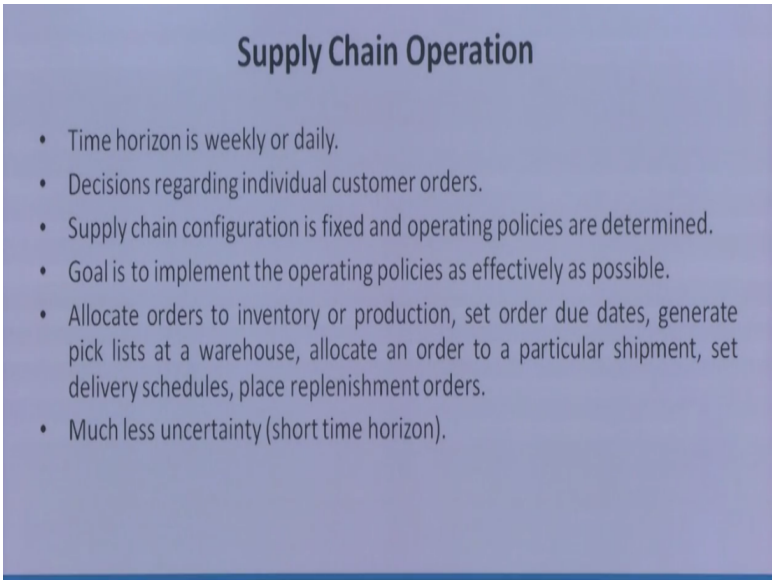

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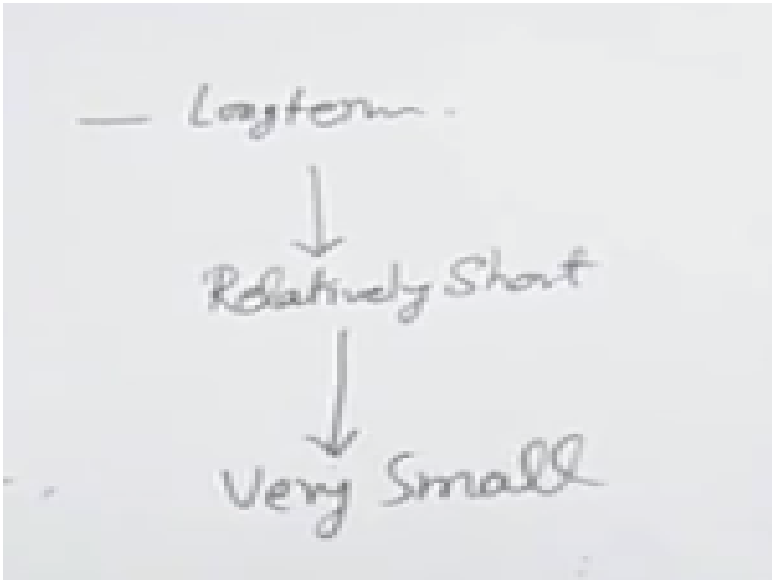

So now we are finally coming into the implementation stage of supply chain. And here as is mentioned the time horizon is very very small. So the time horizon is very small, it is long term in case of your strategy, it is relatively small in case of planning and it is very small and it is as a small as you can see weekly or even daily in some cases also. So if you are talking of let say food supply chain.

If you are talking of supply chain so the time horizon may be daily. if I am talking of apparel supply chain the time horizon may be weekly, so we can go up to that level of execution monitoring that time horizon can be weekly or daily. You take the example of 7, 11 Japan, in that case the supply chain operation time horizon may be few hours also. Because they replenish their inventory 3 times a day and when they are replenishing their inventory 3 times a day.

So in fact the time horizon for companies like 7, 11 Japan is less than a day, it is just 4 to 5 hours. So here actually the time horizon is really very very small. Then here we take decisions regarding individual customer orders. Now at this level we started taking care of individual customers. That what are the requirements of that particular customer, what are the quantities required, where it is required.

So all those things with respect to individual customer you are taking care at this face. And here also the past data may certainly help us to take better decision with respect to customer satisfaction, with respect to customer experience, with respect to customer experience to our supply chain decisions and so that you can make your individual customers more happy. Here our supply chain configuration.

And this decision making is govern by the planning faces. So this is a kind of hierarchal arrangement planning activities are fit by the strategic nature and operational are fixed by the planning face of the supply chain. The goal is to implement the operating policies as effective as possible. So whatever you have decided, whatever quantitative as well as qualitative goals you have for your organization.

You try to implement at the operational level with the maximum effectiveness. Then allocation, orders to inventory, or productions at order due dates, generate pick up list from a warehouse, allocate, order to a particular shipment, set delivery schedules, place

replenishment orders. All these are the various types of supply chain operational issues which we handle in the operation.

