

**Supply Chain Analytics**  
**Prof. Dr. Rajat Agrawal**  
**Department of Management Studies**  
**Indian Institute of Technology-Roorkee**

**Lecture-01**  
**Introduction to Supply Chain Management**

Good afternoon friends, we are going to start our discussion on very important topic for managers of the day that is supply chain analytics. Supply chain analytics is the combination of data analytics into the supply chain management. Supply chain management we all know in one of the most important aspects of business now a days, we know some of the popular names of fortunate five hundred companies like Walmart, Dell and similar 7, 11 etc from Japan Alibaba from chain.

These companies are known because of their supply chain competence and now days it is believed that supply chain is one such area in the organization which can provide lot of complete competitive advantage to a particular organization. If you go to the website of hardware publisher you will find maximum cases in the area of supply chain management and I come particular from the domain of operation management.

And now many of us feel that supply chain management which was once upon a time considered to be a subset of operation managements. And now-a-days the situation is almost reversed. The supply chain has become an umbrella term and operation management has become a subset of supply chain management. So therefore the course of supply chain management and using the data analytics technique into the supply chain management. So that name has come supply chain analytics.

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## Outline

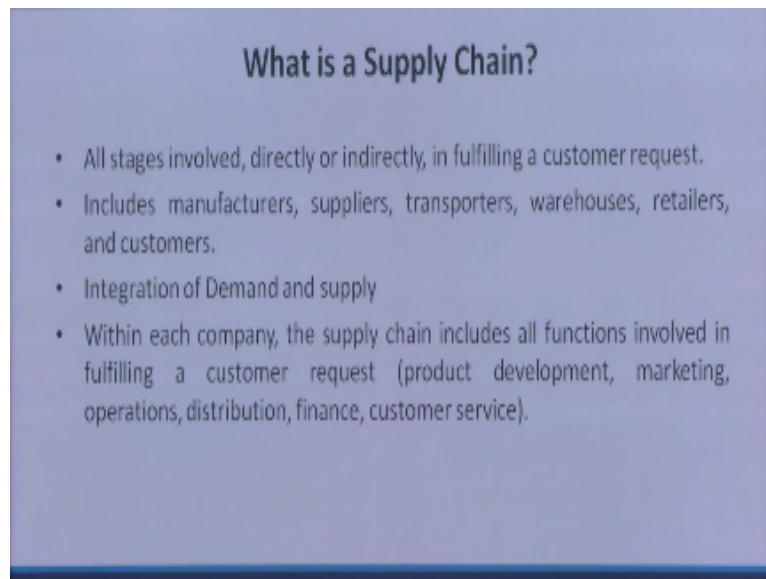
- What is a Supply Chain?
- Important Changes in Supply Chains over the ages
- Decision Phases in a Supply Chain
- Process View of a Supply Chain
- The Importance of Supply Chain Flows
- Examples of Supply Chains
- Competitive and supply chain strategies
- Achieving strategic fit
- Expanding strategic scope

In the first this lecture we will have some kind of introduction of supply chain that evolution of supply chain over last hundred years then what are different important decision phase in supply chain. There are different ways in which we study the supply chain, those process views we will see in our decision in first two lectures which are the introductory lectures of this course.

Then we will also see what is the importance of various types of source in the supply chain. We will also see some very important examples which makes supply chain so popular and then we will see the strategic aspects of supply chain management and that we can see that how can we achieve that strategic fit field with respect to the supply chain management and the competitive strategy of the organization.

So in first two lecture we will have a broad over view of the subject and we will see that how supply chain management has become the use of data analytics and particularly the present for more supply chain management where most of the decision that we are taking with the help of real type data. So let us start with understanding with of what is supply chain.

