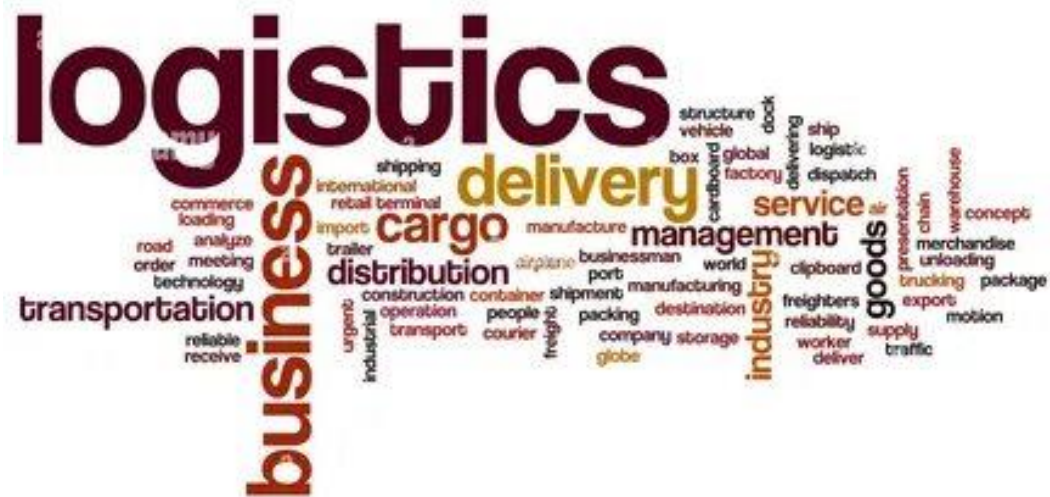


МИНИСТЕРСТВО ОБРАЗОВАНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ  
УЧРЕЖДЕНИЕ ОБРАЗОВАНИЯ  
«БРЕСТСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ»  
КАФЕДРА ЛИНГВИСТИЧЕСКИХ ДИСЦИПЛИН  
И МЕЖКУЛЬТУРНЫХ КОММУНИКАЦИЙ

# Introduction to Logistics



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Пособие составлено в соответствии с Учебной программой для специальности 6-05-0412-03 «Логистика».

Основной целью пособия является формирование у студентов коммуникативной компетенции будущего специалиста, позволяющей использовать английский язык в профессионально-деловой деятельности. Предлагаемые тексты и задания к ним направлены на овладение студентами лексикой, используемой в сфере логистических операций, развитие и совершенствование навыков говорения, чтения и письма. В пособии также содержится материал для организации самостоятельной работы студентов.

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## **Part I**

### **Unit 1. Logistics Role in the Economy and Organization**

*Task 1.* Before reading the text check the meaning of the key words and word combinations in the dictionary.

*Nouns:* logistics, competitiveness, distribution, enterprise, consignment, customer, inventory, supplier, infrastructure, authority, requirement, freight, source, deployment, shortage, management, consumption, enabler.

*Verbs:* evolve, ensure, achieve, spread, overlap, implement, affect, maintain, attain, store, deliver, outsource, precede, process, manufacture, provide, compel, impact.

The scope and influence of logistics has evolved in the late 1940s. In the 1950s, and 60s, military was the only organization which used logistics. The scope of logistics has been extended beyond the army, as it has been recognized as one of the important tools for developing competitiveness. Competitive advantage means the company has the ability to differentiate itself, in the customer's eyes, and also is operating at a lower cost and greater profit.

Logistics facilitates in getting products and services as and when they are needed and desired to the customer. It also helps in economic transactions, serving as a major enabler of growth of trade and commerce in an economy.

Logistics has come to be recognized as a distinct function with the rise of mass production systems. Production and distribution were earlier viewed as a sequential chain of extremely specialized activities. The role of logistics is to ensure availability of all the required materials before every step in this chain. Obviously inventory of raw materials, semi-finished and finished goods is a must across this chain to ensure its smooth functioning.

The concept of logistics has its base upon the systems approach. There is a single chain, with flow of materials starting from the supplier, then to the plant and finally to the end customer, and also these activities are done sequentially in order to achieve customer satisfaction at low cost. For this to be successful there has to be co-ordination in the activities of the department.

With reference to an organization, an organization gets a concrete shape due to its structure. In the earlier times, the suppliers in distribution activities were spread across the entire structure, thus resulting in an overlapping of activities and finally in unaccountable authority and responsibility. In today's process driven organization, where the focus has shifted from functions to process, logistics has become an essential part of the process.

#### *Definitions of logistics*

The American Council of Logistics Management defines logistics as "the process of planning, implementing and controlling the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customers' requirements".

