Logistics & Supply Chain Management

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Lecture 54 : Supply Chain Digitalization: 21st Century Supply Chain

Hello dear friends, welcome back to NPTEL online certification course on logistics and supply chain management. So, now, we will start our discussion on very important and we can say the latest topic which is the supply chain digitalization. maybe 2-3 sessions will discuss about how can we can go for making our supply chain more smart, sustainable, resilient, and the very basic start with supply chain digitalization. So, in this session, we will see the evolution of digital supply chain, what are the key components, and then we'll talk about how we can implement this, what are the factors which are responsible, and factors which are forcing us to go for supply chain digitalization, and we'll see some challenges. We'll discuss a couple of cases, one in healthcare, how we can go for digitalization, and then we'll discuss the very famous case of Dell supply chain, how over the years they are renovating, innovating their supply chains to meet the customer demand. So, supply chain distillation obviously, as the name suggest here we will try to replace all the manual things with the distilled solutions right.

so implementing advanced digital products and services into different aspect of the supply chain just to streamline operations improve management and increase visibility improve management means overall management of the supply chain so that we can be more productive we can be more efficient we can be more error free right so that is the basic function when we are going for when we are advancing our supply chains. So, digitized data management is the first very important thing, and we will say the challenge as well because when we are talking about the digital supply chain, we are you know, almost going with one parallel digital world where we will all represent all the physical aspects You know digital form right so obviously then a huge amount of data will be generated right, and then this data we need to process this timely data, and then we need to make the decisions based on this data a very small example here we'll take inventory management software let's say if you are surfing the internet and then in between you like some product and then you want to order that product online right so once you are ordering the product or even searching that information is also going to all the stakeholder in the supply chain why that customer particular customer got interested in you know just viewing that product what may be the appealing point to that particular customer or the behavior or the nature of the customer is like that because you are tracking all the records what customer is doing you have full information so what is

going to be the appealing point then he is clicking on your ad then he is placing the order that information is also you know shared with the distribution channel with the manufacturing unit with the raw material suppliers with the warehousing management team with the transportation management team quickly so that you can make the quick decisions based on that real time information right so when we are saying that we have that automatic system digital platform so that means it will not take time to transfer data from one point to other point so inventory can be managed at very very efficient level you need not to manage you know high level of inventory and then high cost will be there so because now you are real time you are tracking the data you can maintain at little lower level because you are getting the accurate and exact information on the point of sales right so again if you are tracking the sales records customer information that will help you to demand forecast and obviously plan your all the distribution functions and plan your supply chain throughout right Just go through quickly the evolution of this digital supply chain. So obviously earlier we were heavily relying on manual processes, documentation was there and we have seen that in some small organizations still what we are doing that if we want to find out the demand at country level. So what we are doing in small villages or maybe region wise we have defined some area.

Area wise some sale managers or sales person they are collecting the data. we are combining that data for one maybe district and then district level all the data will be collected then state wise we will be compiling the data then you know the country wise we will be compiling the data you just imagine from one step to other step to the third step and we have seen that will be effect also where the information starting the exact information is like this and when we are passing through multiple channels so information gets amplified because you are also keeping some safety stock with you if initially you recorded 10 pieces of demand you are placing order for 12 with the distributor, distributor is placing order for 15 this keeps on going we have discussed in wool whip effect right so these were some of the you know inaccuracies and you can say because limited visibility was there throughout the supply chain and then the advent of computerization in late 20th century and we have seen the very first software now we are quite matured using these kind of enterprise resource planning or SAP solutions are there where you can keep all the data record in your system right. So, if I am here I am operating or may be managing 10 different plants right or 10 different supply chains. So, while sitting here I can view whatever activity is going on throughout that supply chain even within one organization how many lots we received in the raw material right. in particular lot how many items were there how many rejected will send back to vendor then for how many vendors we made the payment today how many purchase orders we placed how many manpower even everything is going on record in digital format during your using this your enterprise resource planning platform so that means sitting here i can find out quickly what are the bottlenecks where we are performing low today what are

the reasons where are the breakdowns everything in real time i can view sitting in my office at one place So, same is the case here also, but you can see ERP systems provided a foundation for digitalization, they often lack the real time visibility and agility.

