Logistics & Supply Chain Management

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Lecture 60 : Assets Management in Supply Chain

Hello dear friends, welcome back to NPTEL online course on logistics and supply chain management. So today we are into the last session and we will discuss about very important aspect of supply chain where we will talk about how we should manage our assets in the supply chain. whatever assets we are using for long term short term how we need to ensure their 100 availability so that they can be efficiently utilized throughout the supply chain right so when we talk about throughout supply chain whatever assets we are using so at vendor and also whatever assets we are using through transportation whatever assets we are using manufacturing distribution keeping customer inventories everything whatever assets we are using we need to take care of those assets right so we will talk about some kpis how we can measure the performance how in a better way we are you know keeping our assets and what are the challenges risk if we are not taking care of or maybe tracking our assets right so Just talking about supply chain assets, obviously we can divide broadly in tangible and intangible assets. So, tangible assets like manufacturing facilities you are using, warehouse you are using, in warehouse you are using automated tugs, you are using automated trolley systems. or software warehouse management software that will come in intangible asset through that software you are utilizing through different machines right robots are working so then again the combination of tangible as well as intangible assets resources then transportation vehicle you are using inventory you are carrying those all are physical tangible assets and intangible assets the information which is flowing through the supply chain The intellectual property, the IPR, any R&D you are doing, innovation you are doing in the supply chain, your brand value, your relationship with the customer, relationship with the supplier. So, that is intangible assets.

So, when we are talking about asset management, we need to take care of your physical as well as your intangible assets so these are the essential components that enable the efficient flow of goods services and information through that main network right and then the reverse supply chain is also there where also we have seen that this these three flows are not only in single direction but in bidirectional right so from customer sometimes goods are coming back from manufacturer sometime or seller sometimes the money is going back to the customer if customer is returning back the product so we have seen those situation right so asset means that portion of assets of any company which are directly or predominantly attributable to the company's operation to supply manufacture and distribution of the product right so this will obviously not include the company cash cash

equivalents or any liquid investments in the share market or other markets you have done that will not be considered under this right so this is again one short video on asset management through the supply chain you can just go through and see what are different solutions are there when we are talking about tracking our assets and maintaining our assets right so this process of developing operating maintaining and selling assets cost effectively is the major objective of any asset management right through the supply chain so when we are saying that how you because when you are maintaining your supply chain assets you are maintaining the resiliency of the supply chain viability of the supply chain so to do so we need to keep the track of all the assets now what tracks we are talking about what records we need to track we need to track if we are buying this camera after how many hours maybe if it is running how many hours we need to change the lens after how many hours we need to repair the camera so that there should not be sudden breakdown and in between what we are recording is totally interrupted that should not happen right so same goes with the industries also if you are buying machines at different time or at the same time you should know that where you need to when you need to maintain and how long it will take in the maintenance this is the major concept when we are talking about the supply chain asset management right so again another example warehouse operations and you are using trucks those freight carrier vehicles right so let's say after one delivery there is post trip inspection and you realize that there is some break issues in that vehicle so obviously that will go out of that supply chain and you will take some time to maintain that so you should know that how much time is required and it should be under regular maintenance when we are saying you have the planned maintenance that means you have the alternative as well right so our main focus here is to go for the planned maintenance so that alternatives will be there and our supply chain will not be interrupted How we can ensure that if we have scheduled maintenance for whatever machines, vehicles or physical assets we are using and I must include the manpower as well. if manpower is taking obviously they have every right to take the casual leaves or earned leaves or maybe medical leaves so if medical leaves obviously we cannot plan but if that plan is there for them so for casual leave or some other things how we can go for the alternatives if suddenly the absenteeism rate today is so high in the organization how we will survive so obviously we will not be able to finish the product if 500 stages are there in the production line so obviously 500 minimum workers are required right so then we need to come up with the comprehensive work orders how much work is there how many resources are required how much time it will take what are the equipment required how many manpower required this comprehensive work order will be there then you can find out that what is the requirement and you can historically you can track and inventories the data right and then you can keep the record then employee and vendor scheduling as well so when we are saying comprehensive order work order you are getting at the same time that should be circulated to all the vendors so vendor should know in starting only that this much material they need to supply these many lots throughout the year they need to supply plus minus this can be there But yes, as long as we can maintain that schedule, obviously we will be more efficient and effective. And then institutional knowledge for new team members, how we can ensure the onboarding process efficient so that they can also be part of the

organization and in that way we are increasing our intangible potential. assets because we are adding to knowledge right so effective asset management in supply chain can support uptime and in turn your team's ability to maintain revenue streams obviously you need to keep the words i view on your supply chain where what is happening and if that transparency throughout the supply chain is there through technology then you can track what is happening and where it is happening right and how much time it will take to you know again regain the original position talking about assist management in supply chain first is the very basic function why we are going for is cost control obviously when we are going for maintenance scheduled maintenance planning We know that today out of 10 machines, 2 are going for routine maintenance.