Philip Kotler defines logistics as "planning, implementing, and controlling the physical flows of materials and finished goods from point of origin to point of use to meet the customer's need at a profit".

Logistics is all pervasive. Some excellent examples of value adding logistics services:

(a) Reliable, foolproof logistics system of delivering lunch boxes to over 5,00,000 office goers every day without letting the wrong lunch box reaching the wrong office and also ensuring the boxes reach on time. (Dabbawalas of Mumbai)

(b) One of the largest logistics network in the world today, which delivers letters in the most cost effective manner across six lakh villages, one hundred and twenty cities and several thousand mofussil towns covering the length and breadth of the country within twenty-four to forty-eight hours and serving more than hundred and seventy countries with Indian source stations/ customers and/or destinations as mentioned earlier. (The Indian Postal Services)

### *Logistics objectives*

Reduction of inventory. Inventory is one of the key factors, which can affect the profit of an enterprise to a great extent. In the traditional system, firms had to carry lot of inventory for satisfying the customer and to ensure excellent customer service. But, when funds are blocked in inventory, they cannot be used for other productive purposes. These costs will drain the enterprise's profit. Logistics helps in maintaining inventory at the lowest level, and thus achieving the customer goal. This is done through small, but frequent supplies.

Economy of freight. Freight is a major source of cost in logistics. This can be reduced by following measures like selecting the proper mode of transport, consolidation of freight, route planning, long distance shipments etc.

Reliability and consistency in delivery performance. Material required by the customer must be delivered on time, not ahead of the schedule or behind the schedule. Proper planning of the transportation modes, with availability of inventory will ensure this.

Minimum damage to products. Sometimes products may be damaged due to improper packing, frequent handling of consignment, and other reasons. This damage adds to the logistics cost. The use of proper logistical packaging, mechanized material handling equipment, etc will reduce this damage.

Quicker and faster response. A firm must have the capability to extend service to the customer in the shortest time frame. By utilizing the latest technologies in processing information and communication will improve the decision making, and thus enable the enterprise to be flexible enough so that the firm can fulfill customer requirements, in the shortest possible time frame.

### *Various functions of logistics*

Order Processing. Processing the orders received from the customers is an activity, which is very important by itself and also consumes a lot of time and paperwork. It involves steps like checking the order for any deviations in the agreed or negotiated terms, price, payment and delivery terms, checking if the materials is available in stock, producing and scheduling the material for shortages, and also giving acknowledgement to the owner, by indicating any deviations.

Inventory Planning and management. Planning the inventory can help an organization in maintaining an optimal level of inventory which will also help in satisfying the customer. Activities like inventory forecasting, engineering the order

quantity, optimization the level of service, proper deployment of inventory etc. are involved in this.

Warehousing. This serves as the place where the finished goods are stored before they are sold to the customers finally. This is a major cost center and improper warehouse management will create a host of problems.

Transportation. Helps in physical movement of the goods to the customers place. This is done through various modes like rail, road, air, sea etc.

Packaging. A critical element in the physical distribution of the product, which also influences the efficiency of the logistical system.

#### *Value delivery in the supply chain*

The world has become a global village where due to liberalization and globalization, business organizations are forced to supply products beyond their national boundaries. Thus in such situations, the role of logistics is to provide time and place utility of the products to customers.

Also businesses are striving to attain competitiveness. In their struggle to survive, their focus has shifted to supply chain, and to deliver value for money for their customers. Logistics plays an important role in the process of delivering value and how successful the supply chain management is greatly depends on logistics planning and support.

Nowadays, the trend is to outsource. Organizations continue to outsource their operations because it is better to outsource the functional areas to experts who can do this job at a lower cost. This is one way of adding value.

#### *Logistics value delivery to the customer*

Inbound logistics: These are the operations, which precede manufacturing. These include the movement of raw materials, and components for processing from suppliers.

Process logistics: These are the operations, which are directly related to processing. These include activities like storage and movement of raw materials, components within the manufacturing premises.

Outbound logistics: These are the operations, which follow the production process. These include activities like warehousing, transportation, and inventory management of finished goods.

#### *Logistics Solution*

Generally, the in-house logistics departments in manufacturing organizations take care of all aspects of logistics. But this is not an area of core competency of manufacturing or trading organizations. Today, a lot of successful business corporations across the world are outsourcing logistics to the third party logistics providers, who are having the necessary infrastructure and expertise to do the job in a better manner. Complete logistics solutions to manufacturers and traders is provided by the third party logistics providers, and they help in integrating various logistics operations, thus ensuring speedy and uniform movement of materials across the supply chain.