So, because at this point of time also whatever we are you know if you are planning for tomorrow, how much inventory is required, raw material, then how much we are going to produce that you are planning for tomorrow, today evening we are sitting here. So what is happen if anything goes wrong during that night or if there any major shift is there in the market tomorrow we will go with whatever plan we have decided so that the dynamic condition of the market we need to understand we need to configure and this well captured when we are now talking about e-commerce market right then I just quoted that example even if the customer is Just going through any social media website, he is checking his messages, inbox, right? Or maybe some other meaningful information. So there on the left hand side or right hand side, many ads are coming. And then maybe one appealing ad was there and I just clicked on that ad and that information is also recorded by the stakeholders. Why I clicked that? What was that so appealing that I clicked that ad? And obviously all subsequent steps you can just follow, right? So, with this online platform and electronic data interchange the plus point here is I need not to compile data at district level and then send to at state level and then at country level.

So, just whenever any we have different touch points right. So, if the customer is coming asking for something, that is also recorded and then if he is not purchasing that product, that information is also recorded why he did not purchase that product. may be the issue was with the delivery he wants delivery within 2 hours and we were saying as per our policy it will be delivered by tomorrow so that information is also there and electronically immediately shared with the top management that customer are now preferring within 2 hours so we need to change our policy right so this is one example and e-commerce platform you know about that now because majorly we are purchasing the very routine items you can just go through randomly you have selected all the items all already they are there in your basket anytime you can replace the order right so but yes now we have matured in that and you can say the penetration of this technology up to that extent where we have different you know platforms we have different softwares for managing everything warehouse management software we talked about transportation management software and just you see in warehouse if you are maintaining let's say inventory for 10 000 items so if anyone is coming and asking for one item maybe you will take time to just recollect to check your records and everything right if just there is one interactive screen and you will just put your item there and immediately information is coming how many units are there not only that information is required let's say the customer is demanding that product so where that product is right now that also you can locate so that

will help you to you know minimize the manpower those many people are not required just very again very simple example we are visiting hospitals now we are going to doctor room they are examining and then they are prescribing some medicines and we are going with that medicine that prescription to some pharmacy right or within the hospital also we have pharmacies we are submitting then they are checking and then sometime long queue is there we are there and sometime maybe same salt is not available or maybe same salt is available with other company so then that discrepancy is there right and we are not you know educated enough or informative enough that we can decide whether we should go for that medicine or not so why don't that happen when we are visiting the doctor there is only one system doctor is entering the prescription there and whatever available options doctor knows better so he can pick that option he picked one paracetamol is there right so he there only he picked how many tablets I need to take Maybe another tablet he can just pick and then enter there. Now he is giving me instructions how to use that. In between all that information will go to back end warehouse and my packet within seconds it will be packed and will be delivered at doctor table only.

so why that pharmacy 10 people are required in the pharmacy and then you are standing in the long queue so that and then again I told you what can be the limitation of that system so how we can go up to that extent so these many software systems are there only thing is we are up to what level we are utilizing this plus point things are there but utilization is a problem So again, now big data analytics and cloud computing. When we are talking about digitalizing any platform, it's not only supply chain. If you'll digitalize your manufacturing, then automated manufacturing plants we have. So that means whatever steps you are doing, activities you are doing in the manufacturing unit, you are generating huge amount of data. sometime defects are happening, sometime the raw material component you are using are damaged by the extra pressure put by that particular machine or anything is going on that particular workstation.

So you are recording all the activities that means that much huge amount of data you are generating you need to store at the cloud. And then you need to take decisions based on the data obviously you need to go for the predictive analytics machine learning artificial intelligence and then i need to know okay now there is problem coming with this raw material component immediately information will be shared with the vendor from where that raw material has come right maybe for same component we have five different vendors but your automated plant manufacturing system it can easily identify that this particular component has come from xyz vendor and this is the problem with the raw material may be the raw material he is using he needs to change the grade of the raw material he needs to change the metal the whatever he is manufacturing right so these decisions are quick decisions and internet of things will solve your all these problems