So, we have already planned that we will run this for extra shift and this is how we will meet the demand requirement. So, but if after 2, there is sudden breakdown in other 2s. so then obviously you will not be able to maintain that delivery and then less than truck load will be there during transportation that is gone you will lose orders in the market because your inventory is not replenished at that time Again there will be use inventory pile up in your manufacturing unit because you are not able to process all will add to your cost will increase. So, maintenance this is important in this. Then revenue management you can do again there is concept of supply chain finance.

so how you can ensure see usually what is happening this is again new trend in the supply chain where you can get the finance right usually what is happening your vendors are supplying material you are paying them as per the quality and quantity you are receiving from the vendor but immediately maybe you have to make the payment maybe within 60 days within 90 days right but these are very small players let's say your vendor is also very small and maybe your manufacturer is maybe small or big your manufacture is big even sometimes it is taking time but for ninety days if their payment terms are within ninety days for three months how you will survive without without the returns that means that much inventory you need to invest of your own that much time you are taking to liquidate your inventory right so this supply chain finance the financing institution will help you to get the finance on the same day when the material is delivered right and when the payment is done that will be done to the financing institution by the manufacturer and then this way the financing bank will take very small interest right may be 1 percent 2 percent that rate is not very high and in that way we can ensure the sustainable flow of the finance and you can maintain the revenue at the vendors end as well and your end as well right. So, we will talk about some of the KPIs, scheduling we need to do, work order management, complete work order like I talked about comprehensive work order details should be provided that this is required to accomplish that work. So, this will be like planning and design your supply chain and then procurement will happen from the vendors, construction of your all the facilities required you will maintain that facilities equipment whatever it is there right and finally disposal how you are utilizing after the end life of that particular equipment particular facility how you are ensuring that right so how this is different from inventory management

inventory management we are keep keeping the record of routine whatever coming in whatever going out raw material inventory semi finished goods inventory or finished goods inventory but asset management we usually talk about the long term assets we are keeping to produce those products so we will maintain those product till the end of that life cycle unless we are not selling that manufacturing unit to some other player right, replenishes goods and parts to sell the customer, here implements regular inspection, cleaning, repair and replacement of assets. Here replacement of may be spare parts are required very frequently to maintain that machine. Customers only return items to inventory if they are dissatisfied, but here users borrow items and return them to the asset pool, if today you are borrowing this camera from me tomorrow again you will return and that camera will be in my asset pool right minimum contact with each item that is quite obvious because you are processing and you are delivering but then here determines which assets provide value and which are liabilities if your asset is becoming liability it is better to replace sometimes we have seen that in your household also you realize that now we need to change this car why you are taking that decision we need to change this car because the fuel efficiency has gone very down routinely very frequently you have to repair that and then huge cost is there so that in operation research we talk about the replacement problem when you should replace your equipment so we need to take care of the scrap value we need to take care of the maintenance value we need to take care of the cost of the new equipment and then we will say whenever this cost is maximum we need to replace this asset right this is how we can go for so types of asset in any supply chain these are short term which we are moving in the market right the others are long term which we are keeping for longer raw material we know till now work in progress finished goods are there and then we are using packaging material packaging material which is going with the every packet every product but for packaging we have equipments as well we have tools and equipment to convert the raw material into finished one you are doing any operation lathe machine is required to do the lathe operation for turning operation right in that way so many other your molding machine is required to produce the plastic products So, whatever machines, tools, equipment you are utilizing that you need to maintain.

