E-Business
Professor Mamata Jenamani
Department of Industrial and Systems Engineering
Indian Institute of Technology Kharagpur
Lecture 18
Supply Chain Management - I

So we continue our discussion on supply chain management and we are trying to study since last class is we are trying to understand the information flow within the supply chain.

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And in this context we defined what a supply chain is and we saw that supply chain is actually connects the value chain. Supply chain is actually the value delivery network which connects the individual companies who finally are responsible together to fulfil the demand of the customer.

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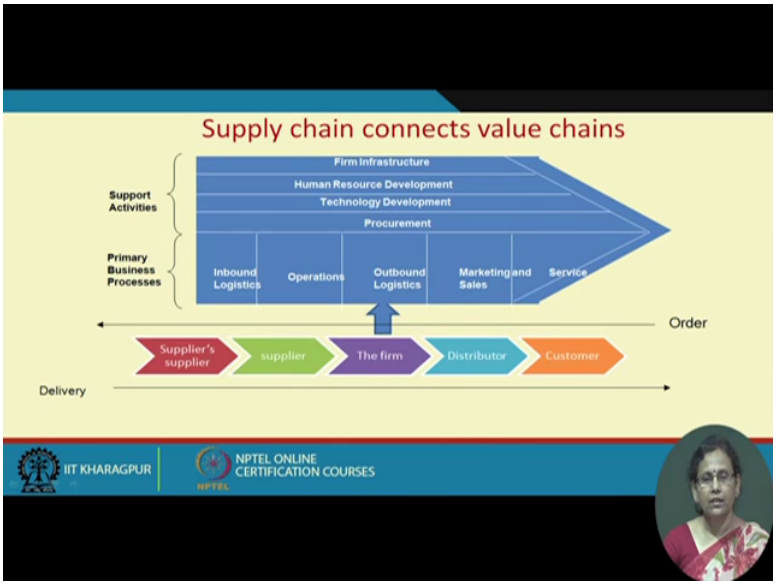

Then we saw that this supply chain goes through four major cycles.

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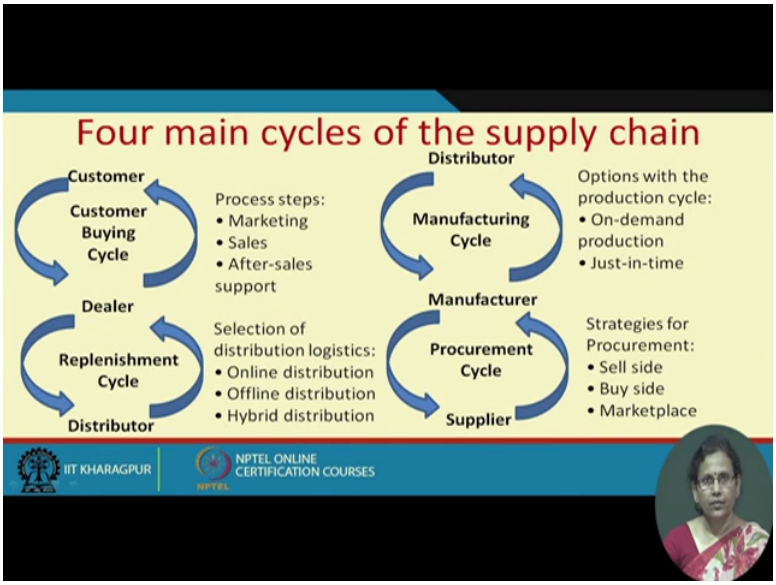

And during this to carry out this cycle a number of activities are carried out.

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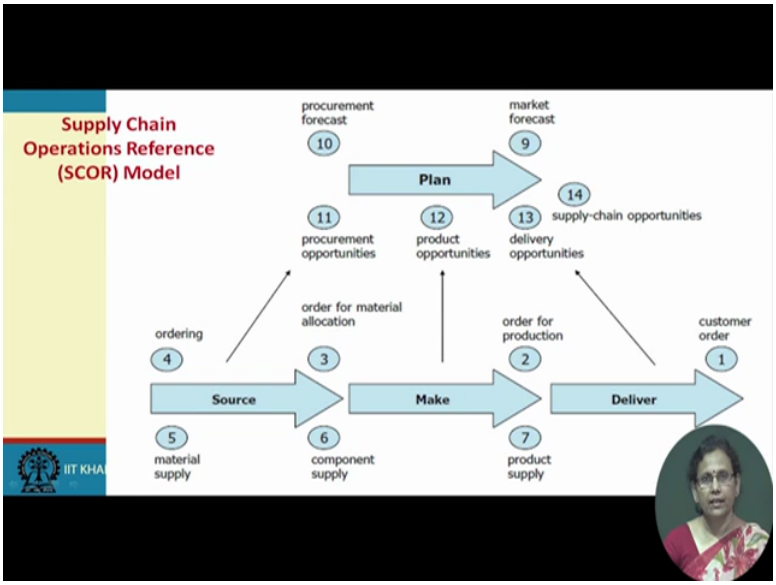

And there is information flow while carrying out these activities. Here we saw that what are various information that can go from the supplier to the purchaser?

