

Management of Inventory Systems
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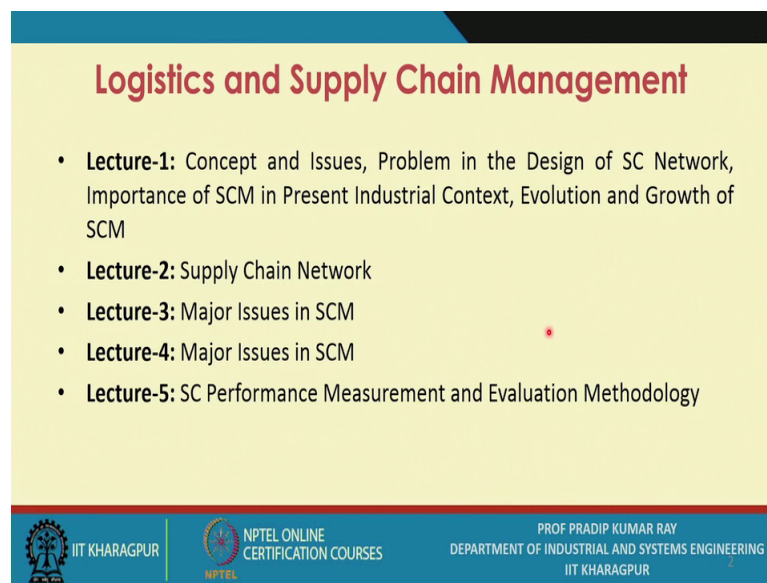
Lecture - 56
Logistics and Supply Chain Management

So, till now we have discussed many important issues related to Management of Inventory Systems. And as you might have noticed that while you try to have a management system for inventory control, you also must consider the production control aspects and many other important issues and these issues we have already discussed from several perspectives, like say from the perspectives of online real time control, from the perspectives of say theory of constraints, from the perspectives of say the material substitutions through value engineering, so all these topics we have covered.

Now, during this week this is the last week or the 12th week of this particular course, now we are referring to an important topic that is Logistics and Supply Chain Management. Now throughout the world worldwide, because of many reasons the logistics and supply chain management has assumed the critical importance; and the entire framework of the inventory and the production control systems in any organization; it is said that is essentially a part of the logistics and the supply chain management, which is basically you can say is a biggest system and within the system within the supply chain management systems so you have been working.



So, what we have thought of that you must conclude our lecture sessions with this, with discussing this important topic called logistics and supply chain management.

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Logistics and Supply Chain Management

- **Lecture-1:** Concept and Issues, Problem in the Design of SC Network, Importance of SCM in Present Industrial Context, Evolution and Growth of SCM
- **Lecture-2:** Supply Chain Network
- **Lecture-3:** Major Issues in SCM
- **Lecture-4:** Major Issues in SCM
- **Lecture-5:** SC Performance Measurement and Evaluation Methodology

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And there are the several issues involved, there are several topics included in supply chain management and what you will find that that for the supply chain management systems to be to be working making it is specific objectives. You must have sufficient control on your inventory systems as well as your the production systems.

So, so in the process of say highlighting or the important issues of supply chain management, we will come to know what extent the inventory and say the production control say the facilitates, say you know the achievement of objectives of logistics and supply chain management.

Now there are the five lecture topics I have selected, and all the issues all the important issues, it is go with very large topic supply chain management we will come to know, that there are so many issues you need to consider, but still what I thought of that out of the many relevant issues a few important most important issues we need to discuss, particularly the topics which are highly relevant to understand to understand the usability or usefulness of say inventory and production control.

So, there will be five lecture sessions, and before I take off or before I start discussing for these important topics, let me tell you ah the top lecture wise the topics I intend to cover. In the first lecture session; the basic concepts and issues which we must be dealing with in logistics and supply chain management we will be highlighting all these concepts and issues.

The problems in the design of supply chain network, so we will come to know what is the supply chain network and once you present your supply chain network and then what are the problems you need to address, how these problems are to be formulated and what are the decision variables and each in each problems all these details we will try to highlight.

Importance of supply chain management in present industrial context; this point already I have mentioned that in the present industrial context, the supply chain management issues you must consider, and evolution and growth of supply chain management. Supply chain management is not a new concept, but over the years what has happened it has gone through several phases as the industrial situations it is changing so, also the supply chain management related issues ok. So, new kinds of issues you need to address under supply chain management.