Logistics is nowadays widely used in virtually every area. The success of a logistics service providing company depends on how they conceptualize and implement the logistics solution, and also tune to the requirements of the customer.

### *Future of Logistics*

Nowadays corporations look only for sustainable competitive advantage, not only for growth, but also to survive. There is so much killing competition that corporations are compelled to review their business process while they deliver the products and services to customers, who are looking for more and more value for the money that they are spending. The focus of competition has shifted from the product to the supply chain.

Today, logistics management is based on the system concept and cost approach. Transportation, warehousing, handling of material, inventory management and order processing are the major logistics activities, which impact the customer cost and operation. Integrated logistics helps in taking the cost out of the supply chain and also enhance the customer service level.

When looking at the macro level, a growth of a country's economy depends on the availability of excellent logistics infrastructure. The speed of the movement of goods depends to a great extent on the various modes of transportation like rail, road, air, and sea.

Logistics has a bright future, especially in India, but certain pressing issues like abolition of octroi levy, rationalization of customs formalities, improvement in road and rail infrastructure, creation of modern warehouse facilities etc, have to be taken care of. The geographical position of India also is well positioned to emerge as an excellent hub for a variety of products.

### *Understanding the main points*

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
logistics	a company, business, organization or other purposeful endeavor
competitiveness	one who purchases or receives a product or service
distribution	the power to enforce rules or give orders
enterprise	the process of moving raw materials and component parts into, through and out of the firm
consignment	the basic facilities, services and installations needed for the functioning of a community or society
customer	act or state of distributing or being distributed
inventory	one who supplies; a provider
supplier	a collection of goods to be sent
infrastructure	the state of being able to successfully compete
authority	the stock of an item on hand at a particular location or business

**Task 3.** Find English equivalents to the following words and word combinations.

Распространяться за пределы, устойчивое конкурентное преимущество, обеспечить наличие, конкретная форма, процесс принятия решения, отличный пример, в большой мере, оказывать влияние, подходящий вид транспорта, использование самых современных технологий.

**Task 4.** Find synonyms to the following words.

Bring out; identify; denote; dispensing; in a logical manner; approve; barrier; injury; make better; move; come before; inputs; need; velocity; permeating.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
competitive	functioning
economic	advantage
specialized	supplies
smooth	materials
cost effective	activities
frequent	position
shortest possible	transactions
improper	companies
physical	logistics
global	boundaries
successful	management
integrated	time-frame
geographical	manner
national	village
required	distribution

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

The scope of logistics, competitive advantage, production and distribution, the flow of materials, inventory of raw materials, to define logistics, reduction of inventory, order processing, to attain competitiveness, to deliver materials, to look for competitive advantage, bright future.

**Task 7.** Review questions.

1. When did the scope and influence of logistics evolve? 2. What does the term ‘competitive advantage’ stand for? 3. What does logistics help to facilitate? 4. How did logistics change the understanding of production and distribution? 5. What does ‘the system approach’ mean with reference to logistics? 6. How is logistics defined by various organizations and scholars? 7. What are the objectives of logistics? 8. What do logistics functions include?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner’s talk, think of questions to ask at the end of it.

## **Unit 2.** Logistics and Customer Service

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.



*Nouns:* retention, allocation, dispatch, customer, reason, service, trustworthiness, strategy, importance, change, delivery, influence, credibility, efficiency, , frequency, costs, transaction, structure, flexibility, value, offering, variable, commitment.

*Verbs:* cater, deliver, invoice, enhance, attract, scale up, evaluate, postpone, gain, mean, reduce, impose, relate, sustain, associate, ship.

Customers are the focus of any activity. The primary reason behind this being that ultimately every product, service or idea finally needs to cater to the customer's requirements.

According to Lalonde Bernard J, "Customer service as a complex of activities involving all areas of the business which combine to deliver and invoice the companies product in a fashion that is perceived as satisfactory by the customer and which advances the companies objective". Customer service, as a concept has many aspects to it. Logistics management has a major role in enhancing the customer satisfaction and also retention and thus creating a lifetime customer value.

In other words, customer service as a combination of activities enables a business firm to add more value to the buyer. It is a key element of the product or service, which is offered to the customer. With good customer service, the existing customers are satisfied and this attracts new customers through word-of-mouth communication. Customer Service is not just a function or an activity. It is a philosophy, and attitude. With so much importance given to customer service, companies are trying to increase the level of customer service and scale up to the expectations of the customer. Unless the products are in the hands of the customer at the time and place of requirement, products do not have any value attached to them. To attain a commendable service level, the firm has to plan a closely integrated logistics strategy.

