

Logistics & Supply Chain Management

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Lecture 01: Introduction to Logistics: Design and Management

Hello dear friends. So, welcome to NPTEL online certification course on Logistics and Supply Chain Management. I am Dr. Vikas Thakur, Assistant Professor, Department of Humanities and Social Sciences, IIT, Kharagpur. So, today we will be starting with our very first session that is on Introduction to Logistics. And already we discussed little bit about why I have given so much preference on logistics while designing this course as being I have included almost 15 to 20 percent portion to specifically logistics and including warehousing and transportation storage as part of supply chain.

So, as the first session we are going to cover the obviously the basic concepts about logistics and how it evolved, what are the key elements of logistics management, we will talk about the stakeholders in logistics management and what are advantages of effective logistics management system. So, we will talk about some modern concepts evolving in the logistics area and leading towards the comprehensive supply chain management perspective. We will talk about some of the national, international forces which are contributing towards or may be forcing our logistics and supply chains to develop in a better way. So, we will talk about this industry and obviously we will consider the global as well as the local scenario.

So, before we will proceed further I will just take very simple example and we will try to differentiate somewhere or may be relate the logistics function with the overall supply chain management concept. So, if I will talk about the very common product we are using. So, that is let us take the example of bread. So, everyone is using bread and butter as their breakfast or kind of short meal. So, from where it is coming? If I will talk about the raw material we are using, so maybe we are using wheat, maybe we are using salt or maybe sugar or maybe yeast or maybe something else.

So, these all are ingredients which are used to make the bread. So, if I will take only wheat, since wheat is coming obviously, as flour as one of the ingredient and is coming from where is coming from another stakeholder which is flour mills right. Now, flour mills are using their raw material as wheat grain and which is coming from another stakeholder you can say the farmers. Now again farmer are also using so many raw materials like they are using seeds they are using fertilizers they are using machines and etcetera pesticides and all other raw materials to grow their crops right. So let's take only one example of machine where they are using let's say tractor for growing their field so for tractor another stakeholder may be then it is coming Mahindra and Mahindra they are purchasing the tractor from that.

Now mahindra and mahindra while preparing that manufacturing unit so so many different suppliers are there for manufacturing one unit of that tractor right so lets take so many different supply again use supply chain will be there down the line so if i will take for example only one component which is as raw material which is tire now this tire is again made up of may be we are using rubber and then we are using steel wires as well so steel wires again coming from some steel industry steel industry again taking the raw material from mining and all that and this supply chain will keep on keep on growing and going and going till the end right so this is a complete system so supply chain management is So, systematic approach. So, we will consider the whole chain as one system and whether you are suffering from losses or you are gaining some profits. So, that will be shared through all the supply chain stakeholders. Now, where comes the role of your logistics function? So, in between whenever we in between means two stakeholders whenever we are going for transportation of the material from one end to other end then comes the function of logistics. In between whenever we are storing grain in our warehouses or in our storage houses.

So, then again we need logistics functions. So, logistics means through that supply chain whenever you are storing whenever you are transporting physical distribution of the product from one end to other end will definitely will be addressed under logistics function. So, this is not only limited to warehouses and transportation obviously, in the

chain if we are managing somewhere information also that will be part included in logistics. So, we can see the logistic function is subset of supply chain and because this is very important and why this is important in the very next slide we will see why this is so important that we need to pay special attention when we are managing our logistics. see if i will quickly talk about the total supply chain cost so here you can see 50 percent is coming from the transportation which is again part of your logistics function and then again if i will add inventory as carrying cost into this that means approximately 70 percent these two components are carrying.

Although this there are so many other elements we are managing with respect to supply chain with respect to logistics, but if we will take roughly amount so that means, 60 to 70 percent cost in the supply chain is because of your logistics. So, becomes very important to address this special function and will prioritize under this function what are the different elements so that we can address those elements separately. Quickly if we will go through this logistic function, if we will divide this logistic function these are the major four factors which are contributing. So, first one is you can see 58 percent is because of transportation. So, transportation is carrying the maximum share and if you will see by a road we are transporting the maximum material which is again is a kind of limitation that we will talk about in our further sessions about the transportation is one particular separate chapter we will see why we should go for sometimes we should go for ship transportation, rail transportation, where air transportation is required.