So, all these details we will discuss during the first lecture session second lecture sessions, we will discuss in detail the supply chain network. We will continue these discussions on a supply chain network along with the major issues in supply chain management, during a third lecture session as well as during fourth lecture sessions.

So, we also must know that what are the major issues in supply chain management and how all these issues are relevant and if you need to consider all these issues, what sort of approaches ah what sort of you know say tools and techniques you need to use. And we will conclude ah these lecturers' sessions with say the last lecture sessions, we will cover the supply chain performance measurement and evaluation methodology. Now this is very important so there could be many types of say measurement system, measurement and evaluation systems for supply chain performance.

So, here we are going to say so discuss a comprehensive supply chain performance measurement and evaluation methodology. So, what are the steps involved in this methodology, what are the data to be collected and how do you identify or the performance criteria. So, what are the for the criteria performance criteria you will select for different members of say the supply chain, so all these details we will we are going to discuss.

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Logistics and Supply Chain Management

- ✓ Concept and Issues
- ✓ Problem in the Design of SC Network
- ✓ Importance of SCM in Present Industrial Context
- ✓ Evolution and Growth of SCM

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And what is our expectation is, with this knowledge in of in supply chain management issues, you will you will be able to design your inventory control systems in a in a better manner. That means, you will come to know to what extent your present inventory control system is effective and for improving the effectiveness of your inventory control systems, what are what are the you know what are the alternate say the control systems we may propose in a given situation.

So, so during these lecture sessions we will discuss the basic concept and the issues. Problem in the design of the supply chain network, importance of supply chain management in present industrial context in specific terms you mention, and then evolution and growth of supply chain management, so this the course of topics we going to discuss now.

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Concept and Issues

- The concept of Logistics and Supply Chain Management (SCM) is introduced to address the problem of integration of organizational functions.
- The organizational functions range from ordering and receipt of raw materials and other parts/components through the manufacturing process to the distribution and delivery of products/end items to customers.
- Integration of these functions should be done in such a way that it results in (i) achievement of higher quality in products and customer services, (ii) reduction in inventory cost.

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Now, the concept of logistics and supply chain management is introduced to address the problem of integration of organizational functions. As you might have noticed that there are different organizational functions you must be dealing with. This point say we have already mentioned like say there are different functions like say the marketing and market research, any specifications engineering or the product development, then you deal with the procurement, then you deal with say the process planning and control, then you have a production, then you have the inspection and the final examination so and then sales and distributions so and there are many others like the technical services; then thus a storage the storing and say the packing and storing a sales and distributions technical services and even disposal of reviews.

So, these are the specific ah so the organization functions and what you need to why do you need to do; that means, you need to integrate all these functions. And you will find that that is a information flow, there is a material say material flow say between all these functions and what extent you are able to make this flow as smooth as possible.

Now, these organizational functions range from ordering and receipt of raw materials, these are very vital function and other parts and components to the manufacturing process to the distribution and delivery of products or the end items to the customers ok. So, this is the entire process; that means you have the inbound logistics, then you have a

factory systems or say productional manufacturing systems and then you have the outbound logistics; that means, from say the suppliers to the customers.

Now, this is a dynamic system, so there will be flow of materials in different forms and what you need to do that means, ah when you run a factory systems to what extent you can exact control ok, to meet your to achieve your objective of liquid financial performance what extent you control the activities of or the or the or the tasks or the you know related to the flow of materials from the suppliers, as well as the flow of materials or the say in different forms to the customers ok. So, that is your responsibility integration, so integration is a must. So, integration of this function should be done in such a way that it results in now this point you just (Refer Time: 13:46) down; that means, these integration we always talk about integration.

But integration can be done in several ways ok, but here in this case when we talk about supply chain management, these integration should lead to achievement of higher quality in products and customer services, and the second important objective is it must result in reduction in inventory cost. Now these are the two critical problems always you face, so there are several instances where the companies or the organizations have ah have successful have been successful in achieving this two objectives.