Transportation vehicles during transportation whatever you are using truck, ships, airplanes or other vehicles. or maybe automated vehicles so whatever you are maintaining warehouse infrastructure here tangible intangible here also intangible you are using transportation management software we talked about transportation management software for route optimization or maybe to find the alternative routes we are you are getting maybe lesser distance is there, maybe traffic is less, maybe that frequent flow of the traffic is there. Then warehouse also we have warehouse facility we have cooling facility we have lighting facility all those assets are there we have automated tugs to ship the inventory automated trolleys tractors we are using equipments robots to keep the inventory that is your tangible assets intangible assets we are using warehouse management software just to keep the track of the, you know, order management is also done through that. If you are recording order, I will, that my software will track where that product is, will pick the product, automate it by robot, will pack the product, will ship the product, right? So

information technology assets, whatever software, hardware, technological infrastructure you are using to maintain the transparency, visibility throughout the supply chain. If you are saying that your supply chain is blockchain enabled, so whatever blockchain technology you are implementing through whatever hardware software is required if you are saying iot sensors you are deploying iot sensor you are utilizing tangible products and then recording information so quickly from all the touch points so that you can take real time informed decisions intellectual property patents, trademarks, copyrights or other intangible assets your secret recipe how you are delivering the services your intellectual property human resources very important part struggling this logistics industry is struggling to get the talented human resource and because now we are talking about introduction of so many automated kind of warehouses, transportation, management systems so we need skilled manpower right talking about asset management kpis so mean time between failures how how much time it is required right so this will allow you to anticipate the future breakdowns and then if breakdown happens then how much time is required to maintain that how we can calculate that time asset has been in use and minus unplanned downtime due to breakdown divided by total number of breakdown so I want to know how many times you went for unplanned breakdown that means there is deficiency in the system we were not efficient to predict the to do the predictive maintenance right mean time to repair how much time it is required total maintenance time divided by total number of repairs you are doing overall equipment effectiveness how effectively you are utilizing is availability into performance into quality if your product or equipment is a kind of nature kind of molding machine 24 into 7 you can run.

So, out of last 7 days how many times how many hours that equipment molding machine was not available for production because that was broken down or may be some issues were there whatever, but not maintained what not available. performance actual cycle time sometimes we have some equipment but they are taking longer to process the products right so then we are saying that let us change this car again example we cannot run more than 40 km per hour because of you know very old car right and then quality whatever we are producing how many are rejected how many are quality products or up to what level of quality our equipment is still producing that we need to record these are some of few kpis asset utilization rate how we are utilizing up to the full potential is this and then up to what we are utilizing return on assets how what is the total income and what are total assets we are using we can divide that per asset what is the income maintenance cost how much cost it is taking to maintain asset downtime how much time it was not available for the production asset availability again percentage of time asset is available for any routine operation asset life cycle cost from you have taken over the asset till the from the cradle to grave approach how much cost it is taking to maintain asset performance ratio what is the actual performance what is expected that ratio you can calculate work order completion rate so within time frame work whether we are completing the work orders those are allocated on that particular machine and then asset condition index so that we can find out how many time it is you know maintained how frequently it is requiring maintenance that means that the condition of that equipment is deteriorating we need to go for the

replacement so what are the benefits if we have end to end solution for supply chain asset tracking cost effective monitoring will be there we can monitor throughout the supply chain if our we expected that within 2 hours that delivery should be done but why it took 4 hours because the carrier truck which was carrying that inventory was having some problem So, that cannot go more than 30 kilometer per hour. So, that we should have that monitoring. Real-time visibility, this is another. If you can really track that truck is really going at very low speed, you can take better decisions next time.

And you can... again respond to your next player or may be customer that the truck which is carrying the inventory taking longer sometimes what you are getting as a message when you are taking you know you are booking ola so they are saying that 10 minutes let's say they are saying 10 minutes it will reach sometime that time is revised so they are giving you information that time is revised right and if someone is not coming he is cancelling that order then again quickly you are getting the information ola is searching the other or ola uber whatever platform you are using searching for other option right so sustainability optimization will be there so why we are going for predictive maintenance and we need to track the assets so that they can contribute for longer period of time so that means that will add to sustainability minimum carbon footprint will be there if we are maintaining them and fuel efficiency will be there so we will be having enhanced control over the all the assets whatever we are utilizing so if you have those insights and control you can take better decisions so supply chain asset tracking systems what are the risk optimal efficiency if not you are optimally utilizing the assets that is loss for your organization risk of disruption everything is going well but then again something happened like we discussed in emergency supply chain so many things can happen on the road so many things can happen when you are transporting or warehousing the product you can damage that so that how you can provide that information asset loss prevention you are using assets but at that time the risk of theft is also there some people unauthorized they can also use your assets right if you as a platform let's say i'm placing orders at amazon they have my all the account details i'm so frequently doing the transactions so what if someone unauthorized person will have the access to that right so obviously it will have that so competitive advantage it will provide you if you will not do that your competitor will do that that is a risk for you technology in supply chain asset tracking these are some of the technology frequently you have seen radio frequency identification we can quickly find out where the location is right now whether it is moving or not right gps global positioning system so i was talking about how you can even track the truck who is carrying your lot right so that lot is why it is taking extra time because the truck driver was you know resting somewhere taking extra time eating somewhere so whatever he was doing right so that we can also record so if even if your truck is not handled properly that also you can track that person may be rested for longer period of time and then he did that rash driving so chances of wear and tear accidents are more that also you can you know track right so this is your truck is your asset barcode scanning this is another beautiful example when you are going for picking the inventory from the shelf of big bazaar all those big malls right so they are scanning the product that is one information they are collecting that billing information what is the value