So, we are not saying that completely we should obsolete any of this these mode, but yes in what percentage or proportion we should use each mode of transportation that so many different factors are there cost may be one sustainability may be one, another your reliability may be another one, speed of delivery may be another one, customer requirements may be the other factor, right so we will talk about these factor in that chapter. Second, followed this transportation is then followed by your inventory carrying cost. I talked about the carrying cost whatever we are holding inventory. So, that is also required. So, again there will be one session on inventory management.

There will be talk we will be talking about why inventory is required, because always we have some gap with the supply and demand so to fill that gap there is concept of inventory so inventory management we are always focusing on neither we should be having excess inventory or we should not be stock out right so these are the two basic objectives So, next comes the part of warehousing which is again a logistics function. So, before distribution to the end customer we have some strategic locations where we are defining our storage, it can be at a temporary storage or it can be may be for some duration right depending upon the nature of the product. So, we will be again discussing about this in detail and there are some administrative cost related to this. So, from these facts it is clearly indicated that logistics is very very important part of any supply chain so we should focus on this so just going further I'll just show you this small video and you'll just see how as a logistics or supply chain the companies or organizations have evolved over the time check this out It hasn't been such a long time since people first started shopping online, and it was easy to keep up with the clicks. Little by little by little by more, the clicks added up to be more than the stores, and e-tailers worked harder than ever before, because they had to keep up with the clicks.

The clicks came from laptops, then tablets and phones, Monday through Sunday, office and home, 24 hours in every zone, and still they kept up with the clicks. Now shoppers ask more from the websites they're on, their language, their currency, their way, or they're gone, so you'd better keep up with the clicks. All of a sudden, there are so many must-dos if you want to keep selling, like delivery there, no, there, or there. And make it tomorrow, first thing. No time for borders.

Got to stay in control to stay in the flow and continue to grow. But we'll help you. Keep up with the clicks. Right, so with this video you can just imagine the wonder which is happening at the back end of any supply chain or logistics with one click how the things are being delivered at your doorstep or maybe there are different distribution models depending upon that whether the customers are picking some pick up locations and going there and collecting their products or you are preferring your product should be delivered

at home. but what I'm saying that the ad says that that you can make that click from anywhere any part of the world and then you can pick the product from any other part of the world right so then once you will click that so whole team on the back hand will start collecting your information processing your information as order processing and all that and then will make every effort that your product reaches your home and then it's not end with another click you can return the product as well right so the effort which has been put up by the whole team to ensure the timely delivery of that product from one end to the other extreme corner of the world right so with another click the again this cycle will start right so that is the promises So coming from all the logistics players, all the e-commerce websites and they cannot simply say that returns are not allowed then you can just imagine the situation of those players.

So that means there is no mercy for those players and they have to evolve like this and the next generation maybe the scenario will be totally different where we will be talking about AI and machine learning and internet of things coming into picture and then the picture will be totally changed. but let's go back and then we'll start the journey of how this logistic function started so when there was very local view whatever we were producing there was no concept of kind of economy or common currency which we can use for making the transactions and all that so what we were doing as a local community whatever i was producing maybe i'll give you to some other person other person is producing something else he will be giving to me right. So, this is a kind of local view, but then we develop this view further and then we went for a regional right. So, may be at one place we want to have the access to all the product and services nearby right. So, then obviously you can see bull cart or horse cart you can use to travel up to that much distance, but now this is obviously not sufficient enough right.

so now I want that if something is being produced in south part of the country India and then that should be delivered to the northern region as well eastern region as well and western region as well right so if apple is being produced maybe in the hills top there so that should be distributed through this kind of supply chain or logistic should be distributed to every part of the country not only country then we are talking about should

be distributed to whole world right so Then, if we are talking about the this country as one market. So, obviously, we need to develop the transportation means as well right. So, we can see that clearly by a road we are going or we are using trains or sometimes we are using ships if that infrastructure is available for us right. So, that is now we are expanding this business to whole country right now obviously now the ad says that we can make click and we can pick the product from anywhere even if you are sitting here then from if you liking some product from maybe ah from alibaba or may in China or maybe you want to ah shop something in US market you can do from anywhere right so that means you have to expand your business globally right so expanding your business globally essentially means that your supply chain is the first thing you need to set up your logistic distribution network is the first thing you need to set up from where you will source your raw material from it's not that if you are producing in this country you can source your raw material here only if you are finding better options in terms of price in terms of quality in terms of quantity obviously you will go cross borders right So, if all those obviously, if we are going cross border and if we have localized vendors. So, obviously, there are some pros and cons with the local vendor as well and with the overseas vendors as well.