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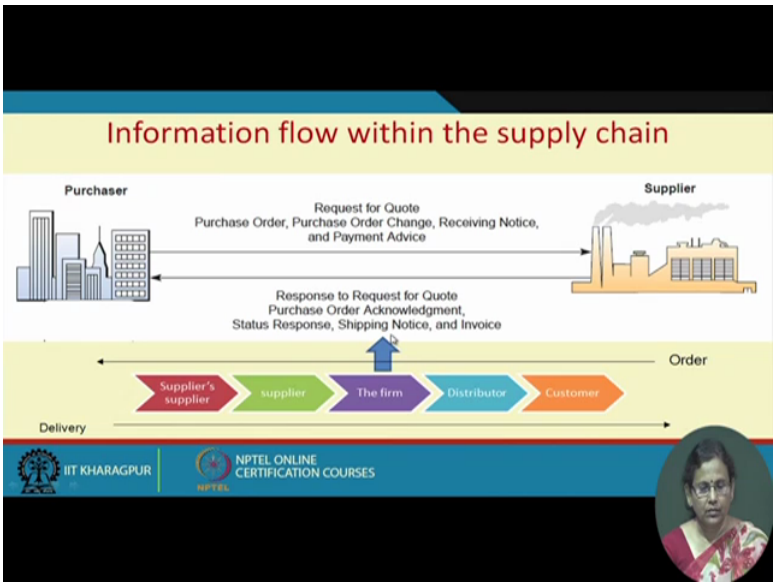

Now let us see what kind of information is actually shared between supply chain partners and what information sharing can do? Look when we discussed about the supply chain we saw that order information goes from down the supply chain from customer till I mean it goes to the upstream. And then the delivery information actually goes downstream.

Now this order information is very crucial for the firm to decide its production, decide how to produce and how much to produce? So for this purpose the information sharing if it is down within the supply chain it can actually reduce the variability in the supply chain.

because the product information is shared from the downstream members the suppliers can make better forecast, they can account for promotion and market changes, this information sharing can enable the coordination of manufacturing and distribution systems and strategies, this can enable retailers to better serve the customers by offering tools for locating desired items, this can enable the (ret) retailers to react and adapt to supply problems more rapidly and this can enable lead time deduction.

And because of this variability in the supply chain one important phenomena called bullwhip effect can happen.

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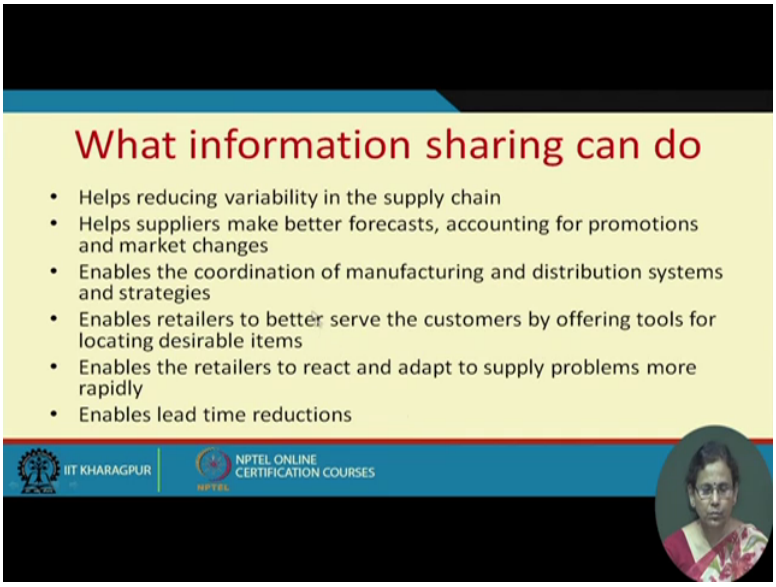

Now see this variability in the supply chain which is about the uncertainty in the demand pattern that is becomes more and more prominent as you go from your downstream member to the upstream members. Look here it shows the (varia) variability in the quantity order to the upstream members.