In today's market, customers are so much demanding, not only in the quality aspect but also with regard to the service aspect. Customers form a few perceptions in relation to the various aspects of customer service like reliability, competency, responsiveness, trustworthiness etc. With the help of these cues, customers evaluate the firm's services and conclude whether they are satisfied or not. Physical distribution plays a major role in delivering customer service.

As there is an increase in the competition, and there is advancement in technology, companies today are faced with the mounting pressure to develop even more innovative strategies for customer service.

Two key factors that have contributed maximum for the growing importance of customer service as a competitive weapon are the continuous development of customer expectations and the gradual shift of customers from branded products to local unbranded products. A very good example would be the personal computer market, where the buyer finds it difficult to make a difference between a branded version and an unbranded one. The rapidity of technological change and a decreased product life cycle has further developed the importance of customer service.

### **The elements of customer service**

#### *Order Delivery Cycle Time*

The general tendency for a manufacturer to look into is the physical delivery of the product when the orders are not delivered on time. So, when orders are not

delivered on time and customer complaints are received, the manufacturer looks into the physical delivery of the product to the customer and tries to solve this problem by bringing the product closer to the client. Thus, there is a tremendous increase in the stock-holding points for the manufacturer. When the manufacturer examines this closely, he will realize that physical delivery is not the most time consuming element of the order-delivery cycle time, but there are a host of other activities like transmission of the order, processing the order, etc which also affect the delivery. In fact an activity like the order processing itself consists of a series of activities like the registering the order in supplier's system, allocation of material from work-in-progress, warehousing and distribution centers, packing the materials, dispatch of material etc.

#### *Reliability of inventory*

When a specific item is out of stock, which is interpreted as a loss of sale and if these

stocks out conditions take place frequently, these will influence the customer service levels. And would further lead to a loss of credibility for the company.

#### *Consistency and frequency in delivery*

The firm must ensure the maintenance of a same or similar delivery period over a period of time to deliver material to the customer. This means the firm must have the ability to coordinate the various logistics arms, and also the efficiency and effectiveness of the entire chain.

Also, the frequency of delivery is an important part of the customer service. Usually, a customer does not prefer to stock huge quantities of particular items, and would prefer smaller quantities in smaller lots. Eventually there is an increase in the transportation cost, but the inventory cost reduces and there is a net effect in the entire supply chain. When there are multiple orders from small clients, there is congestion in the logistics pipeline, and thus this reduces the ability of the company to serve its larger clients more efficiently. Also the logistics costs for small orders are more than the large orders and also they would swallow up the profit on the large orders. To avoid such hassles, and to avoid additional costs, the frequency of delivery and minimum orders are being used as limitations imposed on suppliers as an effort to reduce normal tendency of most clients.

#### *Other factors*

Apart from the regular factors there are also others like the transmission of order collection, frequency of visit of salesman to customers, invoicing and collection systems, communications level between customers and suppliers which can be of more importance to certain organizations.

#### **Phases in customer service**

a) *Pre transaction phase*. In this phase, the service level and other related activities are defined on a policy level in both qualitative and quantitative measures. It is the creation of a service platform to serve the customer, so as to build up credibility in the market and create a good image amongst the existing and prospective customers. In other words, this refers to those elements, which determine the capability of service before they are provided.

Pre-transaction elements are usually relate to corporate policies or programs, written statements of service policy, adequacy of organizational structure and system flexibility.

The following are the important elements of the pre-transaction phase:

- *Customer Service Policy Statement.* This gives the service standards for the company. For example, company X, a leading automobile spare part manufacturing company, makes a policy commitment to deliver the spare parts to its customers within 48 hours of placement of the order.

- *Accessibility.* This refers to the ease with which customers can contact the firm.

- *Building the organization.* In order to implement the policy derivatives on customer service, the firm must formalize the reporting structure, delegate authority and also allocate responsibility. Also, a proper reward system will motivate employees who are involved in customer service to interface efficiently with the customer.

- *Structuring the service.* The expectations of customers, the industry standards, and the standard of service the firm would like to maintain influence the basic structure of any service. For sustaining the competitive advantage, innovation in service is very much necessary. Innovation adds to the value of the offerings made to customers. Another key aspect to service structure is the delivery. Two important aspects of delivery are place and time.

- *Educating the customer.* This is important because this can reduce the customer complaints on deliveries of products, their operations and maintenance etc., Usually customers are educated through manuals training, seminars workshops etc.