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Concept and Issues

- SCM is found to have a huge potential competitive impact.
- It was originally introduced to describe a new integrated logistical management approach across different business functions:
 - i. Purchasing
 - ii. Manufacturing
 - iii. Distribution
 - iv. Sales

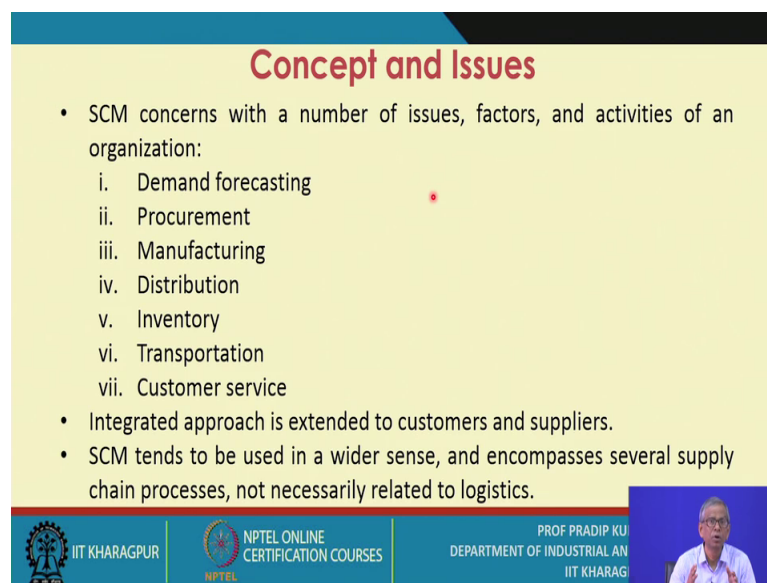
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Now, supply chain management is found to have a huge potential competitive impact; that means, if you find that your product is competitive and your market share is growing

the profitability is also increasing there could be many reasons and 1 of the most say or the important reasons always you will find that is your supply chain management system is very efficient and effective. So, so if you have, so if you supply chain management is proper appropriate and it will have a positive impact on your on your say the financial performance; it was originally introduced to describe a new integrated logistics management approach across different business functions ok.


So that means, as I have already pointed out that the supply chain management is not a new concept, in the earlier times what used to have that means, ah we used to for supply chain management used to concentrate on managing different business functions is it ok, like purchasing like manufacturing distribution sales. These are the typical the business functions will be dealing with.


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Concept and Issues

- SCM concerns with a number of issues, factors, and activities of an organization:
 - i. Demand forecasting
 - ii. Procurement
 - iii. Manufacturing
 - iv. Distribution
 - v. Inventory
 - vi. Transportation
 - vii. Customer service
- Integrated approach is extended to customers and suppliers.
- SCM tends to be used in a wider sense, and encompasses several supply chain processes, not necessarily related to logistics.

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Later on SCM for as of now the SCM concerns with number of issues factors and activities of an organization ok. So, so it is not only concentrating on the few say business functions, so it deals with a large number of issues factors and activities.

So, some of these issues or the factors or the activities I have named like the demand forecasting. So, this will must look into procurement function as we have already discuss in detail the purchasing management basically it deals with the procurement function; obviously, there will be dealing with the manufacturing system. The distribution likes a you have already discussed or the distribution requirements planning, then the inventory

part you looked into the transportation is a very important issue and the customer service the service level you already know what is the service level.

So, ultimately the entire supply chain management; that means, your supply chain management should be such that ah we can achieve the desired you know the service level, as you know say the desired by the customers. So, an integrated approach you can extend to customers and the suppliers; that means, not only you are trying to integrate the activities which you carry out within your factory systems, but you also try to integrate the activities you carry out in respect of your supplier as well as in respect of your customers.


So, like we refer to the CIM computer integrated manufacturing. So, here the integration is done or the activities that you carry out within the factory systems, but then again we go one step ahead you say why do not you go for computer integrated business; that means, why do not you include in your integration ok. The activities you carry out constantly with your supplier as well as the activities you carry out in respect of your customers all the time. So, then we will move from say from CIM to CIB computer integrated business like what many Japanese organizations have done.


So, SCM tends to be used in a wider sense and encompasses several supply chain processes, not necessarily related to logistics, I started with logistics in sixties, but the later on it encompasses many other supply chain processes.