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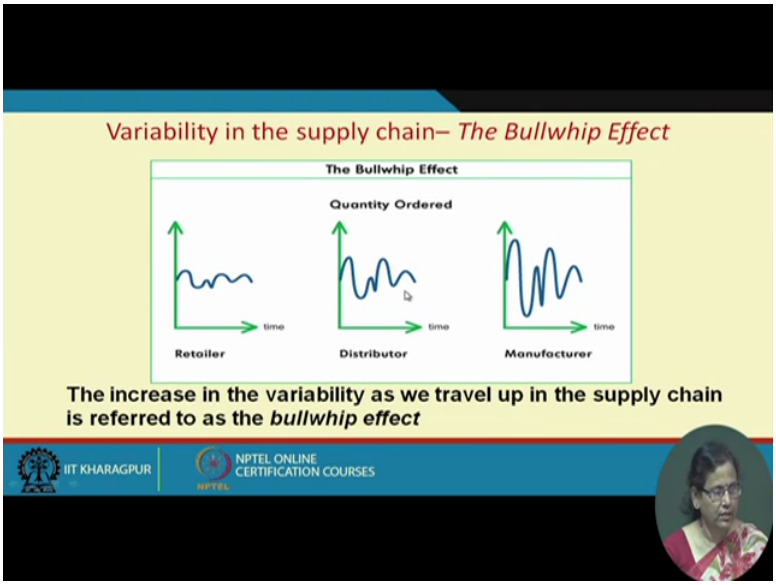

Now though there are many reasons for this variability like demand forecasting, uncertainty in the lead time, batch ordering and so on. The lack of centralised information have been characterized as one of the major reason for variability in the supply chain.

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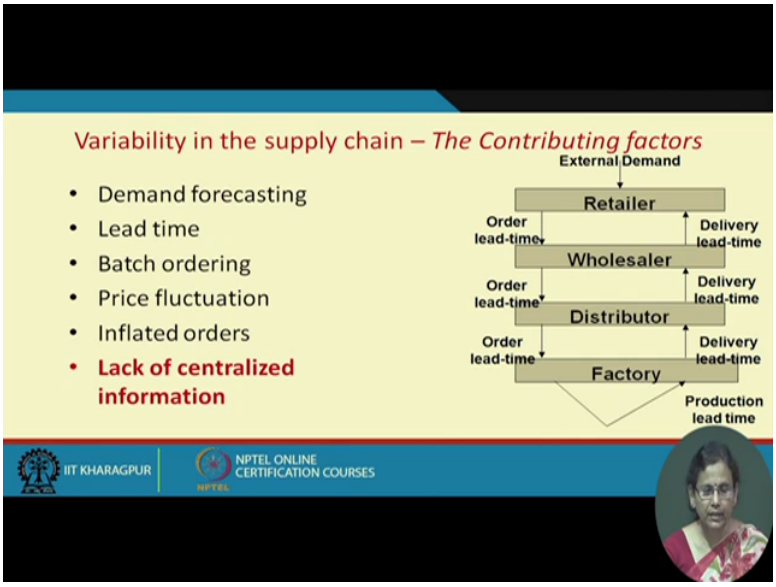

So what this variability in the supply chain does? As I told you this is called bullwhip effect and (bull) because of this bullwhip effect because there is uncertainty about what will be the customers demand and how much to produce? There is increase in safety stock level, there is reduction in service level and there is inefficient allocation of resources. All these things

because of the demand uncertainty. And accordingly there is increase in the transportation cost.

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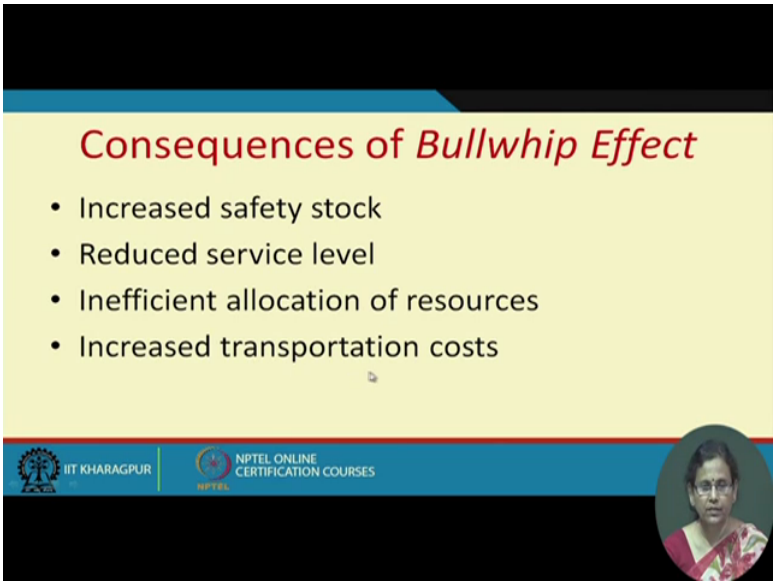

Now this e-supply chain is about facilitating real time updates across the supply chain from consumer to the supplier, from downstream to upstream and it provides the greater ability to feel orders and better understand the customer needs.