because then All the stakeholders are connected through that, right? Cyber physical system, IoT sensors are there, embedded system, all the facilities are embedded, right? So, in real-time, you are capturing the data, and then you can make an informed decision like the example I quoted. So, if we talk one step further, then we'll talk about how we can implement the blockchain supply chain, right? Where all the stakeholders are connected in such a way that it is a decentralized system, immutable system, no one can, you know, just like an interrupt in that system right so it is error proof system and you can ensure the safety security of the data right so that those are the plus points when we are talking about blockchain robotics we have seen in in the session of warehouse management how we can deploy robots to identify the inventory to manage the stocks without any error right and then whenever we need to pick any item out of 10 000 items listed on your shelf within no time your robot can pick that item and then we have autonomous vehicles which are moving through that those shelves within the warehouse and just to keep the updated inventory when you need to again reorder with the vendors so everything is maintained with that So these can be you know the plus point advanced version when we are talking about supply chain digitalization these are some of the factors technologies e-commerce integration cloud computing right how we are generating large amounts of data right and artificial intelligence we are collecting the data and when uh machine learning we we want our machine should learn about the behaviour or whatever is happening whatever we want to model it right so whatever is happening around the environment so that we can configure or we can forecast even if you want to forecast a weather you also can predict the conditions weather conditions right so that in advance we can plan whatever if we are planning the supply chain activities right so blockchain we talked about internet of things and digital twins where you have parallel digital world for your physical things right so these are some of the you know digital transformation the technologies we are using so we will just discuss in detail what are the key components of supply chain digitization First is data analytics and big data like I quoted we have set up different touch points if the customer is coming to your store that is one touch point we are generating the information why the customer is picking one product not another product we have different products on the shelf, and then he picked one product he then again dropped that product back on the shelf because he did not like because of something right he observed something, but he did not like, and he placed that product back on the shelf why that happened so this is one touch point we are generating the information on the billing counter again touch points are there where the bills are being generated and you are again collecting the information through your distribution network again many touch points are there where your packet is right now it is out for delivery it is damaged during the delivery or the returns are happening all those information is again generated so big data we are generating right and then through your distribution network in the manufacturing also you have touch points and then with the raw material suppliers with the stakeholders with the industry with the competitors

everywhere you have touch points right so right now maybe the market is this one right why only these many customers are coming to us So, if this is the case, how the other player is growing so big, whether our customers are shifting to that particular segment or some other customers are shifting to that particular segment. Why that is happening? There is fixed pattern. People are shifting from one, maybe from my brand to other brand.

Why that is happening? right so means this these all touch points are there where we are generating the data and we need to handle that data internet of things so we are deploying sensors RFID tags smart devices to collect the real-time information very small example I will quote here how we can implement internet of things let's say I have smart kitchen within my house right now Because we are consuming every day we are consuming butter and every day we are consuming juice Right now, I am placing this butter and juice in my refrigerator, now my refrigerator knows that if I place the order today for butter or juice, it will take a minimum of one day or two days whatever is the time period right so whenever these two product reaches the means may be the safety stock I need not to interfere because whatever butter I am buying the brand is fixed right whatever apple juice I am buying the brand is fixed the quantity I am buying that is also fixed right so when it is fixed why I need to interfere every time whenever there is safety stock is going down right below the safety stock level my refrigerator should automatically order the butter and juice for me So simple right so that means this is iot we have this system and where we have smart refrigerators and things will be in the industry also we can you know take care of our inventories in that way because when we are talking about routine buying things right or routine any activity then your you know robots or internet of things or these you know techniques can help you in a better way then cloud computing so cloud computing provides scalability flexibility and accessibility enabling real time collaboration and information sharing among the supply chain partners right so we can whatever data is there we can just share that data through the cloud with our all the stakeholders maybe as distribution or transportation agency i need to plan my transportation capacity the warehousing partner need to plan the warehousing capacity the raw material suppliers need to plan the raw material how much raw material they need to ship tomorrow or today or today evening right so these decision you can make and then blockchain technology so this is secure and transparent transaction right so it will be shared through all the stakeholders in that supply chain Right? And this is trust, we can easily trust on this and because this is blockchain technology, right? So, decentralized data storage will be there, and these are immutable records, right? Digital twins, so I was talking about the digital twins creating digital representation of physical assets, processes or system within the supply chain. So, whatever physical is going on we have one parallel digital system. and we can review all the time we can just turn on our system and we can see what how the things are flowing how the manufacturing is happening that we can do that robotic process automation where we are doing the

repetitive routine activities that through robots we can do so in manufacturing most of the things we are doing repetitively In R&D only, we are coming up with the new things, new designs, and then we are testing, right? There may be human intervention is required. But when we are talking about the commercialization at large scale, obviously robots can be deployed. And then it will be error-free, right, if robots are doing.

