Indian Institute of Science

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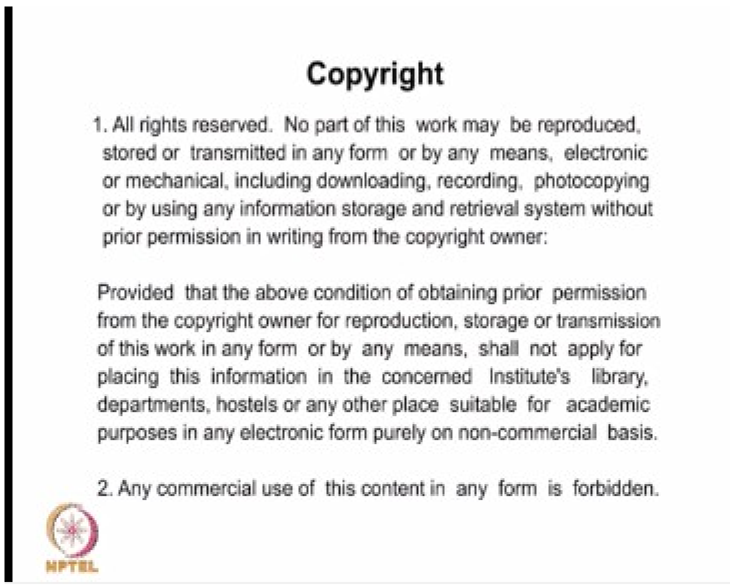

Global Supply Chain Management

Lecture – 02

Introduction to Global Supply Chain Networks Part – 2

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We will continue with the introduction of the global supply chain networks.

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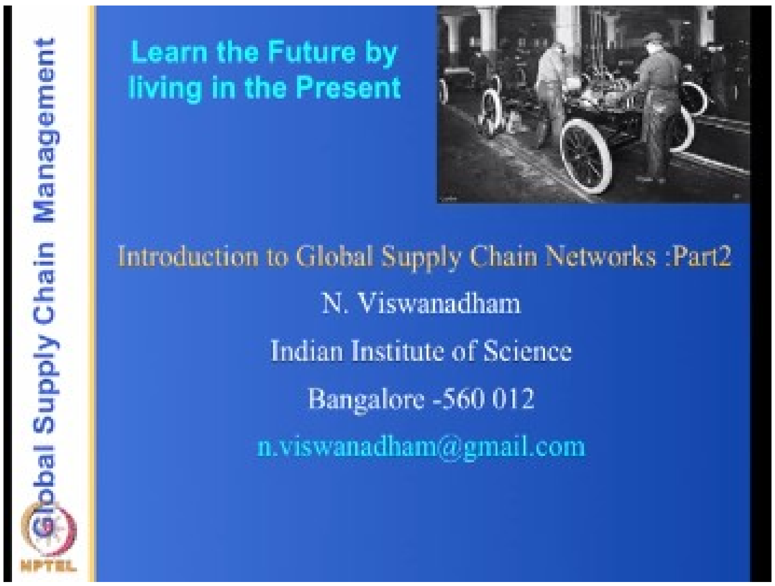

We very briefly summarize in this slide the number of players in a supply chain Network.