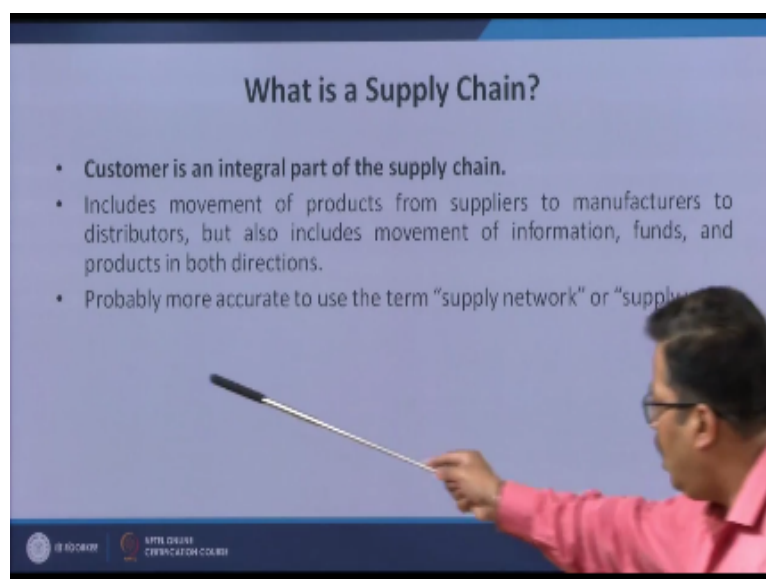
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Now supply has become such a common term that we find so much mention of this term in media report. We find the mention of this term in parliamentary debts, we find the mention of this term is day to day discussion also. So many times we were wonder whether it is an academic term or it is more term of media and reports, but now we are going through a formal course of supply chain management.

And therefore it will be relevant for us to understand the real meaning of supply chain management and what does it means, and what are the meanings of supply chain management further?

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Now as we can see that supply chain involves all the stages in the fulfilment of the requirement of the customer. And these stages may include manufactures, suppliers,

transporters, warehouses, retailers and customers himself. It is very important to understand all time and I will be emphasizing although this course that customer is a very much very integral part of supply chain all the time.

Please we need to ensure that customer is always consider whenever we are taking a decision are related to supply chain wherever we are talking to supply chain so customer is always an integral part of the supply chain. Many a time you feel that up to retailer is our supply chain and customer is not the part of supply chain, but now onwards once we are going through the formal course please remember the customer is the integral part of the supply chain.

The role of supply chain is integration of demand and supply. This is very important, demand comes from the customer side and supply comes from all these people manufacturer, supplier, transporters, warehouse, retailers, they all help us in fulfilling the demand of the customer.

So proper integration of demand and supply that is very much necessary for customer satisfaction as well as for the profitable for the service providers. So therefore the important of the subject is becoming more and more in the coming competitive times and within each company the supply chain includes all functions involving product development, marketing, operations, distribution, finance, customer service, after sale services, etc.

Many of us may feel that supply chain is a more related to operations management but if we talk in a very holistic manner now a days it is no longer specific to operations rather it is more holistic concept and we require equal involvement of product development, the involvement of marketing, the involvement of distribution, the involvement of finance, and after sales services in achieving the objects of supply chain management.

Because as I am saying that it is integration of demand and supply. So demand side information, the demand side data is normally captured by the marketing people and on the basis of the data that information the product development team, the operations team, they develop new products, they ensure the supply of those products to the customers and then further wherever the customers is ensuring the supply to that very point, to that very place is the responsibility of distribution team.