If a machine if you do automation obviously produces fewer errors as compared to human beings once it starts producing errors so that means you need to stop the production there only because after that, it will continuously produce errors only, but in the case of humans, maybe now he produces some rejected material next step he will produce ok next 5 material will be ok but then again he can commit the mistake so it is very difficult in that way so continuously you are watching your process quality control is on you know work that they need to investigate continuously supply chain visibility platform so for real time data insights Obviously, you need to maintain the visibility throughout the supply chain, where is your raw material lot right now, what is the status of the production, if production is finished why it is not dispatched till now. So, if it is dispatched where the lot is right now, when the customer will receive and on the other hand you are engaging the customer also with that information when you are going to receive that. so it's a collaborative platform where because you need real-time data information sharing right so that will only happen when you are collaborating with your all the stakeholders and this the benefit of digital supply chain smart supply chain you can reap only when you all the stakeholders are connected to that supply chain it's not that we have digital supply chain but only manufacturer is taking the benefit out of that means of information or informed decisions they are making so this is again when we are talking about digital supply chain smart supply chain cyber security is something that is big question so obviously threats and attacks are there how we can include encryption authentication access control and continuous monitoring so that if anything goes wrong how we can retain that so obviously then we need to go for quick backup things if something goes wrong we can retrieve our data or information supply chain network optimization. So optimization means optimize the design and configuration of supply chain network. So again, we have discussed this in detail.

If you want to set up the warehouse location, so how you can set up the warehouse location? So obviously, we have one session, complete session on deciding the warehouse location, right? Where you will consider all the factors, the demand, the supply, the local conditions, right? And then the space available, then the economic parameter, then the social parameter, sustainability angle, all everything you will consider. figure out and then you will say this is the best location right again example of supply chain network optimization during transportation you are using you know a gps

system just to advise you the best possible route as per the minimum cost as per the minimum time right the weather condition the obstruction on the road so that you can real time you can view that predictive maintenance I talked about implementing IoT in manufacturing system a kind of smart factory right so when you are you know just observing the behavior of every machine so that means you can also predict when that machine will go out of the parameters right so bear and tear will be there and in advance you can find out and you can go for predictive maintenance so real time tracking and tracing not only the movement of the goods the The functionality of the equipment you are using and the machines you are using that also you can track and that will help you to plan your predictive maintenance supplier collaboration platform so obviously we need to ensure communication collaboration and information sharing through this network digital supply chain with all the stakeholders talking about stakeholder customer is another very important stakeholder how we are engaging you are placing order with the zomato so next moment you are getting the confirmation your restaurant has approved the order accepted the order Now they will show that he is preparing the order after some time 15 or 20 minutes you will get the intimation that your courier partner has picked the order he is on the way let's say there is rain and then you will get the intimation that because of this heavy rain now your packet will be delivered little late 5 minutes or 10 minutes so every information they are engaging the customer and you are getting every information So, in that way you feel scared also ok may be delay is there, but this is the condition right now. Sustainability and environmental management. Obviously, when we are talking about smart supply chain digital supply chain, and we like the example we quoted that inventory management we need not maintain that much inventory so that means when you are utilizing fewer resources less consumption of resources you are degrading less environment simply right so you will be socially sustainable socially, you will be sustainable economically also because per unit cost will decrease you will be sustainable and environmental also you can and again If you are a kind of organization, you want to educate your customer how much footprint you are leaving when you are producing this product. That information also you can share with your customers.

so, if you have changed the packaging style just so you know to ensure that it can be recycled properly that information you can also share it with the customer. The customer will feel more happy and satisfied with you that you have taken this environmental initiative so complete this record you can track you can see that right now we are producing this much carbon footprint now we are going for the next step where we will be you know renovating our supply chain our packaging and we will be reducing this much carbon footprint so supply chain resilience and risk management Because we in advance know that if there will be any disaster, natural disaster, all political scenario or anything goes wrong we can predict that. So, obviously we can plan in that way our supply chain will be more resilient to any disruption. right disruptions will happen every