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Problem in the Design of SC Network

- To quantify and optimize the trade off between customer service levels and inventory investment required to support the service requirements.
- Problem in SCM becomes challenging mainly due to dynamic nature of supply chains:
 - i. Prolific product variety
 - ii. Short product lifetime
 - iii. Frequent new product introductions

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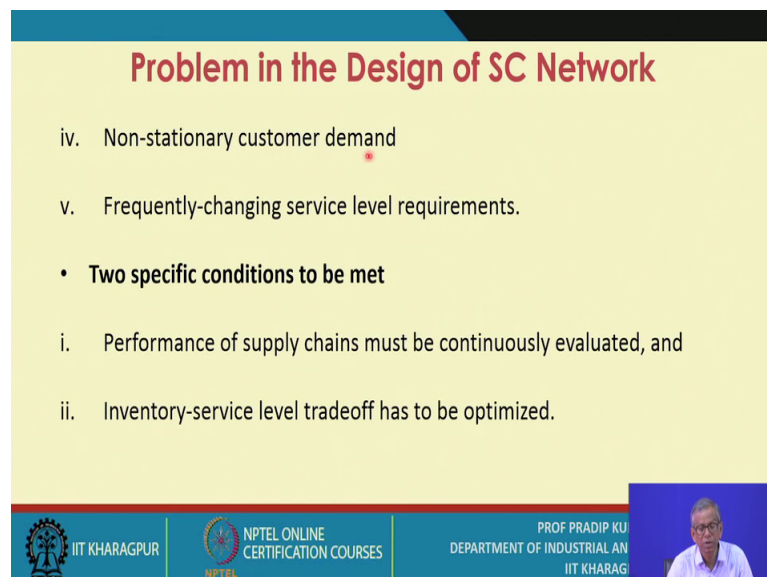
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Now, one of the problems that you may come across, in the design of say supply chain network to quantify and optimize the trade off between customer service levels and inventory investment required to support the service requirements. Now, this is very important that means, one is the service level and you need to have a very high service level and this service level which you have to say the maintain the desirable say service level, you have to maintain with minimum inventory investment. So, and there could be many other the secondary objectives, you may have and all these objectives you need to satisfy simultaneously. So, it has to be an integrated approach and there must be a period of ah between for getting an optimized performance level.

So, the problem in SCM becomes challenging mainly due to dynamic nature of the supply chains is it ok. So, say the supply chain the characteristics as well as the flow of materials will changing overtime. So, it is a dynamic system so what are the main problems actually you may face like you need to consider likes a prolific product variety ok. So, the product varieties are more than short product life time is it ok. So, the product life cycle is becoming day by day it is becoming shorter and shorter for many products frequent new product introductions.

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Problem in the Design of SC Network

- iv. Non-stationary customer demand
- v. Frequently-changing service level requirements.
- **Two specific conditions to be met**
 - i. Performance of supply chains must be continuously evaluated, and
 - ii. Inventory-service level tradeoff has to be optimized.

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So, this is one non stationary customer demand, so this already we know that; that means, when we deal we already we have dealt with a problem called the problem under uncertainty and so while we classify the inventory related problems.

So, it is even suppose the problem is problem under which is you come across, but again the probability distribution maybe known probability distribution of demand maybe known at this point in time, but in future maybe the probability distribution you may change with the type of probability distribution may change. So, many a time you come across non stationary or the demand situation frequently changing service level requirements; so this also another problem.

Now, two specific conditions are to be made for supply chain management you just note down these two points, first one is the performance of supply chains must be continuously evaluated is it because, it is this performance is a function of time there are many factors affecting the performance of the supply chains and so obviously this performance is to be continually monitored and evaluated. Inventory service level trade off has to be optimized this point already I have mentioned; that means, ah you try to maximize the service level with the minimum inventory investment. So, this is really a challenging assignment.

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Importance of SCM in Present Industrial Context

- In today's global market place, individual firms no longer compete as independent entities with brand names. They work as a part of an integrated supply chain.
- Success of a firm depends on its managerial ability to integrate and coordinate intricate network of business relationships among supply chain partners.
- A firm, manufacturing or service, belongs to at least one supply chain.

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Now, why you know the supply chain management has become an important issue or important management practice in present industrial context. So, you must have very clear very the clear ideas on this, so why almost all the organizations they talk about the importance of, but there becoming aware of the importance of supply chain management.

In today's global marketplace individual firms no longer compete as independent entities with brand names; they work as a part of an integrated supply chain ok.

So, this has this has this a new paradigm and so I whenever I say create an organization, so I must know that in which say in which way I have become part of a bigger supply chain or integrated supply chain. Success of a firm depends on its manageability to integrate and coordinate, intricate network of business relationships among supply chain partners there are many supply chain partners when we will discuss the supply chain network we will we will have a very clear idea and so all these with the partners these partners maybe in most liking majority of the cases.