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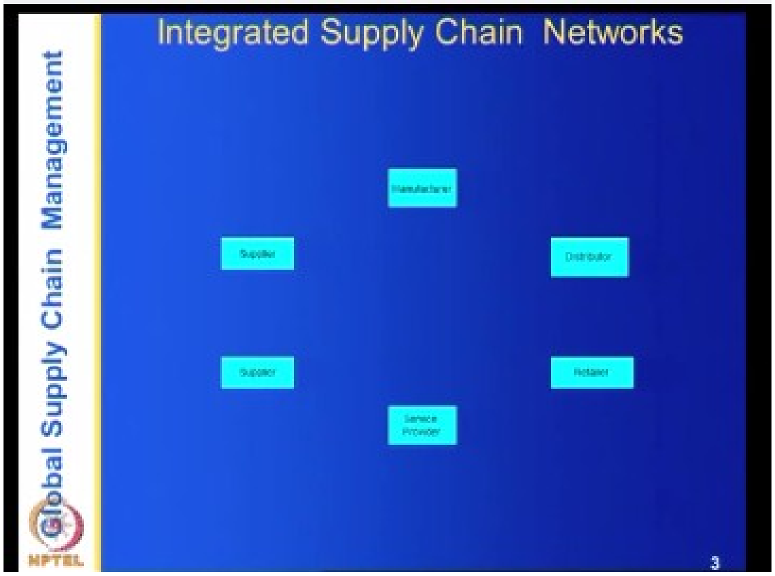
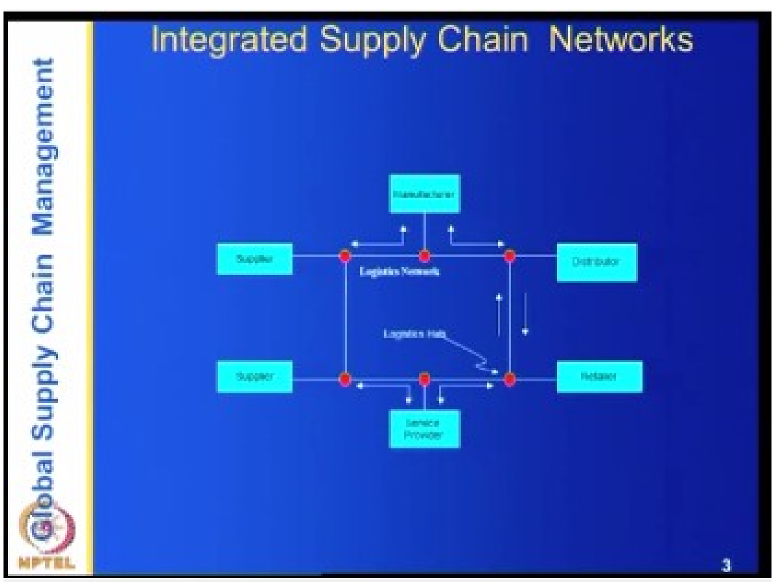
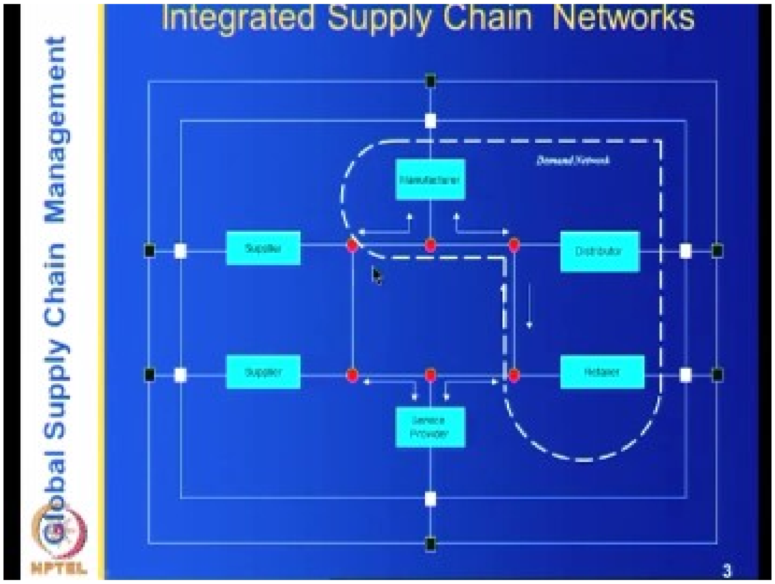


Suppliers are from various countries, the manufacturers are either multi-site or single site. There are distributors and retailers and several service providers. The service providers could be financial service providers, logistic service providers or freight forwarders. Several kinds of foreign service providers are required. Logistics network enables the transfer of goods from one place to the other.

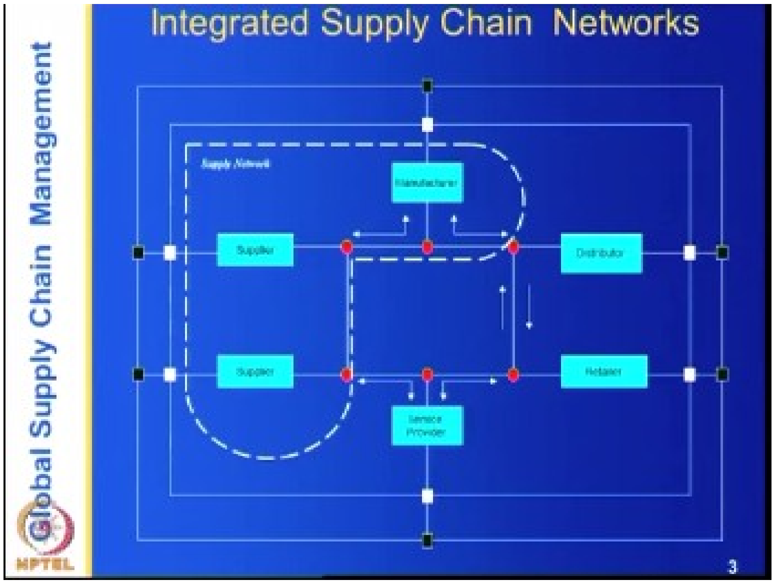
Secure information network connects all the players in the supply chain and this transfers the financial information or information regarding the ordering requirements, the designs or others.