right so how what you will do if there is a strike with one vendor now that supply is interrupted the problem here is that you are getting information a little late so if that moment only you can sense that this is going to happen tomorrow because already there is something going on in that particular factory right so you can sense that you can you know to diversify your flow of the material or your things through some other channel you can prepare for that regulatory compliance and governance you are keeping the record of everything and then you can meet the regulatory whatever compliance or governance regulations are there all the documentation digital record is there you can you are ready all the time you need not to focus or you know this set of one separate team to you know prepare all the documents to be submitted to those regulatory authorities so continuous improvement and innovation when we are talking about we are improving this transparency real time information sharing data decision making right ai we are using machine learning we are using iot big data analytics predictive analytics we are using obviously every day that information is being used to innovate renovate your product and when we are talking about these are the five steps right we how we can implement digital this transformation in the supply chain so first is you need to define the vision your vision should be aligned your organization vision should be aligned with the your overall objectives if you are going for digitalization you need to assess the resources with the existing system what is your legacy system right so what you are doing right now what is the need why you need to shift to the digitalization and what are the plus points if you will shift that because that is required when you will manage your workforce because any change will be registered by your existing workforce because they also need to develop their new technical skills right so if you will convince them that we are facing these problems right now with the with whatever system we have right now we need to implement this new system obviously you can convince them and you can educate them train them for the new skills and then you need to collect the data make the analysis that if we will implement this system right now these are the parameters performance parameters after implementing this is going to happen right unified data and processes so to achieve complete end to end visibility across the supply chain obviously you need to develop that unified platform where you will collect all the data information whether it is related to your transportation network it is related to your warehouse it is related to assignment problem it is related to what to manufacture how to manufacture where to manufacture where to outsource how much in what order sequencing scheduling everything that data you have right and then you can define the processes right automate the planning process see every time human intervention is not required if there is any fluctuation in demand right if there is fluctuation in demand you can see either the demand is increasing or the demand is decreasing right whatever way so you there should be automated planning right and then this information should be quickly shared with your vendors that now we are experiencing decline in the demand so accordingly you need to send the material right Utilize data and analytics to make informed decisions big data

analytics will help you and then we can predict the things that align people with the process this is the point which is most important in any organization: when you are going for technological intervention you need to train them just to align them with the new technology so if we will talk about the benefits of supply chain digitalization better financial management One example inventory management: earlier you kept 10 crore inventory with you at your outlet now you are keeping only 5 crore inventory because you have real-time data when the demand is going to come you need not prepare for the next 15 days 20 days or 25 days if within 5 days you can replenish the inventory it is sufficient enough to keep inventory for 6 or 7 days depending upon the nature of the material right and then from where you are getting the material keeping all plus minus time units in your hand you can manage that minimized lead time because quickly you this information is shared or as the customer plays the order click that button quickly it is shared with all the stakeholders so packaging is done at the same time courier partner is going to pick the order from the seller And it will be routed to the main distribution network right. So that way, you can minimize the lead time, you need not to you know to hand over the documents physically from one point to another point.

It improved decision-making because now the decisions are made on real-time data so obviously, I will be closer to the reality of increased automation wherever it is required that i am buying routine items butter bread or juice i am taking these brands fixed quantity right so obviously those many things can be taken care organization flexibility is there because now this is with you you can pick how much you want to and then you have extra resources with you right so when you have the organization flexibility right to support specialization or minimize process cost so at whatever your components you are talking about productivity you are talking about labor cost that you can manage right accelerate innovation obviously this all whatever we are doing is ensuring innovation only right now we are just digitalising our doing the distillization of the let's say the purchase records only tomorrow we'll go for digitalizing the production planning and control how we are managing different you know Brands or products or models at the same production line, so this will keep on going, and then we will be fully automated at one day end-to-end customer engagement already, I told you when you were placing the order how these e-commerce websites are engaging you and what are the factors which are forcing government policies technological advancement Globalization and complexity and market demand and competition are forcing you to do quickly we will go through because the government is funding some tax rebates as their regulatory framework. They also want to push you to know the latest technology so that more and more industrial hubs can be set up here with more productivity and obviously employment generation and gdp will be obviously those things will contribute towards the national income right market demand and competition because your other competitors are implementing that they are providing the digital records right now if you are shipping

the product who is taking care of the physical bill you are sending so it is better you maintain all the bills maybe today i i don't require that maybe if that product is carrying warranty for five years who will keep that bill for five years but if my flipkart amazon or all the players from where i am buying that product they are maintaining the you know the records the digital record of those bills so if i need to claim anything i can easily do that technological advancements are there which are forcing us to implement that so that the better decision making can be done internet of things we are collecting huge data and then if our data model is suggesting that within next five days you need to maintain this machine for predictive maintenance. So, anyhow we need to plan within next 5 days, otherwise on next day anytime it can break down can produce the rejection and then the loss will be higher in that term and we cannot plan because that will happen suddenly. Globalization and complexity are global forces that are coming. If they are so productive and obviously then their costing will be lesser, price will be lesser, their margins will be high and your margin will be lesser but price will be high because you are not efficient, you are not productive.