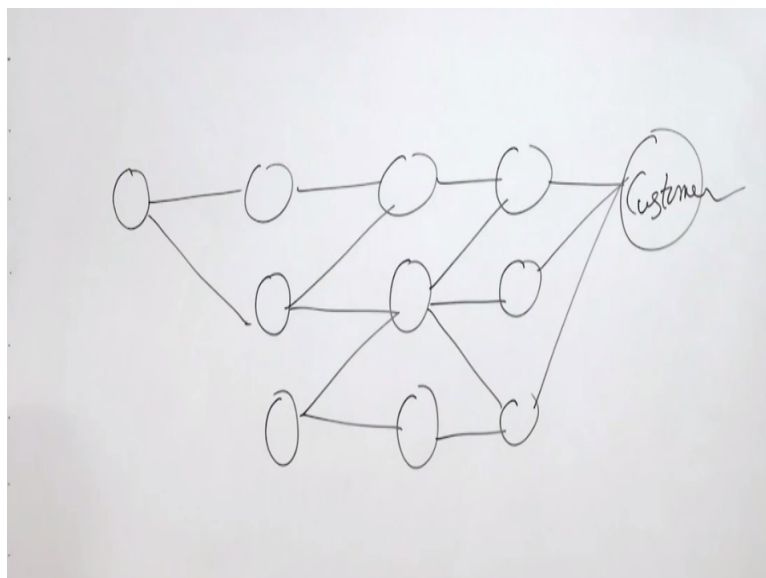
So it is very important that the scope of supply chain management to be understood in a wider perspective and just do not limited to the operation scribe. So therefore we will see our coming discussion that supply chain management has all three vertical of decision making it deals the strategic level also, it is deals at the technical level also and it deals at the execution level also because of involvement of all the functions.

It is very much similar when we talk of integrated marketing, when we talk of total quality management or when we come to this class of supply chain management, we talk of involvement of all functions. So this holisticity is very very important in modern management concepts and that is what we are trying to emphasize.

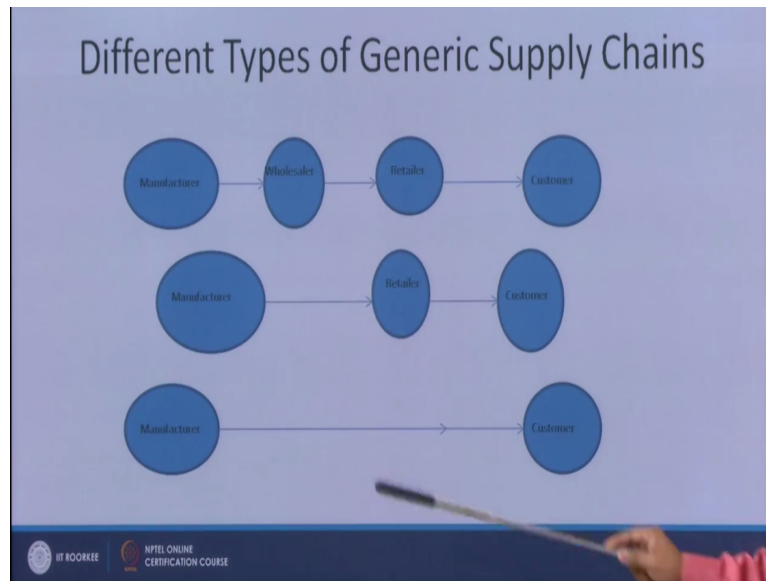
As I mention that customer is a very much integral part of the supply chain and these supply chain includes movement of information from supplier, those are here in the left side of the supply chain to the manufacture and to distribution and also includes movement of information funds and products in both the direction.

We will see these things in better pictorial manner in our coming slides with increasing competition it is more appropriate. Nowadays to say that supply chain is now changing into the form of a supply network or supply wave.

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Because when we talk of a chain it is linear like this, but actually it is no longer a linear system, you have many important players at each of these locations and there maybe a crisscross at each of these stations and therefore it is more appropriate to say that supply chain is now becoming supply network or supply wave. Let us see these are some of the generic type of supply chains.

Where you can see that in a conventional type of normal supply chain which we all know. There is a manufacturer, manufacturer is producing the goods, these goods are coming to wholesaler, wholesaler is distributing to large number of retailers in the market, and those products are coming to the customer. This is every conventional type of supply chain and we all have used these type of supply chain.

But nowadays you can also see you can also understand that there are supply chains where wholesalers are not there. You have large retain houses like big bazaar, like reliance teams, like Walmart where probably wholesalers are not there and manufacturer directly supplying these products to the retailer and retailer those big retailers are directly supplying these products to the customers.

And there supply chains where manufacturer is directly distributing products to the customer. For example BHEL take the example of BHEL. So BHEL is the manufacturer and the customers are a state electricity board, so it BHEL is making a tribune, so there is no wholesaler, no retailer in-between and in that supply chain BHEL is directly distributing those products to the customers and customers.