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Now this supply chain information sharing can happen in two different ways. First it can be inter enterprise, it can be connection between inter enterprise systems. Let us say this is the

ERP system of the manufacturing corporation and you can get the demand data. We are concerned about getting the demand data from this way and providing the order details from this way and your actual items will be moving from the upstream to the downstream.

So from retail store it can come to retail chain then to the distribution centres, then it can come to the manufacturer, then manufacturer accordingly ask the raw material from the supplier and so on.

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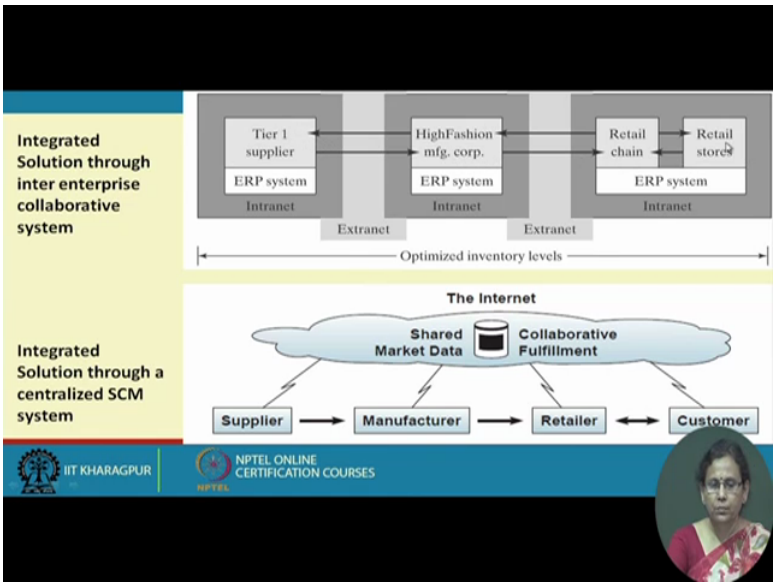

So in this process the ERP system of the individual entities can share information. This is one way of getting the information shared. The second way however here the retailer can actually connect with just its immediate upstream members. But in case you like to share this data among all the entities in the supply chain you may need a centralised SCM solution in which you will have a centralised database to which individually everybody will be connecting.

So it will be a different system which will help individual members to connect. It is a centralized system, centralized database.

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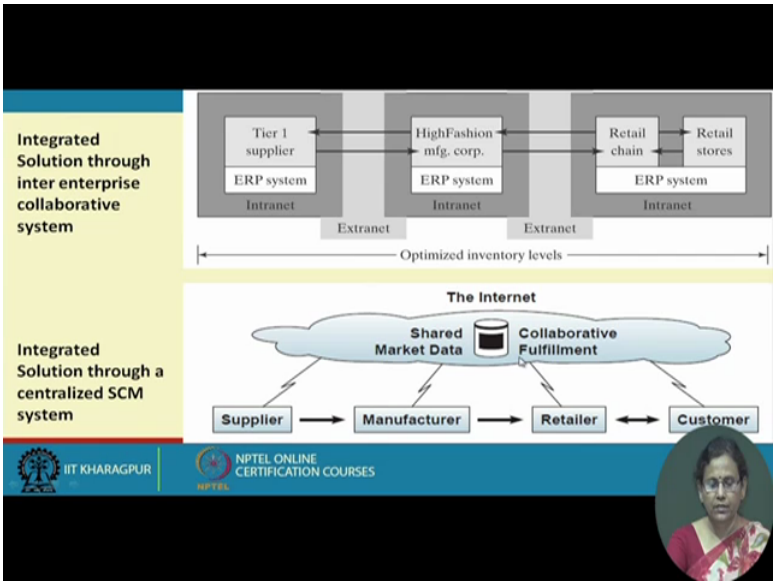

So what are various objectives and outcomes which can be accomplished with this inter (entr) enterprise supply chain information system? So in fact I would like to tell you here connecting between two ERP systems can have many strategic level, operational level as well as technical level problems. But the mutual (agree) agreement between two organisation is quite possible.