So obviously, customers will prefer their products, right? So what are the challenges in supply chain digitalization? The information system and data, the information you are collecting from all the touch point, some fake information will be there, right? So maybe sometimes you will try to draw some meaningful conclusion out of some information which may be very random right so that you need to ensure the another thing is team training right now we are struggling with getting the you know talent for managing our warehouse management system or transportation industry or distribution network shortage of talent is there and many this is not only in India everywhere it is this problem is there so obviously then training them for new skills is again big job change management obviously this is the human tendency if i will ask you to change the resistance will be the first that will come why should we change right so that setup you need to change so this is very beautiful thing you can just see distilization in health care already I have given you short picture see 47% wish to know more about their doctor doctor is knowing everything about us they are asking the history the all the patient history in our family and what medicines we are taking so what are the symptoms how we are feeling everything but we never know about the doctor how many patients like this he has treated previously and what were the results the medicines he is prescribing what are the side effects right we never go for that why that information is not available that should be there so that we need to track that information so that we can make the decision that if this is the problem this doctor is the best in the industry 38% would like to check a hospital and its medical facilities before going there so how you will know that so if you unfortunately got admitted in any of the hospital and then they are searching for the blood any blood group and then they are saying we are falling short of this blood group can you please arrange and all those things so this is you just imagine the situation

so why don't that full record is there with this hospital these are the equipments and facilities these are the labs testing we can do there this blood group is available or not these many doctors are there so that information is there so we can make that decision well in time where we need to visit 77% would prefer online medical appointment because we are now limited by the time. So how we can meet the doctors and during COVID-19 also we have seen telemedicine is again because then if these are some of the diseases which are communicable if you are visiting the hospital then you can infect the others also. So, how you can get the, you know, a doctor advise through telemedicine and they can prescribe what precautions you need to take the medicines and then online those medicines can be delivered at your doorstep, right. And then data records my health record should be obviously my private documents should not be shared with anyone right and then big data analytics in healthcare is something that is going to give fruitful results right we are wearing so many medical devices, we are wearing smart watches, we are wearing wrist band, oximeters, you are checking your blood level, pressure level, your oxygen level, the temperature, the sweating level, the how many steps you worked today, so everything you are counting so that you can plan your diet or we are maintaining record in some or other way The another case of supply chain digitalization is case of Dell and we have discussed in detail so just you can go through I'll just quickly mention some few points right so what Dell did earlier they know direct to customer model for PC sales so they were very happy doing that you go to their store you give your whatever your requirements are and configuration and then maybe within one or two days they will deliver you but over the time they realized this model will not work completely 100% right so maybe we need to build to order is ok but we need to go for build to stock as well right where we will keep some products ready so that if any customer is in urgency then they can go for that so actually they're transformed in 2017 where they realized they need to change transform the digital supply chain to enhance supply chain transparency predictive analytics and automation so ultimately they can drive the more value for their customers right and you see for developing that they need to go for digital and interconnected digital your business landscape right so that business digital ecosystem they try to develop and three transformational level so you can see actors, processes and technology. So, they said that make the right commitment, ensure parts supply, keep the customer informed about whatever is happening and then manage supplier ecosystem, drive operational efficiency.

These were the main motto for them and you can just go through the size and scale 25 plus manufacturing locations. 2000 service centres 50 distribution centres is a big number 3 units shipped per second they are shipping 3 units 770 power distribution centres 392,000 Dell and EMC stock keeping units are there how much they are selling you just go through these numbers and then shipping you see 34000 ocean containers 220,000 orders per day more than that these are you know just the figures you can just see how

they are doing a global operation. So, we can just conclude here. The main benefit of digitalization is you have greater visibility, so visibility means obviously you have access to all the information, better decision-making can be done, and if we talk about inventory only, you can maintain a little less inventory right because you know when the demand is going to come, and then it will provide you greater flexibility risk In advance, you are prepared for any disturbance that will come in advance, and you are prepared to do that right. So, the company needs to invest in better integrated IT systems throughout the supply chain, which can analyze big data and system-based algorithms for more automated supply chain management.

so this is all about digital supply chain in the next session we will discuss about how this digital supply chain can be combined to make more smarter supply chain right so we will see what are different techniques we can implement in detail like the iot system we discussed about like big data analytics we talked about machine learning artificial intelligence how we can use this to make better decisions so that's all for this session thank you very much