So depending upon your product to product depending upon the nature, the unit cost and so many other factors you may have variety of supply chain. These are some of the generic type of supply chain and the suitability of the supply chain depends up on the type of products, the type of customers, the type of intermediaries you require, but as I told you that these are very linear kind of arrangements.

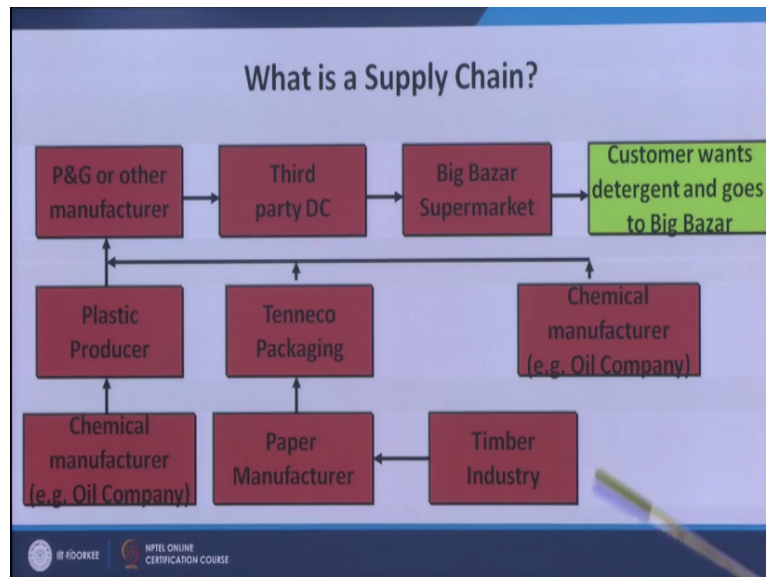
These 3 which I have shown here, these are very linear kind of regimens. But actually it is not sure, actually the situation is like this where you have manufacturer, but many wholesalers, many retailers are there, and these wholesalers, and retailers are making a network kind of situation, so these are chains but what I have drawn on the board, this is more like a network. So this is supply chain network.

So in the present environment we say that supply chain network is more appropriate than simply supply chain. And one more thing which I will like to emphasize in the beginning that now a days the competition is not between one organization to another organization. It is not correct to say that Maruti in India is competing with Tata Motors. Rather it is more appropriate to say that supply chain of Maruti is competing with supply chain of Tata motors.

So while supply chain competes with another supply chain and therefore for the success of the organization it is very important that we develop the competence of entire supply chain. It is not the competence of a single organization. If Apple is competing with Samsung, so it is not the Apple and Samsung directly, but it is the result of entire supply chain of Apple which is competing with the entire supply chain of Samsung.

Because lot of wholesaler, retailers, and there are large number of players on the left hand side of these manufactures also. So in our coming slide we will go to those also and then only this competition is taking place between one supply chain and another supply chain. So these are some generic supply chains but as we go ahead in this course we will see more specific supply chains also.

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Now coming to a very specific example of supply chain where some customer is going to purchase some detergent at a big bazaar mal, supermarket and let us see how things are happening in this real supply chain, those were the generic supply chains in the previous slide. Now this is an example of a real supply chain. Now in this particular case you see customer is coming to the big bazaar to purchase the detergent and big bazaar is keeping that detergent.

Now how many different parties are involved in this entire process. Big bazaar is procuring the detergent from the Procter and gamble. Now Procter and gamble is manufacturing the detergent or any other manufacturer which is manufacturing the detergent, it requires plastic producer, it requires packaging, it requires chemical manufacturer. And they also like plastic producer is further requiring the supplier like chemical manufacturer to get the plastic granules.

This packaging supplier this requires timber industry and paper manufacturer. Paper manufacturer is the supplier to the packaging industry and paper industry requires the timber industry. And then again this chemical manufacturer which is required for making the detergent. So now you see to get a product like detergent from the big bazaar and which is manufactured by some manufacturer like P and G and some other like that.