- *System design and flexibility.* While designing the system, care should be taken that all the possible queries, which the customers can ask, must be answered. The system may be manual or fully automatic, similar to ecommerce. Also the adaptability of the service delivery systems to meet a particular customer need is essential.

b) *Transaction phase.* During this phase, the customer service is associated with the routine tasks, which have to be performed in the logistics supply chain. Those variables directly involved in performance of the logistics functions, for example, availability of product, order cycle time, reliability of delivery etc. The following are the various service elements associated with this phase:

- *Reliability of order fulfillment.* This is a key factor. There needs to be reliability in fulfilling the order within the agreed time frame and also with respect to the quantity and quality of the material ordered.

- *Order convenience.* The ease with which customer can place an order. There are various barriers to this like the paper work required by the supplier, compliance to various procedures, complex payment terms, poor communication network at suppliers end etc.

- *Order postponement.* Sometimes, the customer may postpone an entire order or some parts of it. This means customer has to reschedule his requirements. In some other case, due to availability of a certain product category in the future, the seller can allow the buyer to place the order immediately and he would ship the product when it is available on future dates.

- *Consistency of delivery*: Delivery consistency of repeat orders is important.

- *Product substitute*: There may be some situations in which the product ordered couldn't be shipped due to certain manufacturing or quality problems. In such cases, the seller can offer a substitute product and honor his commitment.

c) *Post transaction phase*. This is a phase where customer satisfaction and building up of a long-term relationship with the customer are involved. It involves commitment of resources to offer the desired level of service. These measure the customer satisfaction on the basis of the expected results. Generally supportive of the product in use, for example: warranty of products, parts and repair service, procedures for complaints of customer and replacements of products. The following are the various elements singled out within this stage:

- *Information of order status*. In B2B transactions and e-commerce, the customer after payment of part value (sometimes full value) of the product as an advance, requests feed back on the status of the shipment on a continuous basis.

- *Customer complaints, claims, and returns*. The seller's responsibility will not be over once the product is dispatched to client. Sometimes, the products damaged during transit, or the product may not be according to the functional requirements of the customer. For this, there must be a policy for product return and this is usually done through reverse logistics system.

- *Product installation, commissioning and technical snags*. This is part of the after sales service, as complex products may sometimes develop technical snags during the warranty period. The after sales department takes care of all these issues.

- *Customer awareness and training*. A key aspect of service element in this phase. For technically complex products, it is necessary for the seller to train or educate the user regarding its operation.

### **Customer retention – an extension of customer service**

It is the totality of the 'offer', which delivers value to the customer. An illustration to highlight this can be a comparison between a product in the warehouse and a product in the hands of the customer. The value addition here is the fact that the product is in the hands of the customer.

According to the 80/20 Pareto (the Italian economist, Pareto) rule, 80 per cent of a company's profits comes from 20 per cent of the customers. A further dimension to this would be to say that 80 per cent of the total costs to service would be generated from 20 per cent of the customers. Thus, identification of the real profitability of customers and then develop strategies to develop services that will improve the profitability of all customers is essential.

While 'getting and retaining customers' is the main focus of marketing, in practical terms, organizations put in more effort in getting the customers rather than retaining them. Organizations have to make a conscious effort in understanding how many of the customers they had a year or six months ago are still with them as customers. The retained customers can be more profitable than the new customers in the cost perspective. Also the word-of-mouth communication happens through existing customers.

The principle of 'Relationship Marketing' is rapidly gaining popularity. A high level of customer satisfaction must be created so that they don't consider any alternative suppliers or offers.

There need to be certain pre-determined standards for controlling the service performance. There are various standards available like order cycle time, order-size constraints, technical support, order convenience, frequency of delivery, claims procedure etc.

The basic purpose of providing services is to deliver value to the customer for the money he is spending for the product. Customer service means all customers must be treated equally and also to extend service to build a fundamental business relationship. Also, a step ahead of offering basic services is to offer zero defect services. Repetitive operations have to be performed without errors by using automated systems. Another possibility is to provide value added services, which are basically unique and add efficiency and effectiveness to the basic service capabilities of the firm. These value added services have evolved due to forced innovation, due to differentiated offering, for growing and surviving in competitive markets.

### *Understanding the main points*

**Task 2.** Match the words with their definitions.

<i>A</i>	<i>B</i>
enable	to be presented or confronted with
word-of-mouth	to become larger or greater
increase	to ask a question; inquire
mount (v.)	promise or agreement to do smth in the future
be faced (with)	To yield assent; to accord; to acquiesce
costs	to affirm, to make firm and strong; to make smb able to give sufficient ability
commitment	to delay or put off an event, agreement, etc.
sustain	to get upon; to ascend; to climb
take care (of)	to maintain, or keep in existence
query	verbal means of passing information
postpone	to look after; to provide care for
comply (with)	amount of money, time, etc. that is required or used

**Task 3.** Find English equivalents to the following words and word combinations.

Ключевой элемент; требовательные клиенты; обслуживание клиентов; конкурентное оружие; обработка заказов; центры складирования; потеря доверия к компании; период поставки (товара); логистические издержки; ограничения на поставки; логистическая цепь поставок; условия оплаты; ожидаемые результаты; ответственность продавца; возврат товара; добавление стоимости; частота поставок; укреплять доверие.