So day to day if you talk of a supply chain officer or a supply chain manager, so on a day to day basis, week to week basis, hour to hour basis, these are the important jobs. These are the important activities which he or she performs in an organization. So that raising the intents, making the Chelan, making the invoices, delivering the products to a shipment etc. So all these things are the part of our supply chain operation.

And in a good organization you have some extended operating positions for all these things that how do we have inventory replenishment policies, how do we have the delivery schedule channel and all these thing. And here one interesting thing is that in operation level, in operation level you can work whether less amount of flexibility because the time horizon is very small.

Here the time horizon is very small, time horizon is few hours or day or a week, so things may not change so fast within a day and therefore the advantage is there that you do not require much of flexibility and on the other way you can also write that less uncertainty is there because of short time horizon. So that is a very positive sign for supply chain operation and therefore the skills required, therefore the kind of exposure required at the operational level is much less than what we require at the planning at the strategic level.

Because at the strategic and planning level you require a bigger result and you need to handle bigger challenges. And because of the operational requirement because of your day to day affair involvement it is not expected that you also focus on the external issues. So the focus of strategic and planning these 2 level is equally on internal as well as external environment of your supply chain.

While operational people they are more concern with the day to day, with the internal environment of the organization. So that is how you can also understand the difference in a scope of work of different faces of supply chain.

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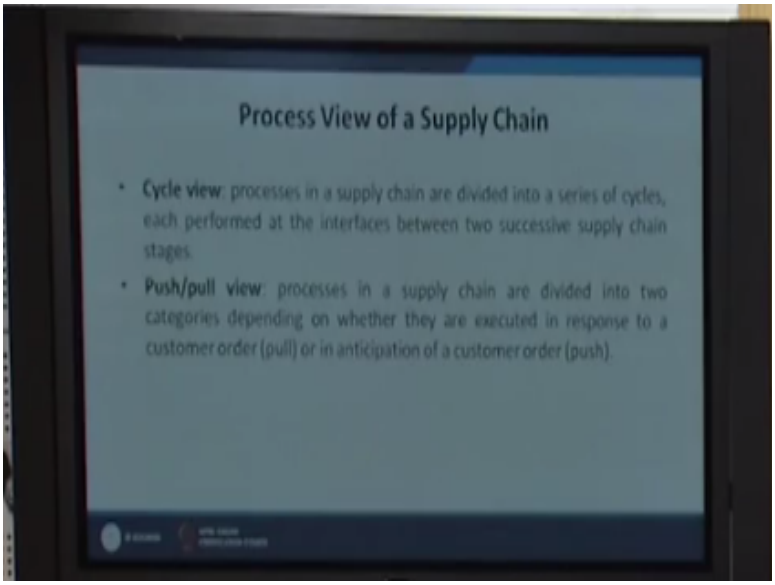

So now once we are clear with the different faces of supply chain decision making. Now the next part of our discussion which we will continue to the next 2 lectures also. That is about different ways in which you can study a supply chain. There are 2 very popular ways which are available in literature which can help us to study the supply chain and these are one is cycle view and another is push pull view.

Cycle view that there are different stages in the supply chain we have discussed in our all the classes earlier that you have wholesaler, you have distributors, we have retailers, you have manufacturers, you have customer, so there are different stages and the processes happening between 2 stages.

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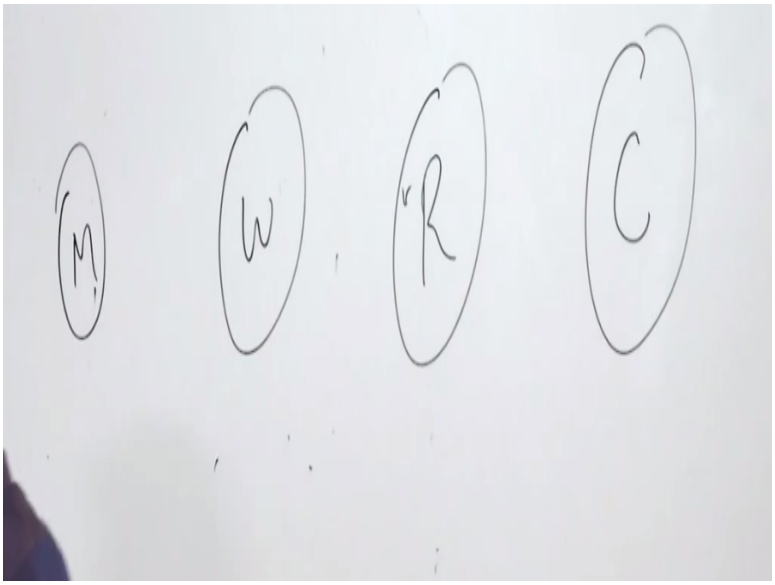

This is manufacturer, wholesaler, retailer, customer. So now the processes happening at any 2 stage at manufacturer or wholesaler, wholesaler or retailer, retailer or customer can be seen in this type of cyclic view.