You have even timber industry in that supply chain. For a normal customer it is very difficult to realize that the detergent which I am purchasing from a big bazaar mal is actually

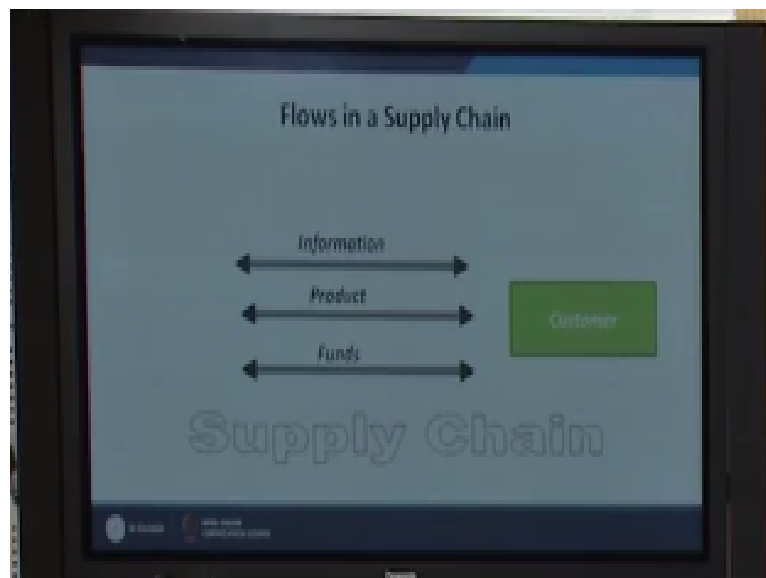


originating the supply chain from the timber manufacturer or timber industry. But when you see in a very holistic manner you will find that this entire supply chain is there.

And now because of you can say limitation because of interest is that back much, you can further find that there may be few suppliers before this chemical manufacturer also, there may be few other supplier before this paper manufacturer also. I have only listed the timber industry here. But there may be some other suppliers also before this paper manufacturer. So just to give you an idea that how real supply chain rather a supply network looks like.

So you do not have only single supplier here rather you have a variety of suppliers supplying different types of components, different types of raw material to Procter and gamble and then it is going to make the final product and finally you get a packet of detergent at the big bazaar mal. So this way this looks very simple but there are so many individuals to whom we need to manage and therefore this management can provide a very important competitive desk to the organization.

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Going further this slide is very very important to understand that normally we feel or we normally in our day to day discussing are more concern about the flow of product in the supply chain. But actually as I told you in the benign the second slide that in a supply chain we are actually having the flow of 3 important elements. And these 3 important elements are information, product and funds.

You can see the arrows in both the direction in the slide just to tell you normally the primary thing which flows in the supply chain that is product and product flows from the manufacturer side to the customer side, product flows from the manufacturer side to the customer side. But nowadays because of environmental issue and because of so many other cause related issues lot of products also flow in the reverse direction also.

And therefore we have arrows with respect to product in both the directions. You have example of LPG cylinders, so filled LPG cylinders flow form the manufacturer to the customers, but empty cylinders flow form the customer to the manufacturer for refilling. You have glass bottles of Pepsi, coke, the filled in bottles flow from manufacturer to the customer, but the empty bottles flow from the customer to the manufacture side.

So and in pharma in FMCG and in variety of these organizations you have expired products also. So expired product flow from the customer side to the manufacture side for proper disposal. Information is also very important. Information related to product availability flows from manufacturer side to the customer side. But information related to what types of products are required.

In how much quantity these products are required that type of information flows from the customer side to manufacture side. So that accordingly new products can be develop. Accordingly designs can be changed, accordingly quantities can be adjusted for all those things this information flows in both the directions. Funds that it the third important flow which is there in the supply chain.

Normally the flow of funds, the source of that is the customer. Customer is the only positive source of cash flow, or fund flow in this supply chain. But when we talk of reverse logistics, when we talk of products going from the customer side to the manufacturer side, in that case funds may flow from that side left side to the right side also. So therefore the arrows in all 3 cases information, product and funds are in both this directions.