**Task 4.** Find synonyms to the following words.

Enlarge; significance; obtain; investment; indicating product, quantity, price; elasticity; separate, individual; representative; upholding; critical assessment of activity; demand; train, next, following; hold; alternating, thanks to.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
primary	customers
customer's	company
existing	distribution
commendable	standards
physical	importance
innovative	customers
growing	requirements
technological	snags
time consuming	orders
specific	service
similar delivery	costs
huge	strategies
multiple	relationship
additional	item
prospective	reason
manufacturing	customers
long-term	change
technical	period
retained	element
pre-determined	quantities

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

Customer service; value; firm's services; blended products; order-delivery cycle time loss of credibility; qualitative and quantitative measures; responsibility; expected results; customer awareness; be treated equally; efficiency and effectiveness.

**Task 7.** Review questions.

1. Why are customers so important in any activity connected with providing goods and/or services? 2. How is customer service generally described? 3. What does it include? 4. In today's market, customers are becoming more and more demanding, aren't they? 5. What are the two key factors which are gaining importance in customer service? 6. What is 'order delivery cycle time'? 7. How should a firm behave in terms of consistency and frequency in delivery? 8. How many phases are singled out in customer service? 9. What is a pre-transaction phase? 10. What are the most important elements in pre-transaction phase? 11. What activities are involved in transaction phase? 12. What aspects are usually highlighted in post-transaction phase? 13. How can customer service be further extended?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it. text.

### **Unit 3. Procurement and Outsourcing**

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

**Nouns:** procurement, transaction, collaboration, survival, increase, contractor, projection, warehousing, distribution, asset, acquaintance, quantity, enabler, consumption, shortcoming, guideline.

**Verbs:** enable, engage, receive, categorize, initiate, identify, allow, expand, realize, outsource, facilitate, affect, execute, enhance, encourage/

Procurement is usually done in order to meet the needs of the manufacturing function or other internal functions for which buying is made. It enables access to external markets, supplier development and relationship management and also relationship to other functions

It is the buyers and suppliers who are usually engaged in procurement transactions, which usually begins with the buyer receiving and paying for the order. When designing the procurement process, it is important to consider goods that the process will be used to purchase. The two main categories of purchased goods are direct material and indirect materials. Direct materials are components like used to make finished goods. Indirect materials are goods used to support the operations of a firm. Indirect materials are components used to make finished goods. Indirect materials are goods used to support the operations of a firm. All procurement processes within a company relate to the purchase of direct and indirect materials.

The procurement process for direct materials should focus on improving coordination and visibility with the supplier. The procurement process for indirect materials should focus on decreasing the transaction cost for each order. The procurement process in both cases should consolidate orders to take advantage of economies of scale and quantity discounts. In addition to the categorization of materials into direct and indirect, all products purchased may also be categorized on basis of value/cost and how critical they are.

#### **Making or sourcing decisions**

1. *Use multifunctional teams.* The strategy, which is developed, must be in collaboration with the various functions like engineering, purchase, manufacturing, engineering etc which will help in identifying the correct drivers in the total cost.

2. *Ensure that there is appropriate co-ordination across regions and business units.* Ensuring that there is enough co-ordination across all the regions and business units, which will allow a firm to maximize economies of scale.

3. *Evaluating the total cost of ownership.* Price reduction need not be the sole objective of an effective sourcing strategy. Total cost of ownership is also influenced by other factors, which have to be identified and used for selecting suppliers. By focusing on the total cost of ownership, also allows a buyer to identify opportunities for having a better collaboration in terms of design, planning, and fulfillment.

4. *Building long-term relationships with key suppliers.* Basically, when buyer and supplier work together, more opportunities for saving will be generated that the two

parties working independently. A long-term relationship will encourage the supplier to expand greater effort on the issues that are key from the point of view of the buyer.

### **Logistics outsourcing**

Today, business organizations across the world are struggling for competitiveness, not only for growth but also for survival alone. The factors responsible for this are liberalized economies of the countries across the world. Moreover, the customers have become more demanding and look for value added services from prospective suppliers, as he wants value for the money he is spending. In such a situation, business organizations across the world have started reviewing their business processes and have realized that cost cutting and differentiation in value delivery are solutions to the current problem

Outsourcing is the transfer of a function previously performed in-house to an outside provider. Outsourced providers are often referred to as contractors or "third parties." When "outsourced" work is contracted out, the outsourcing business or agency still provides oversight.