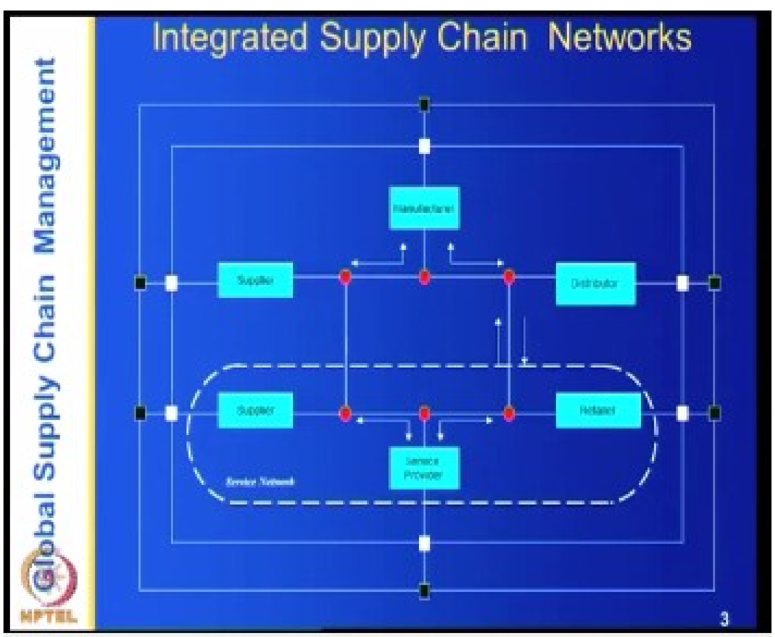
The financial Network is the network the banks of various institutions and the transfer of money happens through the banks. Integrated supply chain network has three net sub networks: the demand Network which connects the manufacturers to the distributors and retailers



The supply network connects the suppliers and manufacturers. The logistics network connecting the suppliers to the manufacturer is called b2b (business-to-business) logistics network and heavy transfer of material or Goods happen through this particular network and this is also called a procurement Network.



And finally we have the service network the connects the customers, the retailers and the service providers. The suppliers are also connected with customers for space parts as well as after sales service. Thus we have three sub networks: the service network, the supply network and the demand Network. There are also three business processes the procurement manufacturing and the distribution and retail.

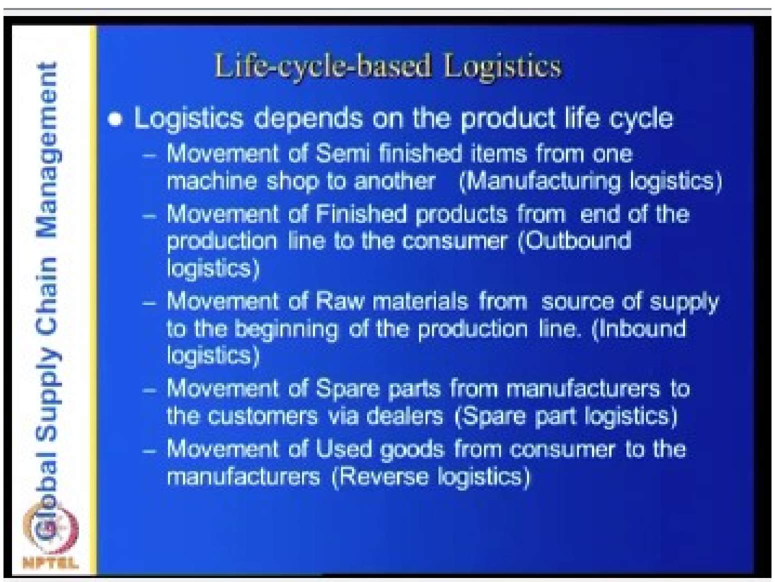


We have now the integrated supply chain network

Example: Barbie dolls are famous and they're sold in the US. The Barbie doll Network is global. The plastic and hair are sourced from Taiwan and Japan. The molds and paints decorating the dolls are from the US. Assembly is done in low-cost locations in Indonesia, Malaysia, and China. China supplies only cotton cloth and the labor.