But one thing is very important flow of information is independent. Flow of information is independent why flow of product and funds are related. The direction of flow of products and funds is always opposite to each other. If products are flowing left to right, so in that case

funds will flow right to left and if products are flowing right to left in that case funds will flow left to right.

So these directions are restricted directions and the flow of information is independent, it can flow independently in both the directions. So that is about 3 important flows in supply chain. Normally normally most of our cost related diseases are linked with the flow of products. That how the flow of product is taking place in your supply chain. But at the same time when we are talking of supply chain analytics the flow of information is equally important.

Because now a days we are moving for real time decision making of supply chain. And for that purpose the efficient flow of information, efficient flow of data is very very important in this particular case. So that our decision making becomes more efficient, more useful helping the supply chain or helping ultimately the objectives of the organization.

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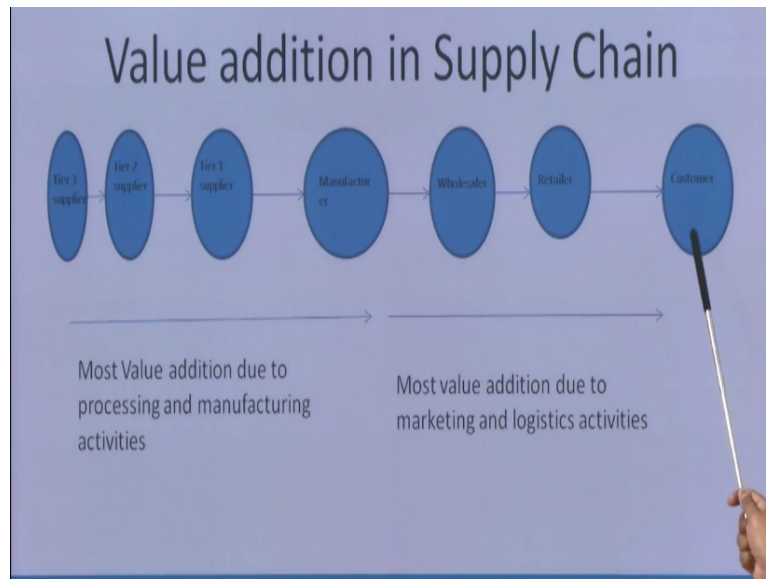
**The Objective of a Supply Chain**

- Maximize overall value created.
- **Supply chain value:** difference between what the final product is worth to the customer and the effort the supply chain expands in filling the customer's request.
- Value is correlated to supply chain profitability (difference between revenue generated from the customer and the overall cost across the supply chain).

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Now let us see what are the objectives, typical objectives of a modern day supply chain. So modern day supply chain the objectives are to maximize the value which we are creating in the supply chain. The supply chain value is actually the difference between what the final product which we are offering to customer is worth and the customer is giving how much for that and this value we can directly relate with the profitability of the supply chain.

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And just to give you the idea of the process of this value in the supply chain. This slide is very helpful for us where you see now in this case you have 3 entities to the left side of the manufacturer and these are vendors, these are suppliers to the manufacturer, which we call them Tier-1 supplier, Tier-2 supplier, Tier-3 suppliers. They are supplying raw materials, they are supplying components, they are supplying parts, some assemblies etc. to the manufacturer.