And in this centralised system everybody has to agree and everybody information system has to be compatible with this centralised system for sharing information. But in case it is between mutual agreement of two immediate entities in the supply chain then there are various objectives which can be achieved and we are going to see what are those objectives and what are various outcomes? So first activity (stra) it is strategic in nature.

So what are the objectives is here? The objective is to establish. What is the purpose? Here objective we are telling so many times. What is the purpose of this supply chain integration and what are various policies and what kind of operating level procedures you would like to have after this strategic activities? So here the outcomes are the objective of connecting the members, then deciding about supply policies and your service levels, then your network design.

Then in the next tactical level the objective which are set by the strategic level has to be now realised. Here various activities are, deploying resources to match the supply to demand which has the outcome as demand forecast, production, procurement and logistics plan and inventory targets.

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Then next is your operational activities. In this operational activities the objective is to deploy resources to match supply and demand and work centre scheduling, order and inventory tracking. Then the last one is your execution level where you decide to build the product and transport it. Here the outcome is to maintain the order cycle and have material movement.

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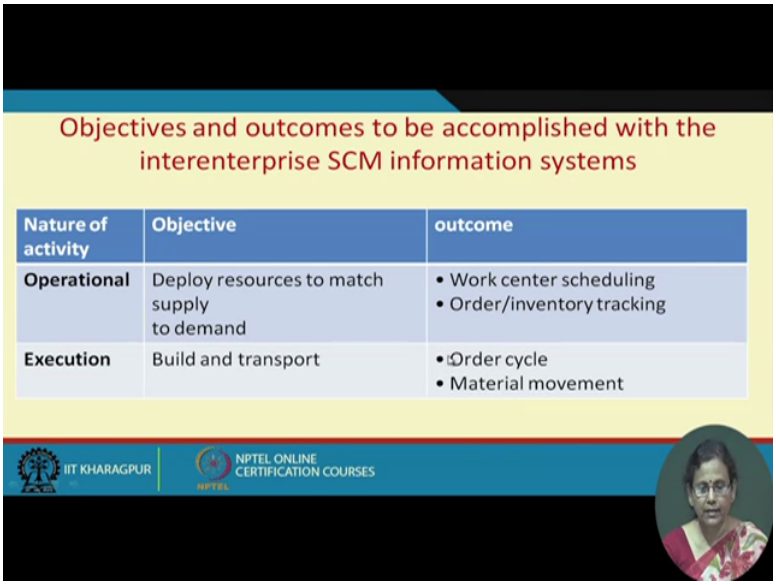

So the various functional processes under this supply chain are strategic sourcing and procurement, forecast and demand planning, customer order fulfillment and service, distribution network and warehouse operation, transportation and shipment management and production logistics.

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In a typical supply chain management system your ERP system will be taking care of the order entry, the manufacturing system planning system and shipping system. It will have these components for which you have to connect to two additional systems and these two are your transportation management system and your warehouse management system.

And though your ERP system has the components for order entry manufacturing, manufacturing planning system and shipping system but actually these are the interfaces through which you receive the data from the external TMS and WMS system. So from your ordering system you get order and shipping notifications and those details are going to your warehouse management system which gives the corresponding details to your distribution (sys) system and it sends you the shipment plan.

Then this shipment plan along with the orders is sent to your (mana) (sys) transportation management system which in turn actually connects with your freight carriers.

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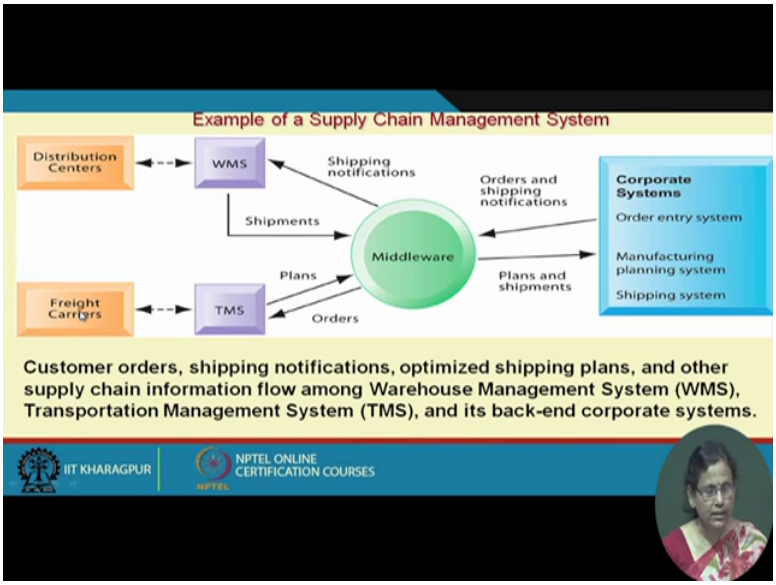

So in a typical B2B supply chain process not only the purchaser and the buyer and the supplier are involved and information flow between them. There are other another entity which has to be there in order to automate the full process. And that entity is the bank. You can have both purchasers bank and you can have the supplier's bank.