It is difficult to imagine that so many countries are involved in making the Barbie doll. The export value of the doll in Hong Kong is $2 (35 cents for Chinese labor, 65 cents for material and the rest for transports and profits). The doll is sold at $10 in the US which includes transport, marketing, wholesale and retail in US. The Barbie doll is made in several countries with their cooperation.

There are several dominant players in a supply chain. They are the suppliers, Logistics players for business to business as well as the business to customer and there are several contract manufacturers, original equipment manufacturers, distributors and retailers

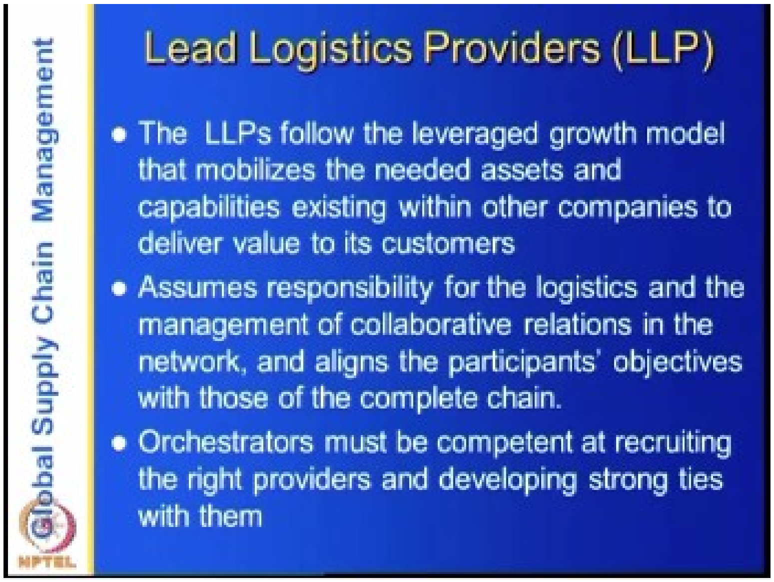


Logistics depends on the product life cycle. Movement of Semi-finished items from one machine shop to another is called Manufacturing logistics; Movement of Finished products from end of the production line to the consumer is Outbound logistics; Movement of Raw materials from source of supply to the beginning of the production line is Inbound logistics; Movement of Spare parts from manufacturers to the customers via dealers is Spare part logistics and finally Movement of Used goods from consumer to the manufacturers is called Reverse logistics. Trucks warehouses , container lines etc are high asset intensive and are owned by 3PLs. Some of the manufacturers have a lot of insurance and other kinds of safety measures if something happens on the way since they are a part of the total supply chain.

Logistics plays a very important role so depending on at what stage of supply chain you are dealing with. The logistics varies from manufacturing to inbound to outbound to spare parts to reverse logistics. Each of these logistics have their own peculiarities and you have to treat them separately.

Most manufacturers handle all logistics functions including trucking and warehousing and they are called 1PL. They own a separate logistics division. 2PLs are basic transportation and storage providers such as truckers, warehouses and container lines and have high levels of asset intensity. Airports and Seaports are categorized as 2PLs. 3PLs provide end to end total value added logistic solutions. They Own some assets such as distribution centers and rent other assets from 2PLs.Freight management is the key process for 3PLs

Third party logistics players are very important and they provide end-to-end value-added logistic solutions. In other words if a supplier is supplying to a manufacturer, then the truck of the 3PL collects the material from the supplier and delivers it to the manufacturer. The loading and unloading, truck hiring, the driver hiring, etc are taken care of by the logistics provider



And there is another type of logistics providers called Lead logistics players .They do not own any assets and they follow what is called leverage growth model. They are just orchestrators and they mobilize the needed assets and capabilities with other companies to deliver value to its customers.

Lead Logistics Providers (LLP): The LLPs follow the leveraged growth model that mobilizes the needed assets and capabilities existing within other companies to deliver value to its customers. They assume responsibility for the logistics and the management of collaborative relations in the network, and aligns the participants' objectives with those of the complete chain. These Orchestrators must be competent at recruiting the right providers and developing strong ties with them. IT connections and social networks play a very heavy role in the design of lead logistics providers and their functions.