Once it is decided to outsource, identifying a short list of partners can be a daunting task. Though many options exist it is essential to sort them. The following can facilitate in sorting them:

1. *Identify areas of opportunity.* Gaining the ability to enter new markets without building a costly distribution infrastructure is one great reason to outsource. Establishing a team to look at current and future requirements of a business, and assess the ability to meet those needs. This team should consist of key members of the logistics organization and such other areas as marketing and customer service. These other departments can provide insight into growth projections and shortcomings in existing processes.

2. *Assessing the Strengths and Weaknesses.* Having an understanding in what the company is good at and not--will enable to find an appropriate partner. Potential partners also have distinct strengths and weaknesses. For example, some logistics partners are better at warehousing than transportation. Others may be great at managing the import process but less skilled in such functional areas as order management.

3. *Decide what to outsource.* Once a team has identified partnering opportunities, it needs to be determined which functions to cede to the partner. Such functions as warehousing and transportation affect how customers view a company's ability to execute. The success of an outsourcing project depends, in part, on the company's comfort level with the partner's ability to execute on the company's behalf.

4. *Identify a Short List of Providers.* Several strategies can help in selecting the right partner. Creating and distributing a request for information that asks potential partners about their capabilities can be done. A list of providers who have experience in the industry can be developed. This process will reduce the number of potential partners quickly. The network infrastructure of the remaining companies also needs to be examined. It may also be helpful to initiate a logistics network optimization effort to identify optimal locations for distribution. The company's geographic needs may require a nationwide network or be more focused on specific regions.



Comparing requirements with the capabilities of potential providers and assessing their technological capabilities is essential.

5. *Consider the Human Element.* Successful outsourcing projects have one element in common: nurturing relationships between key people on both sides. Ensuring not only a fit between corporate cultures but also chemistry between individuals. This is especially important during implementation and ongoing operations.

### **A value proposition in outsourcing**

Logistics service providers help the business corporation in achieving two goals, i.e., reducing operating cost and increasing revenue. As the service provider organizes the required logistics assets, the investment in owning the logistic assets on the part of the customer is reduced, this in turn allows the firm to invest in more productive activities and get more returns on the remaining assets, enhancing the return on stockholders' investment. Alliances with service providers will free the company's manpower for more productive work, concentrate on their area of core competence, and increase the company's returns. The firm gains in knowledge because of exposure and acquaintance with the best available practices and technologies used by the service providers. These value propositions justify logistics outsourcing.

### **Benefits of logistics Outsourcing:**

In logistics, considerable quantities of materials are required to be transported and stored at various locations. Raw materials and components are to be moved over long distances from vendor supply points to production centers. These materials have to be stored for some time as raw materials and later as finished goods. Finished goods need to be transported to the point of consumption. With so much to be done, the critical reasons why companies outsource logistics activities are: a) better focus on core competencies; b) cost saving resulting from better management of supply chain; c) cross pollination of better available practices; d) wider and better geographical coverage by access to specialist world class capabilities; e improved re-engineering benefits f. Lesser internal resources.

### **Critical issues in logistics outsourcing:**

Before deciding on a 3 PL or 4 PL partner, the following several major issues that need to be addressed and examined:

- *Switching cost.* By outsourcing logistics services, there is a re-organization of the existing assets of the company. It includes activities like: a) Managing the existing assets, by the service provider b) Deploying the existing assets on lease to the service provider c) Divesting of the existing assets and also switching over fully to the usage of a logistics infrastructure provided by the service provider

- *Degree of control.* The firm, which is outsourcing must be particular about the degree of control over the service provider's activities, so that they get the service desired by the end user. Having a direct control over the activities of the employees of the service provider is not possible, but service provider should ensure that the information is available on time in order to monitor the activities.

▪ *Human and electronic interface.* A proper interface between employees of two organizations is important to resolve the issues, which are raised out of misunderstanding or miscommunication. The job of co-coordinators of both organizations is important to formulate the policies and guidelines for a smooth operation of the outsourcing firm and also the service provider.

▪ *Tuning logistics services to the needs of channel partners.* For an efficient channel management, logistics is a key enabler. Actually, channel and logistics management have to go hand in hand for an efficient as well as effective physical distribution system. The major areas of interface between channel and logistics management is defining the logistics standards as required by the channel members, designing the logistics programmes by standards, implementing the programmes, and also monitoring the programmes.

▪ *Degree of outsourcing.* The various business organizations resort to logistics outsourcing depends on the following factors like existing logistics infrastructure of the company, company's product portfolio, management policy for third party involvement.