In fact in a typical electronic data interchange that is EDI information flow after the payment authorisation is made by the purchaser then the payment from the after it your purchases bank gets the payment authorisation, it sends the remittance notice to the purchaser as well as it gives the appropriate notice for electronic funds transfer to the suppliers bank. And the fund electronically gets transferred and finally the payment details are sent to the supplier.

So in this particular environment as we have already discussed in the earlier class in a supply chain network not only the information flow, three things flow. One is information second is material, third is money. In fact if you look here we are showing the information part. For example look at this. You are getting the advanced shipping notice from the supplier.

Shipping actually place the physical transportation of the good takes place in the channel but at the same time the information part of it that is the notice which comes to the purchaser. And similarly for money, the invoice gets generated here and sent to the purchaser and the releasing the payment advice to the bank that detail is sent to the supplier. Funds actually get transferred but the corresponding information flow also happen.

So as we discussed earlier in a supply chain the information flows about the material and money as well.

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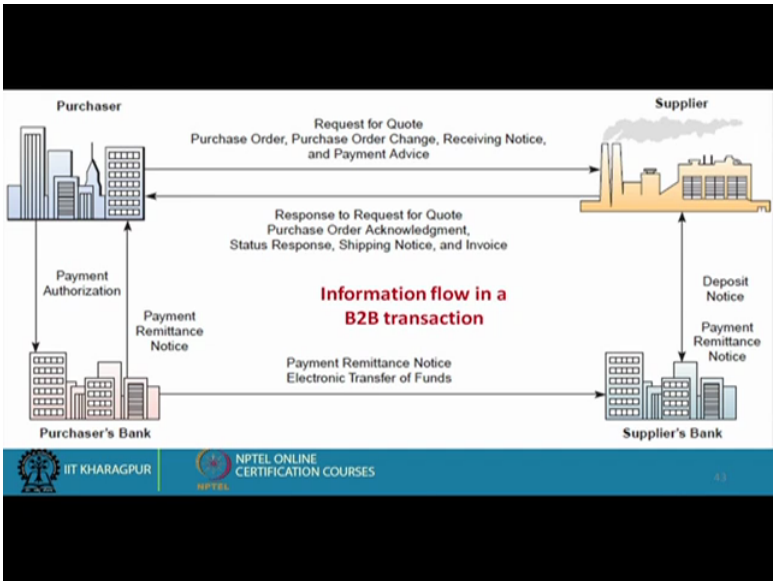

Now what are various challenges of e-supply chain? First of all (sele) planning, selection and implementation of a supply chain management solution. Now what exactly is the idea behind this planning selection and implementation of the supply chain management system? As I was showing you it can happen in two ways. Either two immediate supply chain entities they connect each other or all the entities in the supply chain they can decide to have a centralised solution.

So taking this decision about what kind of method to implement is a challenge. And you remember if it is only organisation he can take its own decisions. But it is multiple organisations. So every member should be convinced that they are going to reap the benefit out of implementation of such information sharing system. Then suppose they plan and select but creating a real time supply chain (manag) (in) management infrastructure is still a problem.

Here let us try to understand what we mean by a real time supply chain management system? Look, if we have the connectivity between two immediate partners then the information will flow between them. Therefore downstream member it will come to the manufacturer then it will go to the upstream member. In between there will be information delay.

By real time SCM infrastructure we mean we have to have some infrastructure where there will be immediate capture of the information by any member of the chain which others can actually (vis) visualize at the same time. So such kind of centralised infrastructure where without any delay every entity will be updated about the changes happening in the supply chain is difficult.

Then even if two members decide to connect their information system the technological differences that exists between both their individual enterprise systems has to be first resolved in order to connect them. Now technology advances so fast that if one of the companies ERP system is little older then for resolving the technological (in) incompatibility issues between both the systems become very expensive.

Then suppose with one of your supply chain member somehow you resolve the technological incompatibility issues. Now if you have multiple supply chain members (alo) individually with each you have to now carry out the same process. It is even more expensive. Then in case a new supply chain partner comes in then making him adopt your technologies for sharing is also problematic.

So implementation why it is a problematic area? In case if you simply talk about the supply chain integration and interoperability and the benefits coming out of it, it is fine, but actually automating the whole process and the technological issues behind it can create many hindrances for automation of the supply chain.