but the point here is we are not limited to one market and we cannot we are forced to expand our business across the boundaries right so this is how the logistics over the time has evolved and Now the only next imagination is if I am clicking something so automatically the product should come out of the screen right from where I am clicking that information. But think about your latest online purchase and with just one click your package is so swiftly arrives at your doorstep. so you just imagine so many different things we need to align it's not only transportation it's not only ensuring the inventory or product it's not only ensuring the quality it's not only ensuring the speed of the delivery variety so many different expectations from the customer perspective right so all those things you ever wonder how all those things are streamlined and then the doorstep delivery is done so behind the scenes magic that ensures your favorite products are always within reach is logistics so Then what is logistics? Logistics refers to the management of flow of goods. I told you that goods are flowing raw material or may be

sub assembled part or may be final product from one end to other end. That is one part that is flowing in that supply total complete supply chain.

so taking care of the flow of the goods then information is another thing information from the market what is going to be the demand pattern what is going to be the expectations from the customer their preferences right so what quantity they want what type of quality they want right so that information is also shared let's say very small information that uh even because this is a broader perspective and information plays huge role when we will talk about the complete supply chain but here in logistics where the information is important see if as a delivery partner i am delivering the packet to the end customer and end customer has picked the option of maybe cash on delivery so in that i have to process that information i have to collect that in cash or maybe at their doorstep as well they can use UPI they can use so many different platforms digital transaction platforms they can use their credit cards their debit cards so I have to be equipped with everything every possible option so that my customer should be relaxed should feel that they are getting the best services So, that is another thing then resources sometimes we are moving our resources from one point to other point. Let us say if we are talking about project big project and there we deployed so many different kind of machines right. So, that project is over or we are starting the next project then we are moving the resources as well. It is not only the machines only we are moving as the resource, we are moving the manpower as well right. So, whatever resources either man, money, machine, material whatever or technology you are using.

So, those kind of resources also you are transporting from one end to other end using your logistics. So, obviously, then it is not only the forward flow, the obviously reverse flow with another click can happen and we need to ensure that. So, we will talk about the range of activities. So, you can see in logistics function essentially includes this planning, implementing, controlling the efficient movement and storage of goods. Now, it is not only that some way you have to store or may be any day you can deliver the product.

so efficiency and responsiveness is something are two extreme ends right so if i'm saying

that within half an hour i want the delivery how you will make this happen within half an hour yes this is going to be the reality maybe next decade within half an hour and amazon already started this thing where they are planning the instant deliveries using drone system right so or maybe uvs right unmanned aerial vehicles they will use and will drop their baggage or packet packets at the doorstep or whatever the customer location is but that is something you cannot say that we are doing all those things and providing you the efficient deliveries and then we can charge extra for that no no no so if you will think in that way the very next slide says that that you have to provide the right product this you can see the right product but at right financial resources you cannot claim that because we are providing all those services so price can be little high because that you need to compete with other players in the market now let's say seven R's if we will talk about of logistics is first is write product, there comes the rule of how the information flows through your logistics network. When you are distributing your product to the customer only then you are recording the information right, that information is required to supply the next order or may be it this information can be related to anything related to your packaging is not good or maybe not recyclable and that customer is very environmental conscious kind of thing maybe there so then information you need to provide to your supplier that the packaging we need to think of because now customers are getting aware about the sustainability and all those things so we need to shift towards that So, not only packaging may be sometimes you need to change the design of your product, you need to add more features into that. So, that whole information will be flowing through this network, right quantity. So, right quantity let us say if I am having a very small ice cream parlour and I know that in any campus where may be 10000 students are there. So, I may consume may be in the end of the day around 1000 to may be 1500 ice creams daily.

now let's say they they got some occasion or they are celebrating their placement session or maybe some incidentally some birthdays are there on the same day so maybe there may be the demand which may be around maybe sometimes 3k maybe 5k or maybe even 6k right so that means that if they are visiting my ice cream parlor every day and then suddenly if they are asking for higher quantity right or variety it is not only quantity or

variety. So, I should not say no to my customer right. So, that right quantity you have to be flexible enough or your logistic distribution network should be flexible enough that you can ensure that availability of the product. Right time if you are making some promises that your packet will be delivered at the right time and because that packet may be associated with some maybe some occasion we are celebrating and today evening 6 o'clock we will start our party so it should be delivered before that right and right condition obviously if you are saying that as maybe Zomato or Swiggy that your services are the best services then if I am ordering my dinner using your services it should i should feel that it is directly coming from the frying pan to my dining table right so right place what are the different channels how you are placing your product right to right customer and right customer we have already identified through your right information and then delivering all these services we have to be efficient as well we cannot say that providing these many services will increase our cost no this should not happen. So, how we can ensure that because even if you will talk about the main point the Swiggy entered into this market was the even the single piece of sweet you can order through Swiggy.