We basically have covered so far the supply chain network with examples. We looked at the integrated supply chain Network diagram, its three flows (the goods flow, the information flow and the financial flows). The good flow is happens through logistics providers : 1PL, 2PL, 3PL or 4PL. Now we move to the globalization issue since we are dealing with global supply chain networks.

So what does global mean. Global means that different countries are involved in the delivery of the particular product. The supplier is in China, the manufacturer is in Singapore and the customer is in the US. The products or the components have to travel several countries and have to visit several ports, airports and visit several warehouses. It has to be uploaded downloaded from various warehouses and so on. Then comes the issue of trade. What are the global trade issues in the supply chains?

The convergence of several technologies , co evolution of several global players is basically is what are fueling a global supply chain network. What are the reasons for the proliferation of global supply chain networks.

Global Manufacturing Supply Chains Networks have proliferated as **a result of convergence of several technologies and co-evolution of several global players.** Decline and transport costs is another reason for another strong reason for their proliferation. Now 80 or 90 percent of the global transport happens through shipping . There were several innovations in shipping such as containerization where instead of putting break bulk products into the ship you put them in containers and transport them. That gives a lot of flexibility and also the ships are larger and oil prices have come down drastically since 2008 . Hence there was a decline in the transportation cost. Standardized modular product assemblies resulting in Outsourcing and Emergence of the Internet has made communication secure. Emergence of the Contract Manufacturers & Efficient Logistics service providers has reduced waiting time. Global logistics players and contract manufacturers have come up in all verticals including auto electronics. Greater integration of the economies is happened reducing the trade barriers . Trade barriers are basically the customs and limitss on products and quantities.

When supply chains are global, the governments and social groups they play a great role because the goods pass through several ports and airports and they have to be managed to minimize the lead time. Now all these issues are all well sorted out and there is a greater integration of economies by reducing the trade barriers. Because of all these advances, there is proliferation of global supply chain networks.

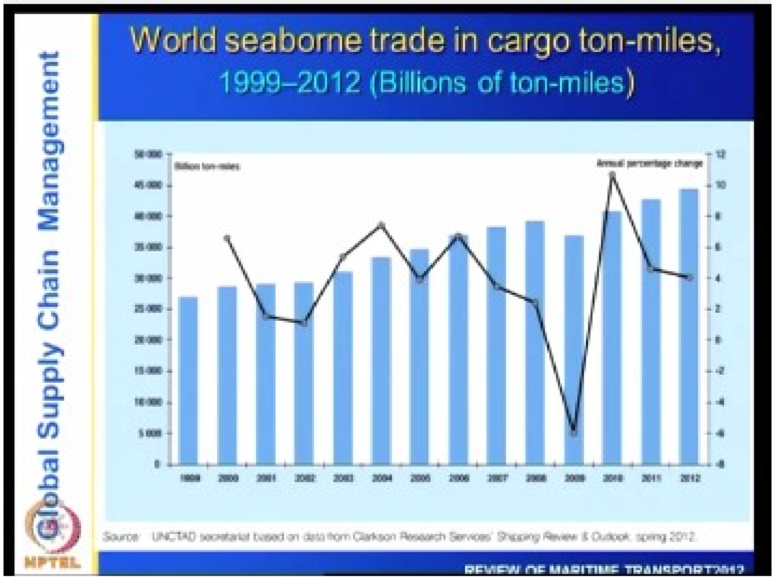
What happens if the particular consignment waits at a port for customs clearance. Eight days in some ports or in some ports places it takes 8 hours. Between 8 days and 8 hours the inventory is lying at the port. Inventory needed have to be maintained by the manufacturer or the supplier. Thus the ports and the trade rules play an important role in the performance of the supply chain the time it takes for goods travel from one point to the other and also the waiting inventory.

There are two kinds of infrastructure one is the hard infrastructure and the second one is the soft infrastructure. The soft infrastructure is also called trade facilitation. When you are having the trade , you have to fill in some forms and it have to visit several people, the customs officers both at the port and outside of the port. Forms are filled sometimes on paper but if they are made online and they were done through email .Soft infrastructure such as trade facilitation, free trade agreements, customs duties, business friendliness and economic diplomacy of the Governments, social factors such as labour unions and industry associations are important for superior performance. Favourable institutional environment reduces transaction costs and positively influence the trade.