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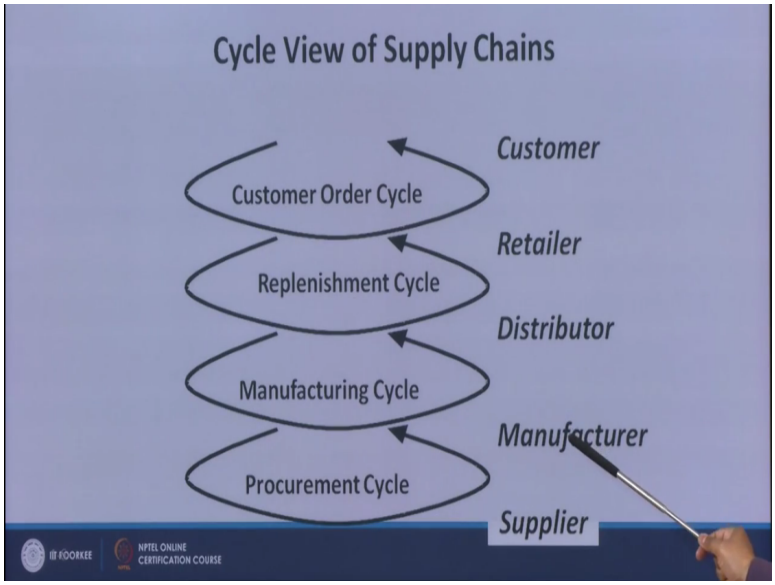

So you have supplier, supplying products to manufacturer, manufacturer giving products to distributor, distributor supplying products to retailer, and at retailer finally customer purchases the product. Now you see this cyclic view conceptualizes a cycle at each of these interfaces. When customer is coming to retailer this cycle is customer order cycle. When retailer is giving order to distributor or otherwise also you can say that when distributor is supplying products to retailer, there is a replenishment cycle.

The meaning is distributer is replenishing the stocks of retailer, fulfilling the requirement of retailer. When manufacturer is supplying products to distributor this is the manufacturing cycle. Here manufacturer is making the products, producing the products and supplying those products to the distributor. And when supplier is supplying raw material, components, sub assemblies part to the manufacturer this is the procurement cycle, that all these components etc. are procured by the manufacturer.

So this way there are different types of cyclic activities, which are happening, now when we go for microanalysis, when we go for microanalysis of all these cycles you will find that in each of the cycle you have almost similar type of processes. Though there you have different names of the cycles, customer order cycle, replenishment cycle, manufacturing cycle or

procurement cycle. But actually the cycles are consist of various processes also. And we will that all these cycles are consisting of similar type of processes. So that is very interesting.

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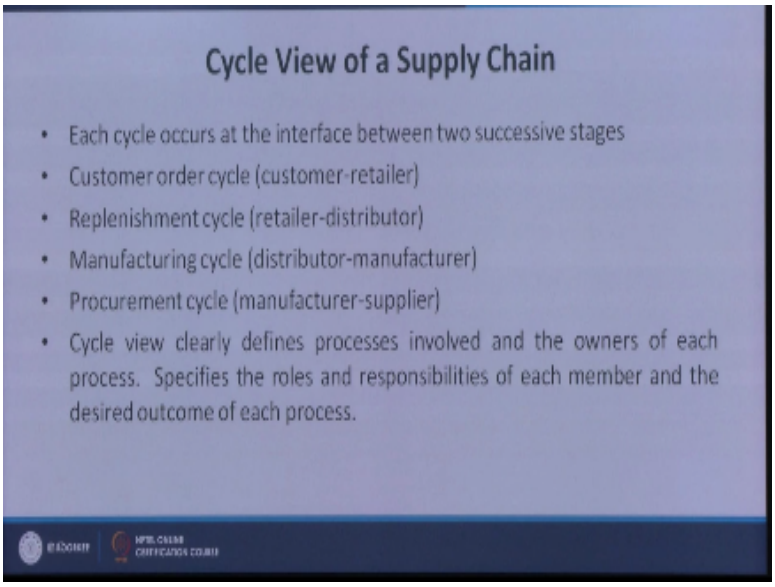

This each cycle as we mention that each cycle occurs at the interface of 2 successive states. And these types of cycles we just discuss. And cycle view clearly defines processes involved and the orders of each process. It specifies the roles and responsibilities of each member, these are the different members, manufacturer, wholesaler, retailer, customer etc. So within each cycle who are responsible for what type of activity?

So that is what is specified in the cyclic view and therefore cyclic view is very important for the proper distribution, proper understanding of roles and responsibilities of different members of this entire supply chain. The cyclic view is one way to look for the supply chain development. But there is one more way that is push and pull view and this will help.

This push and pull view will help us in developing the concept that what are the things in a supply chain can be done in anticipation and what are the things can be done in reaction in a supply chain. So this push and pull view is also very very important for understanding the philosophy of supply chain. So we will continue with this push and pull view in our next lecture and thank you very much till that. Let us see.