otherwise already there are so many other players who are doing well in the market how you can enter right there should be some USP obviously if I don't want to eat too much sweet or maybe restricted by the doctors or my diet is not allowing me whatever may be the reason but today i just want to taste one piece of sweet so then swiggy you should go on that and there is no such requirement of minimum order so here you will talk about the efficiency because if you are processing one piece of sweet obviously you cannot say that that we can be efficient right within thirty minutes delivery thirty minutes delivery that that means if your this you are ordering pizza and that is the person delivery person is covering 10 kilometers to your house right so within 30 minutes that means i cannot wait for another order so that i can combine the orders and then the economies of scale concept somewhere i can ah utilize right so that won't be happening So, these are some of the challenges. We will go further and then we will see how we can deal with these challenges. So, here I have included some video links. You guys can just quickly go through these videos and then we will continue our discussion on the topic. so see how we are making promises within 10 minutes super fast deliveries even because obviously

the people whose delivery boys they are coming there they have to come through the normal traffic jams and all those things we are facing in their routine life but still we cannot say that this is because traffic jam is happening every day right so this cannot be excused for delayed services so Now, how we will arrange our key elements in logistics in such a way that your delivery can be ensured on time.

So, these are five key elements under logistics. First is your transportation. so obviously all mode of transportation you will use right intermodal transportation to ensure the fastest and efficient delivery as well that is on the back end that we need to ensure as the service provider we need to ensure the efficient delivery what customer expects is the fastest delivery they are hardly bothering about whether we are efficient as logistics distribution partner or we are not right second is warehousing before delivering the final product to the customer we are usually storing the product in the warehouse so that we can meet unexpected rise in the demand or sometimes fall in the demand inventory control is another element under logistics where we need to take care of the inventory excess inventory is also dangerous and if we are below the safety stock that is also dangerous for the inventory manager right so we need to maintain the proper level of the inventory obviously we always cannot say that it should be like just in time system we can implement in all the components whatever raw material or final product we are supplying we cannot go for just in time so we will discuss about the inventory control as well in detail order fulfillment this is a complete process as a customer i'm visiting zomato website and then i'm placing my order it will be routed to the restaurant i'm picking or sometimes the best rated restaurant and then they will be preparing this and packaging will be done there my delivery partner will be picking the packet and then will be shipped finally. So, this is how order fulfillment happens and in the end distribution again one complete chapter is there when we will be discussing about how we can give different options to the customers while designing the distribution network. one extreme end can be that you just click on your system on your mobile tab whatever laptop you are using and will ensure the doorstep delivery the other thing can be you are visiting the retail showroom or whatever shop and then you want to feel the actual product you want to see and then you want to buy.

So, we have to be open for all the channels and we should be able to provide the inventory or products through all the channels. So, obviously, the ultimate aim of logistics is to deliver the correct products to the right location at the appropriate time while minimizing the expenses and maximizing the effectiveness. So, competent logistics management is vital for companies to meet customer needs, enhance operational efficiency and also you need to sustain as competitor in the market. So, this is all about your the basic concept of logistics and the key elements of logistics. So, till now we can conclude that so logistics is very very important function in supply chain overall supply chain and we have to meet the customer requirement their demand in a very efficient way and effectively right and whatever way if we are talking about the distribution we are talking about the doorstep delivery so in that way we need to meet the customer demands with the variety with the expectation with the delivery speed with the quality all those features keeping in mind we have to be efficient as well so this is all about the logistics the basic concept of logistics In the next slide, we will be talking about in detail what are the different factors which are forcing us to go for the next level development in the logistics, what are the latest developments as far as the research part is concerned, and as far as the industries are focusing on that, and we'll talk about this logistics industry scenario international as well as the local Indian perspective.

So, these are the books you can refer. So, this content has been prepared by using these books. So, first is logistics and introduction to supply chain management you can refer, introduction to logistics system management, and then supply chain management and transport logistics. Some reference books also are there, global logistics and supply chain management, the logic of logistics. So, that is all for the first session. Thank you very much.