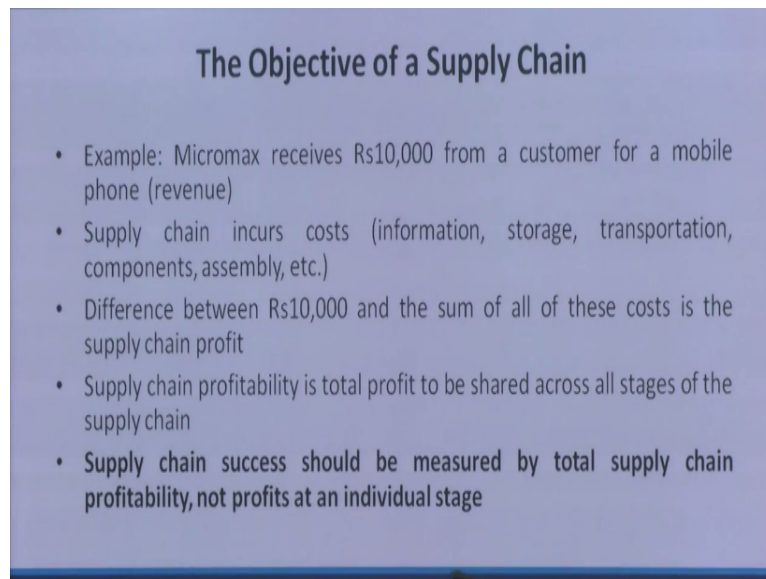
And most of the value addition from this side till the manufacturer finishes the final product is because of processing and the manufacturing activities. You are doing lot of processing, you are doing painting, you want fabrication, and these things are happening. So incremental value addition is taking place because of all these activities. Once product leaves the manufacturer and it reaches wholesaler, retailer, and to the customer.

The value addition is taking place in these phases also. But here the value addition is because of marketing and logistics activities. So we need to see that finally when the product is reaches in the hand of the customers. So what is the value the product has acquired and how much customer paying for that value and we want to actually maximize this difference.

So that difference is actually the profitability of the organization. So it is very very important to understand that we need to do value addition but for that value addition how much customer is ready to pay. If you do excess value addition and for which it is difficult to get money out of the customers pocket then you profitability will be certainly under the question

mark. So we would need to see that do not waste your resources in those things were you do not add significant value and therefore the concepts will help us in achieving that objective.

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### The Objective of a Supply Chain

- Example: Micromax receives Rs10,000 from a customer for a mobile phone (revenue)
- Supply chain incurs costs (information, storage, transportation, components, assembly, etc.)
- Difference between Rs10,000 and the sum of all of these costs is the supply chain profit
- Supply chain profitability is total profit to be shared across all stages of the supply chain
- Supply chain success should be measured by total supply chain profitability, not profits at an individual stage

For an example this slide gives you that if I purchase a mobile phone of micromax at the price of Rs. 10,000 and the supply chain this is the revenue of the supply chain when I am paying 10000 rupees for purchase of a micromax mobile, so if I am paying 10,000 rupees so this revenue of the supply chain. And supply chain incurs cost in getting the information, storage, transportation, the components, the assembly etc.

So all that is the cost of supply chain. Now the difference between this 10000 rupees and sum of all these cost is the profit of the supply chain. And throughout this course we are actually targeting to maximize the supply chain profit. So supply chain profitability is total profit to be shared across all stages of this supply chain. Now it is also very important to understand that when we are talking of supply chain.

So we are talking of total profit and that total profit is shared among all these supply chain partners. All these stages, so I am not talking of profit of an individual stage, or individual member of the supply chain. So supply chain success should be measured by total supply chain profitability and not profit of an individual stage. And as soon as we start of individual stage, the very objective of supply chain, the very objective of working together is defeated.

And then the purpose of the competing with supply chain, competing with supply network will be lost. So all the time we need to keep this in mind and later on with the help of some

data and some kind of modelling exercises, we will see that how this supply chain profit which we are talking in totality is always more than we talk of profit at the individual stage.

So it is not a more like preaching statement, it can be proved with the help of some kind of quantitative data also. Now we also need to see the evolution of supply chain over last 100 years and we will use our part 2 of the lecture to discuss the evolution of supply chain management, so at the time we are just stopping here to discuss that what is the supply chain and how we need to do business in a supply chain environment with the help of coordination with the help of all entities working together.

And not to think for individual supply chain, individual gains, or individual profits, it is a business with the help of coordination, with the help of cooperation of all the members of supply chain and therefore the success of supply chain lies in the coordination supply chain success lies in trusting each other and these are the fundamentals of supply chain management. Thank you very much.