What about the labor and the other players who are there in the ports and outside of the ports whom with the these particular businesses need to deal with and social factors such as labor unions, industry associations, etc are also important for superior performance. In other words you are not just dealing with as a particular supplier, you are dealing with the entire ecosystem.

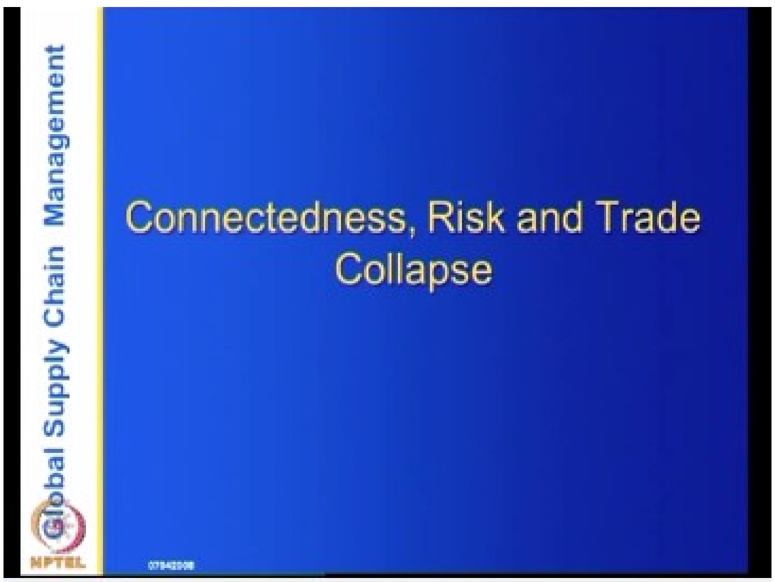
The global supply chain management becomes complex because of these issues and favorable Institute environment reduces the transaction costs One has to be extremely careful about choosing the country you are dealing with.

When you are selecting a country and a supplier you are not just and selecting a supplier you are selected in the country and its environment. It is labor force its other social factors, labor unions industry associations and so on.



From 1990 to 2012 , the world seaborne trade in cargo ton-miles has increased enormously From 1990 onwards it is only raising it is never except in 2008. The reason for 2008 decrease in the trade is the financial crisis in the United States. So because of that there is a sudden dip in the percentage of trade in 2008 but of course from 2010 onwards 2011-12 it started increasing The sea trade is 80% of the trade

You can see that the countries are also trying to collaborate with each other. The free trade agreements were only 16 in 1999 and as of August 2009, 271 free trade agreements. These free trade agreements which are between countries to countries. Statistics show that 40% of the trade happens through free trade agreements. So if you are an export oriented country then it is important that you have free trade agreements with your buyers.



The supply chains are connected logistically that means through a logistics network, whether it is your own logistics or you outsource it to a second party or you just give it to a third party or you hire somebody who organizes the logistics for you, the movement of goods between the suppliers to the manufacturers to the distributors is all taken care of. Logistics transport could be by road network, a train network or an air network or shipping Network. all these networks are all basically existing.

The connectedness also brings risk and risk can bring trade collapse. So far we have been talking about the good things of the supply chains and let us see what happens when you are very well connected both logistically informationally and financially. Then you will be doing very well because your efficiency will increase, your inventories will come down, your lead times will come down and your financial problems are all solved because your banks are all well connected. But since you're so well connected, anything happens in any country can transmit to your entire supply chain. Any trouble anywhere in the world can affect your supply chain so that is what we are going to look at now.

For the last two- or three-decades people have worked very hard to develop high performance supply chains

In JIT (just-in-time) you do not keep any inventory you transfer the goods just-in-time and total quality management that is you just basically want quality everywhere quality of the process quality for the products and so on you can stop the process if the quality of goods are not good and then repair the process and start processing again.

Outsource into low-cost countries and so on there is collaboration between various players they are connected through internet they're connected to logistics players, their banks are connected. There is visibility in other words whatever is happening anywhere in your suppliers and so on you can visualize you can get information through video audio and so on and their supply hubs where you maintain the inventory before the manufacturing to maintain.