They are different organizations and all these partners many of these partners may work at cross purposes and so there could be the conflicting interests. So, between this partner a firm manufacturing a service belong to at least one supply chain ok.

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Two Important Points

- How widely or narrowly a supply chain is managed is an indicator of the extent to which SCM is practiced?
- Supply chains can be managed as a single entity through a dominant number (referred to as 'predator') or through a system of partnerships (through well-developed cooperation and coordination).

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Now, here in this context I try to highlight as (Refer Time: 26:10) the two important points. So, please note them down how widely or narrowly a supply chain is managed. How widely or narrowly it may be you know, when you start a company at the initial stage in the formative stage, you may have say little control or very (Refer Time: 26:38) or say you can manage the supply chain very narrowly.

Whereas, as you expand your activities as your the product mix of becomes wider then you know, so you may be able to control the your supply chain in a much better way and you may have enough control on several members of your supply chain. How widely or narrowly a supply chain is managed is an indicator of the extent to which SCM is practiced ok.


So, this is this is to be decided first supply chains can be managed as a single entity through a dominant number member referred to as predator, supply chains can be managed as a single entity through a dominant member referred to as a predator; that means, you will come to know when you look at the supply chain network, you maybe you will find that essentially that the inbound logistics or the outbound logistics are both there essential controlled by a say the main company or say the manufacturing systems. So, in that context the manufacturing systems of the main company becomes a predator.


So, who is actually the dominant the member in the supply chain, easy controlling or is that company or is that particular entity or that particular member controlling ah almost ah entire the supply chain performance or the supply chains are managed through the system of partnerships through well developed cooperation and coordination. So, these are the two extremes or extreme conditions you may come across while you deal with the supply chain management issues.

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Definition of Supply Chain

- SCM literature is replete with many definitions.
- Most commonly, it is defined as a system, the constituent parts of which include material suppliers, production facilities, distribution services, and customers, linked together via feed-forward flow of materials and feedback flow of information.
- Originally used in the logistics literature in 1980s, to describe a new integrated logistics management approach across different business functions.
- Later on, this integrated approach was extended outside firm boundaries to customers and suppliers.
- Today, it directs to several SC processes not necessarily related to logistics.

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Now, what is the supply chain now SCM literature is replete with many definitions, most commonly it is defined so you please note down this definition what is a supply chain; that means, it is a supply chain is defined as a system the constituent parts of which include material suppliers production facilities distribution services and the customers; linked together via feed forward flow of through of materials that is from the suppliers to say the. So, the factory system and feedback flow of information, so that is very important. In fact that means, the actual status at a particular say point to in at a particular point in time related to a particular aspect in the supply chain you must get through information.

So, the flow and these the flow of information must be in the reverse direction originally used in the logistics literature in the 1980, describe a new integrated logistics management approach across different business functions. Later on these integrated approaches was extended outside on boundaries to the customers and suppliers. So, please go through all these aspects you will get a clear idea that what was what was it says 50 years back and what it has become now. Today it directs to several SC processes not necessarily directed to logistics ok.

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Evolution and Growth of SCM

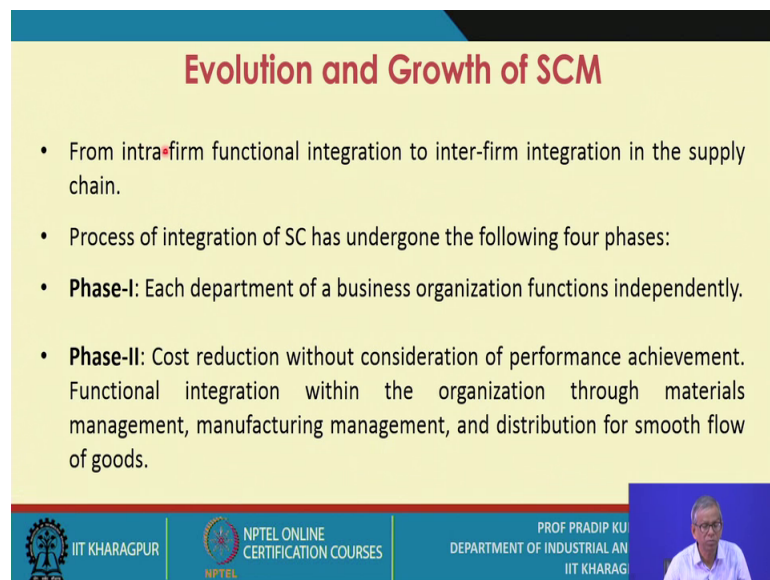
- SCM has passed through several stages of evolution during past five decades:
- Extension of organization to include all other members of the distribution channel (in the context of marketing).
- Technologies such as industrial dynamics and minimum total cost approach to distribution and logistics were advocated.
- For achieving competitive advantage, focus shifted from consideration of factors within the manufacturing plant to factors related to relationship development with suppliers and customers.