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So now we continue with our supply chain management activities in see what are various strategic and operational activities and which related to the technology can actually provide these challenges? In fact some of these challenges we saw last class we will see how this challenges can be elevated? So in this lecture we are going to learn the integration, interoperability and collaboration within the supply chain and what is the role of information sharing here?

Then we are going to see what are various dimensions of supply chain interoperability and the dimensions of supply chain collaboration? Then we are going to talk about the models for collaboration.

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So what exactly is this supply chain integration? The supply chain integration is the extent to which the firms can strategically collaborate with their supply chain partners and collaboratively manage the intra and inter organisational processes to achieve effective and efficient flow of product and services, information, money and decisions with the objectives of providing the maximum value to the customer at low cost and high speed. So this supply chain integration is about the strategic collaboration.

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Now this supply chain integration has two aspects, first interoperability which is about dealing with the technical issues of information integration, then second one is your collaboration which deals with the managerial issues and it has many different aspects. For example your collaboration can have through collaborative communication, the collaboration can have through some kind of contracting, it is a strategic level activity.

Then this collaboration can have through appropriate information sharing, through joint decision making, by joint knowledge creation and resource sharing.

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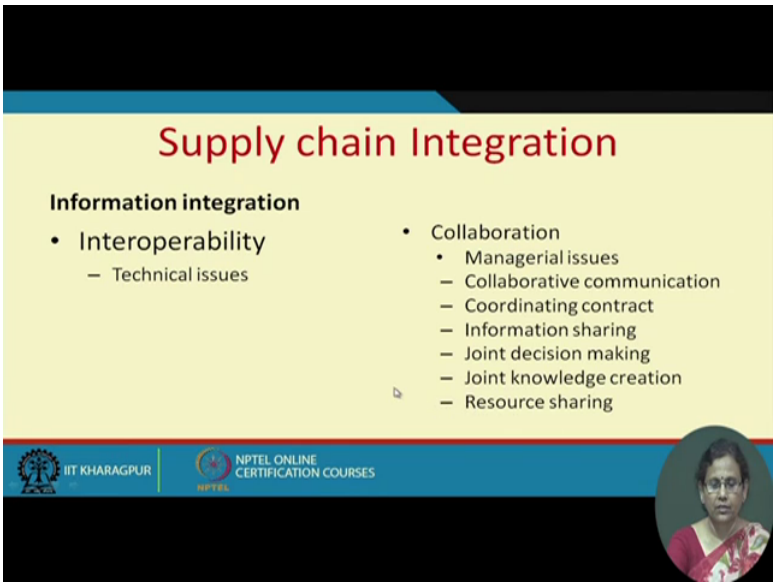

So what we have understood is that supply chain integration is a strategic activity and it has two aspects, one is how strategically it has to be achieved through collaboration and it has one technical aspect which is called interoperability. Now what exactly is supply chain interoperability? Supply chain interoperability is the ability of, in fact we will be first talking about what interoperability is? It need not be only in the context of supply chain. It is about between any two heterogeneous systems.

The interoperability is the ability of two or more systems or components to exchange and use the information that has been exchanged. This interoperable system requires both technical and semantic level operability. Now what exactly is technical operability? This technical interoperability deals with the hardware and software compatibility. In fact when we will be talking about the technologies (supp) of supply chain integration we will be talking more on this, how to resolve this I mean what are various approaches for resolving this technical interoperability?

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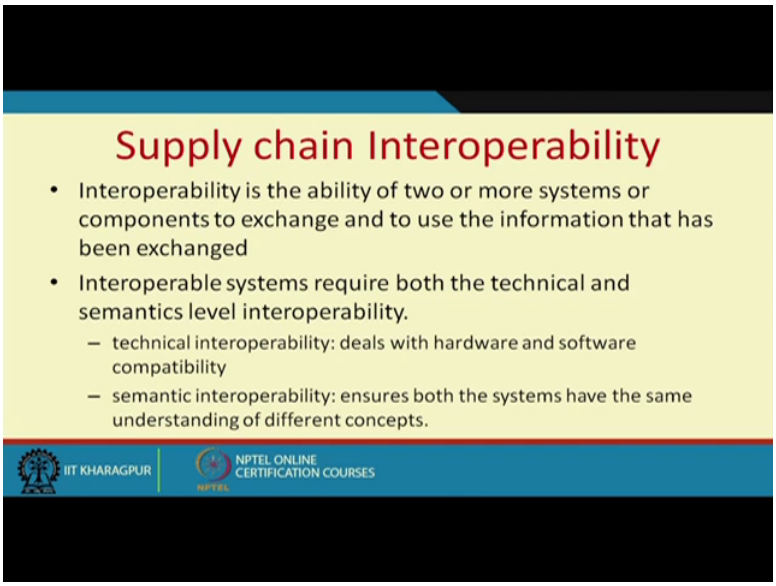

Then next is your semantic interoperability. This semantic interoperability insures that both the systems have the same understanding of different concepts. For example when the product information flow let us say the advanced shipping notice which is come from your downstream members to you. That advance shipping notice actually shows you the product numbers and their quantity, etc which is coming from your downstream member.