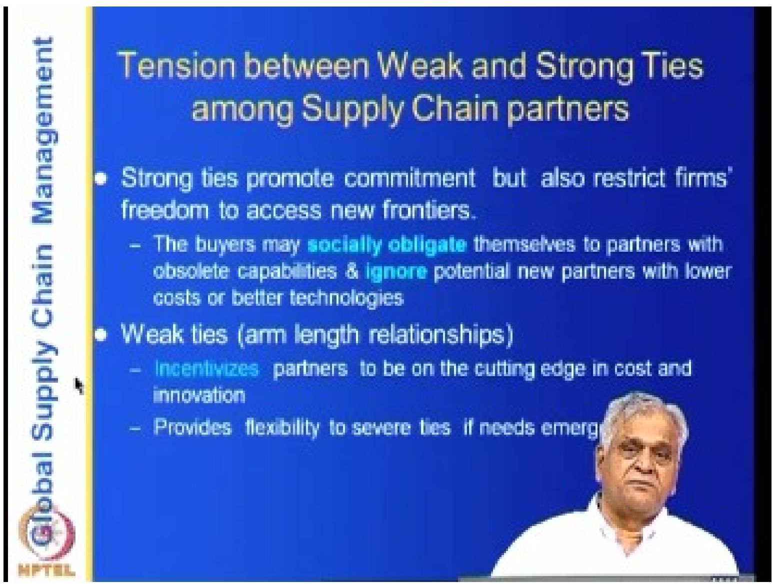
So that as soon as an order comes the order can be executed immediately. You design so that your processes are highly efficient in other words the time you spend from end to end transfer of goods it is going to be the least and also the cost is less because you are not maintaining inventory on the way and you do not need any warehouses and so on.

The web that is the internet and also there are a lot of software's which are given by SAP Oracle and other organizations for supply chain planning. There are lots of experts consultants who basically can map the processes: the procurement process, the distribution process, the manufacturing process, etc. High-performance low inventory just-in-time are buzz words.

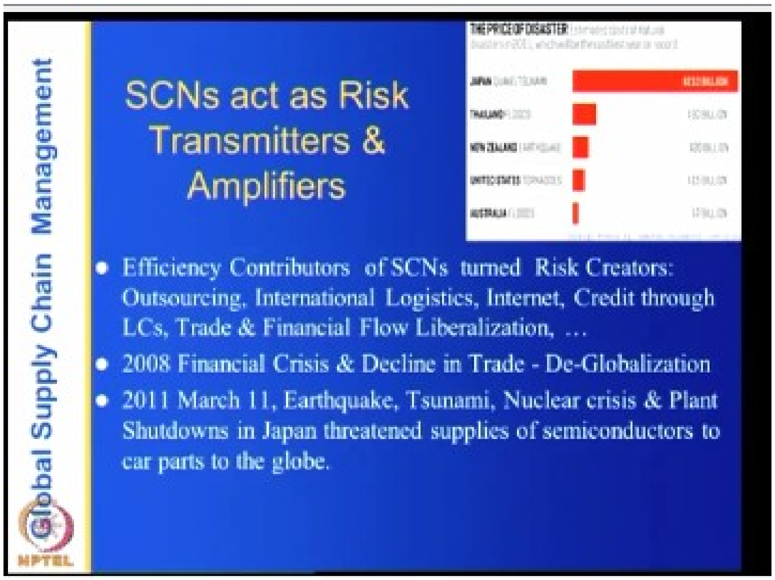
So high connectedness logistically informationally and financially results in high performance The supply chain is designed not to lose any customer. The customer is the king

A supply chain which is lean and which is high performance is brittle. In other words anything happens anywhere can affect your supply chain. Because you are keeping low inventory if your truck fails you don't have inventory, your production stops. Same is the case, since your you are following just-in-time principles, in case there is a fire in your suppliers factory.

If there is a financial crisis in a country, all the banks units are connected that leads to credit squeeze and that affects your supply chain. So whatever happens anywhere in the world affects your supply chain and that is the price you are paying for the high performance.



Strong ties promote commitment but also restrict firms' freedom to access new frontiers. The buyers may **socially obligate** themselves to partners with obsolete capabilities & **ignore** potential new partners with lower costs or better technologies Weak ties (arm length relationships) Incentivizes partners to be on the cutting edge in cost and innovation Provides flexibility to severe ties if needs emerge. The manufacturer can tell the partner, I promise service 30% of your capacity but the other 30% you should get from others. You are trying to keep the people on their edge and then that arm length and relationship will provide you flexibility you can move from one supplier to another. Suppose there is a tsunami in the supplier country then you can move to somebody else in some other country.