other information you can say on the same barcode how much inventory is left out so you can also find out at what time it was manufactured you can also find out who was the operator at that time so all that information you can store that is up to you what you are embedding in that so iot sensors are there again we can find out where your assets are working the location the temperature humidity vibration if those extreme conditions are there obviously there will be wear and tear so then you will see that ok this was not routine or normal environment to work with so there will be wear and tear i need to charge extra for my assets right that will happen near field communication where we have wireless short range communication devices we can track and we can communicate to the assets we have bluetooth technology which is again for shorter distance we can track the assets within within house right we can track where is that pallet where is that where is that tractor where is that equipment whether it is available or not available that we can find out real time location system another technology which uses rfid gps wifi to stay connected within a particular area and we can find out the location and movement cloud based asset tracking software where you are connected to the cloud and you have seen that now all the four wheelers are coming with that chip where you can you know gps you are connected cloud based you can fetch the details where you are right now if you want to find out the better route that also can be utilized blockchain if you want that transparency throughout your supply chain visibility throughout your supply chain how transactions are happening how your truck is going on the road so that blockchain you can do that ai and machine learning this will help you to go for predictive analytics and predictive maintenance can be done so for schedule operation you can go for that and we have mobile apps which we are using to track our software like where is my train you are using that software where is your train to locate that We have drones. So those are also used to conduct the aerial surveys.

Cameras, they can find out where the asset is. Edge computing is a kind of another data processing, analyzing technique where we are placing the device very near to the source from where we need to collect the data. so if you need to track any asset any truck or any lot or any inventory you can place there right augmented reality is we have talked about this digital information onto the physical environment parallel system where you can you know make the decisions how the actual things are happening in the physical world you can find out voice recognition you are giving commands to Siri you are giving command to Alexa and then you can operate on that right so please call to this so then your mobile phone is calling right thermal imaging in this your emergency supply chain also this thermal imaging can play very important role where we can find out a particular heat signatures are coming emitted from body also heat is coming so we can track that then we have ultra sound tracking system sound waves how we can track indoor assets we can so these different technologies we can use right and we are already using smart packaging where rfid tags are there dynamic chips are there where the packet is moving we can find out customer has taken the product we can find out whether the customer has finally used that product or not and packaging is destroyed or not that also we can find right so up to that your packaging is helping now how that information will be helpful to me because i can find out now this product is depleted customer will again come back for the new products and then I need to