Now how do you get this advance shipping notice? While getting this advance shipping notice, either you will be getting it through email or through EDI or maybe through a web

service. But whatever may be the way of getting it, (whi) either somebody has to re enter the data or it has to be automatically captured by the upstream ERP system. Try to understand what I am saying.

I am saying the data is coming from downstream ERP system and it has to go to the upstream ERP system. When this data goes suppose you resolve the (compatibi) technical compatibility which exists because of this hardware and software issues, you resolved it. Now you should be able to get the data. But the meaning of the data is also important. Suppose some product has the product number let us A-111 with your downstream members.

Now unless and otherwise both the companies both the members in the supply chain both the partners adopt the same coding system only from the product code it is difficult to understand what product it is? Now suppose you say that along with the product code the name of the product is sent. Now looking at the name, in fact one of the earlier classes we have already discussed these issues while probably talking about the e-procurement.

We understand that even if we actually send the complete name of some product if the name is not written exactly in the same manner all the time then at least you as the human being can understand but the computer unless otherwise it is explicitly mentioned to the software that all these names even if they are written in a different form, either complete form, short form or in some other way, they are the same. Unless and otherwise that knowledge goes to your ERP system it cannot understand.

So therefore while transferring the data this semantic interoperability of both the systems so that they (underst) conceptually get the same meaning out of certain data is extremely important.

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Then supply chain interoperability is about business to business integration and it is specifically a challenging task because of many reasons. First there are diverse information format. By diverse information format we mean let us say you are exchanging the data between two systems and in one of the systems it is let us say Oracle and other system the data is in some other database let us say DB2.

So that DB2 data has a different metadata structure than that of your Oracle databases metadata structure. So therefore whenever you have to exchange because of this diverse (inform) information format there will be problem. Then second issue come the large and dynamic information space.

By this large and dynamic information space we mean the nature of the information keep changing and because of this change if you have somehow resolved that (techno) semantic integration issues between two types of between let us say you have resolved the issues of compatibility for sending the order information.

Next time when your shipping information comes you have to design specific processes for making that shipping (indus) information understandable. Then next is your lack of standards for semantic integration of data. In fact I have told you already that what is the meaning of resolving the semantic issues during data exchange?

Now if there would have been a common standard then this exchange would have been easier. But there is lack of standard for this semantic integration.

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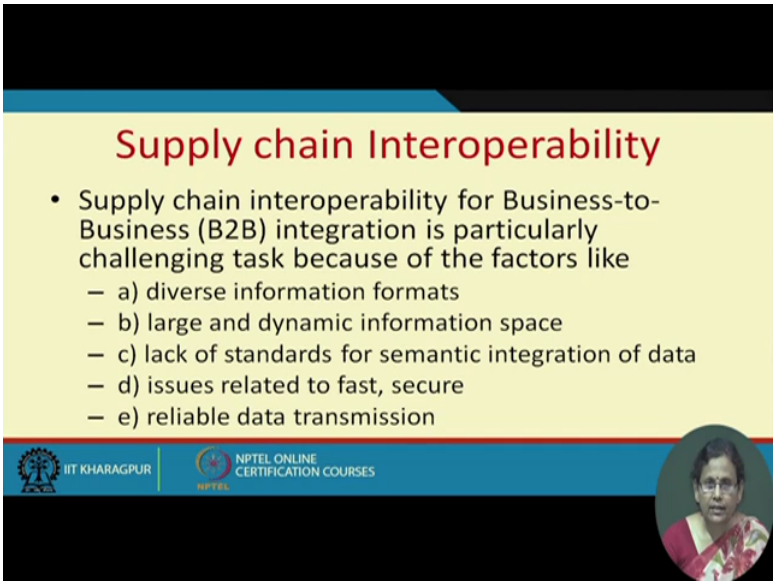

Then when the data goes from one system to the other then proper security has to be maintained. So resolving this security aspect is another problem. Then the reliable data transmission through internet is the last issue which has to be resolved to carry out this supply chain interoperability. Thank you very much. We will be continuing with the same topic in the next lecture.