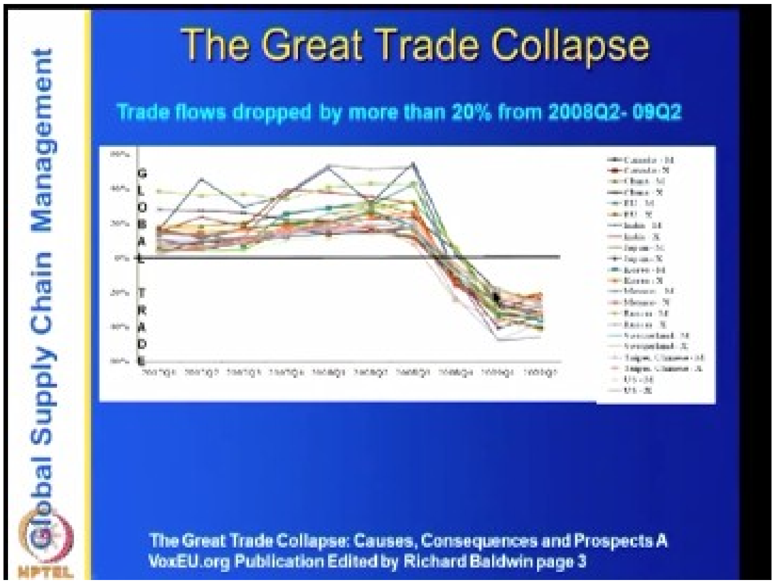
Recently in 2008, there was the financial crisis in the United States what is called home loan crisis. People have bought homes and they did not pay the loans so the banks went bankrupt and that basically got transmitted to other banks. But why should a supply chain be affected ? When banks go bankrupt, credit squeeze happens and interest rates on loans increases. People start postponing the buying of these items which means the demand Falls. Once the demand Falls you have a just-in-time connected supply chain so that means the people start canceling the orders so when you start canceling the orders. The suppliers at the tail end are the losers.

The efficiency of the supply chains has become risk creator. Outsourcing, international logistics, internet credit through letter of credits and trade and financial flow liberalization all are acting as risk creators. I'll show you in the next slide how the decline has happened in 2008 fourth last quarter and 2009 first quarter there was heavy decline in terms of trade and this reasons for this is the financial crisis in the United States.

Why should financial crisis cause this. The bank interest rates have increased and second thing is banks also provide what are called a letter of credits. For letter of credit people started suspecting the foreign banks.

Similarly the earthquake in Japan and 2011 march 11 that has caused tsunami and a nuclear explosion and that has shut down the electricity in parts of Japan. Because Japan supplies the auto parts as well as the electronic parts across the globe and you can see at the top but the financial loss due to the Japan tsunami is around 213 billion dollars.

Basically lot of losses are incurred by the supply chain due to the various crisis , whether it is a natural disaster or a financial crisis or a fire in a supplier. So the supply chains acts as risk transmitters and amplifiers in addition to the efficiency it creates in the supply chain.



If you look at the trade collapse this one trade flows dropped by more than 20% in 2008 4th quarter to 2009 2nd quarter.

Trade collapse happened across the world . Both exports imports for India, Japan, United States have simultaneously dropped so there is the synchronous collapse. Why should there be synchronous collapse, it is because of the connectedness.

The supply chain is connected and everything happens just in time. Once the orders are canceled due to credit squeeze in the United States then the manufacturers have canceled the orders to the suppliers at the tail end of the supply chain. In China manufacturing workers have lost jobs and the logistics providers who basically transfer the goods from China to the United States have lost business.

So here although the material that we have covered so far can be found in the books but the emphasis in our course is going to be on factors : how to design supply chains, how to analyze supply chains, how to innovate supply chains which are basically dependent on all external factors such as the economies, the resources and the infrastructure. or other factors and basically and how to decide minimize the resilient supply chains and that is going to be the subject matter of the future lectures.

In global supply chain network, we have the players all over the world, suppliers in one country the manufacturers another country and the logistics players transferring from one port to the other there are banks and there are governments involved there are government rules and regulations as well as there are social factors like labor unions organizations.

Globalization has created dispersed supply chains which are vulnerable to and dependent on factors that are exogenous to the supply chain. Credit squeeze after the financial crisis, environmental regulations, protectionist policies of governments, political unrest, economic instability, and natural disasters are non-supply chain factors that affected the supply chains performance.

This course presents **the *supply chain ecosystem*** framework to holistically model all the factors that interact with the supply chain and visualize all Operational, Strategic, Management & Execution issues and risk mitigation strategies..

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