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So, SCM has passed through several stages of evolution during past 5 decades, extension of first one is the extension of organization to include all other members of the distribution channel in the context of marketing. In the technologies such as industrial

dynamics and minimum total cost approach to distribution logistics were advocates, later on in respect of supply chain management only, for achieving competitive advantage focus shifted from consideration of factors within the manufacturing plant to factors related to relationship development with suppliers and customers.

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Evolution and Growth of SCM

- From intra-firm functional integration to inter-firm integration in the supply chain.
- Process of integration of SC has undergone the following four phases:
- **Phase-I:** Each department of a business organization functions independently.
- **Phase-II:** Cost reduction without consideration of performance achievement. Functional integration within the organization through materials management, manufacturing management, and distribution for smooth flow of goods.

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And from intra firm functional integration; that means, within the firm that could be many functions ok.

Now, we move to intra firm integration in the supply chain. So, this point you just make a note and the process of integration of supply chain has undergone the following 4 phases. So, the phase 1 is each department of a business organization functions independently that is phase 1, in phase 2 cost reduction without consideration of performance achievement functional integration within the organization to materials management manufacturing management, and distributions for smooth flow of goods, but not necessarily you concentrate on cost reduction.

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Evolution and Growth of SCM

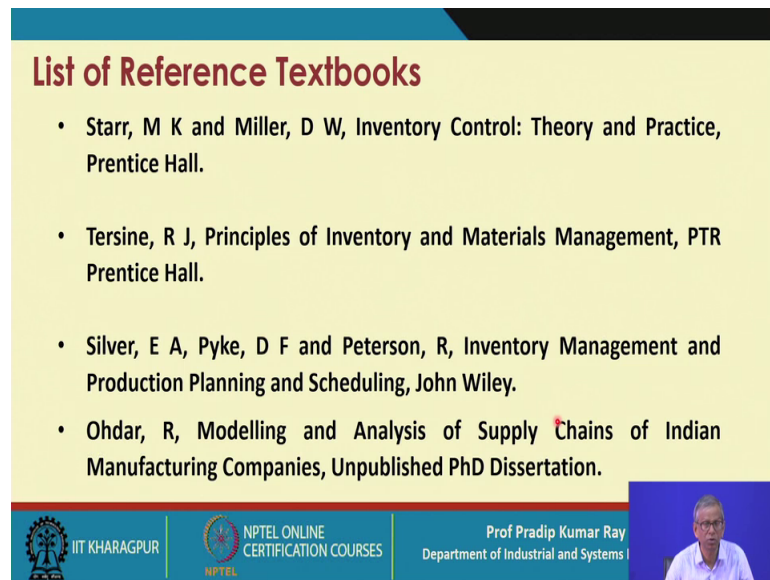
- **Phase-III:** Integration of those aspects that are directly under the control of a company including outward goods management, integrating supply and demand along the company's own chain, recognition of importance of customers.
- **Phase-IV:** Extension of integration to external activities, company becomes customer-oriented by linking customer purchasing activities with company's own procurement, manufacturing and marketing activities.

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In phase three integration of those aspects that are directly under the control of a company, including outward goods management this is an important issue integrating supply and demand along the companies own chain recognition of importance of the customer. So, this is an important consideration and in phase 4 extension of integration to external activities.

Now, this points to be noted, company becomes customer oriented by linking customer purchasing activities with companies own procurement. So, linking your procurement systems with customers purchasing systems, manufacturing and marketing activities. So, these are also is to comes and will also plane the most crucial role.

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So, with this what we have highlighted the basic issues of that we deal with for supply chain management and ah when the things what is the present practices, how do identify the supply chain management related issues in the present industrial context. So, all these details we have come across we are also define in explicit terms what is (Refer Time: 33:50) a supply chain. So, with this basic knowledge now definitely we can we can a say deal with several other important issues, already affecting positively are the supply chain management that will discuss in the subsequent lecture sessions.

Thank you.