maintain the inventory telematics you can see integrated GPS cellular and onboard diagnostic technologies and telemedicine is another example where we are using wearable devices you wear the track rubber band or those watches smart watches and you can find out where you are where you are in the plant best practices for effective supply chain asset management comprehensive asset inventory should be there so centralized record should be there and we need to standardize this tracking process right so that consistency can be maintained and if we are consistent in maintaining the record we will be accurate 100 percent right centralized asset database already i talked about when comprehensive asset inventory is there we are preparing so this centralized database we should develop so that we should know that today out of plant we moved these many resources these many assets have come back so that we can find out regular audits we need to ensure whether physical inventory what we are maintaining is matching our records right asset maintenance protocols routine protocols are there and we have to prevent the breakdowns so then we need to go for that and real time monitoring so immediate visibility into asset location status and performance if any asset is performing lower than what is expected why it is performing less that you can do that preventive maintenance schedule obviously when we have preventive maintenance schedule we can estimate the breakdowns also and then we can reduce the time also to maintain the product asset life cycle management from starting to end what are the different stages where we are using how it is depleted over the time what are the spare parts required to upgrade to change to replace vendor management then again assets with vendors suppliers to ensure the timely delivery of the products right that also we need to ensure employee training is also required when we are saying that tracking visibility transparency how that data we can utilize to men to take the decisions to replace the equipments to replace the assets right data analytics and reporting that should be done and regularly routinely should be done so that we can make the informed decisions and there is chance to improvement because assets hundred percent productivity we are getting that is not possible so how we can make it hundred percent times available our assets what are going to be the future trends in asset management obviously internet of things for tracking enabling real time monitoring of asset location condition and performance then future trend we need to go for the predictive maintenance we should not wait for once things will happen and then we'll go for repair blockchain technology if you want that those immutable records of asset transactions and ownership changes across the supply chain you go for blockchain technology artificial intelligence and optimization so that we can find out the patterns how assets are deplete we are degrading or deteriorating with the time when we need to go for the maintenance that algorithms we can develop autonomous vehicles and drones so this is again future trend how we can utilize those drones to locate our assets augmented reality for maintenance AR technology for remote access maintenance and troubleshooting so that will allow technician to assess digital overlays of equipment manuals and diagnostic tools in real time so digital twin we can come up with the parallel digital world and we can see how things are happening this will help you to modeling and optimizing the things right to better get the better solution sustainable asset management Already I told you if you are maintaining your asset, you can ensure the utilization in eco-friendly way, right? Then cloud-based asset management system where

you are storing all the records, track or about the maintenance schedules, about information, how much time it is used in the cloud, you can have access to that record, right? Any time. Robots and automation you can use, multi-tier supply chain visibility at different levels levels of supply chain end to end supply chain visibility and traceability of the assets this is one example how asset management in microsoft supply chain so this is enterprise asset management in d365 solutions they are providing erp solutions and different packages are there so first you can see dynamics 365 finance financial management for middle and big companies so under that they will help you to make decisions revenue recognition credit management treasury organization administration account receivable so different all tax payroll expenses fixed assets what are the you know liquidity ratio you are maintaining cost management everything you you can find out right another solution is dynamics 365 supply chain management so during supply chain management this product will help you for asset management master planning sourcing procurement service management after sales services collecting feedback right so fleet management vendor management transportation management production management everything whatever is happening through your supply chain So all these activities, services are provided if you will get this ERP solution. Dynamics 365 central solution, we have some parameters of finance and supply chain.

Overall for small and big medium enterprise, they can utilize this platform, right? so these are the major packages they are providing so with asset management module you improve asset life cycle maintenance planning and estimation of maintenance and use different maintenance strategies within one solution so you can go for reactive maintenance schedule maintenance we'll just see how these different types of maintenance will help you if your reactive maintenance means there is breakdown then you are reacting right so in that way you can see increasing asset uptime and revenue will be minimum so uptime and revenue will be minimum in first case and profitability obviously will be minimum second is scheduled maintenance when we are going for preventive maintenance it will add little bit to your uptime and revenue and profit right then condition based maintenance when the condition will demand based on that you will do that if only this thing is required will address that point only predictive maintenance may be the top level highest version where you are predicting when the breakdown can happen before that you just go for your maintenance will give you the maximum uptime and and there is something cognitive maintenance which we talk about intelligent operation we are learning we are interacting with the machines and then the way we are realizing we need to go for the cognitive maintenance and will give you the maximum benefit and maximum uptime of the machine so all the time you can utilize so we can conclude here that effective asset management throughout your supply chain is very very important we talked about the flow of information the flow of finance we talked about the flow of the product but we did not talk about this these flows can be ensured when you have those assets at their place right so if you have automated warehouses your robots are working fine your transportation management system is working fine you are doing the routing properly you are cost efficient you are cost effective right and then you are delivering the quality also to the end

customer right so i means if any risk is also coming on the way how you can come up with your predictive analytics and you can predict the your risk and accordingly you can manage your assets so this was about the last session on asset management throughout your supply chain So I hope you might have enjoyed last 12 weeks whatever we did and we covered various aspects of logistics management, supply chain management and I tried almost to touch all the points and even if something is left out your feedback is really very very important so that it will help me to design this course in future in a better way. so once again thank you very much and wish you all the very best for the exam and i hope this will definitely help you to you know boost in your career and you know learn these practices how things are happening so i could not provide you the full videos i have included the video links but yes because of the copyright issues we did not provide you you can search those videos or not only restricted to that link but others just search the keywords whatever video is coming you can go through that video right so thank you very much and wish you all the best