Logistics service providers basically help the organization achieve two major goals: reducing the operating cost and also increases the revenue. When the service provider organizes the required logistics assets, the customer's investment in owning the logistics assets is reduced and thus the firm can invest in more productive activities and also get more returns on the remaining assets. There is a knowledge gaining activity on the firm's part because of the exposure and acquaintance with the best available practices and techniques utilized by the service providers.

### ***Understanding the main points***

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
transaction	the characteristics of a production process in which an increase in the scale of the firm causes a decrease in the long-run average cost of each unit
procure	one who provides a service, commodity or the means for subsistence
economies of scale	merchandise returned to the retailer, wholesaler or supplier
encourage	deficiency
provider	smth that has value, especially smth that generates cash flows
infrastructure	a deal or business agreement
shortcoming	the act of storing goods in a warehouse
warehousing	to support, motivate, give courage, hope and spirit
asset	to acquire or obtain
returns	basic facilities, services and installations needed for the functioning of a community or society

**Task 3.** Find English equivalents to the following words and word combinations.

Удовлетворять потребности, косвенные материалы, economies of scale, объединять заказы, эффективное пополнение, стимулировать поставщика,

становиться более требовательным, решение данной проблемы, выходить на новые рынки, партнерские возможности, справляться с чем-то лучше, выбрать нужного партнера, определить наилучшее местоположение, оценивать технологические возможности, снижать оперативные издержки, контроль за деятельностью.

**Task 4.** Find synonyms to the following words.

Encounter; ameliorate; lessening; permit; jointly, lasting; enlarge; vestige; beforehand; flaw, defect; curtail; increase; ability, talent; worker; perform.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
procurement	discounts
purchased	location
quantity	areas
liberalized	materials
distribution	weaknesses
customer	opportunities
functional	partners
distinct	service
logistics	process
partnering	economies
outsourcing	practices
potential	infrastructure
optimal	project
available	goods
raw	partners

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

Buyers and suppliers; finished goods; procurement process; coordination; ownership; long-term relationship; outsourcing; ability; strengths and weaknesses; partnering opportunities; provider; logistics.

**Task 7.** Review questions.

1. What is the purpose of procurement? 2. Who is usually involved in procurement process? 3. What should be taken into consideration when designing the procurement process? 4. What are the two main categories of purchased goods? 5. How does procurement process distinguish direct and indirect materials? 6. What are other grounds for the categorization of materials? 7. What are the major issues when making or sourcing decisions? 8. What is outsourcing? 9. What measures can help in identifying a short list of partners? 10. What are the benefits of outsourcing? 11. What critical issues must be considered before deciding on a 3 PL or 4 PL partner?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.

#### **Unit 4.** Inventory Role and Importance

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

*Nouns:* responsibility, customer, burden, amount, inventory, enhancement, performance, maintenance, quantity, disruption, pilferage, obsolescence, deterioration, anticipation, safety, emphasis, liquidity, breakdown, retailer, volatility, expenditure.

*Verbs:* include, await, be shipped, improve, supply, require, get over, represent, terminate, stock up, threaten, stockpile, yield, employ, consume, erode, impact, absorb.

Inventory refers to the stock of materials of any kind stored for future use, mainly in the production process. Semi-finished goods, which are awaiting use in the next process, or finished goods, which are waiting for sale, are also included in this broad category. But these are practically idle resources. Thus inventories are materials/resources of any kind having some economic value, either awaiting conversion or use in future.

Inventory is a key determinant of profitability. Inventory velocity turns assets into profits. The faster inventory turns, the greater the profitability. Inventory is the key issue to supply chain management success. Customers demand that their orders be shipped complete, accurate and on time. That means having the right inventory at the right place at the right time.

Excess of inventory within the pipeline increases the overall working capital requirements of the pipeline and places a large cost burden on the agents of the chain. The levels of inventory need to be reduced throughout the logistics pipeline, which will lead to an effective operation.

Today the focus is on retailers and their distribution services. Inventory aims to reduce costs and simultaneously improve service. Thus the need to reduce costs as against improving service becomes the key issue and the role played by successful inventory management is becoming more apparent.

**Role of inventory.** Inventory is critical to supply chain management because it directly impacts both cost and service. Certain amount of inventory is inevitably required somewhere in the chain to provide adequate service to the end customer, as demand is mostly uncertain and it takes time to produce and transport product. Inventory typically generates an incremental cost of 20 to 40 cent per year for the company. Increasing supply chain inventories typically increases customer service and consequently revenue, but it comes at a higher cost.

Today, inventory investment is viewed as a supply chain cost driver rather than a material asset. Hence, a lean supply chain operating on material requirement planning (MRP), distribution requirement planning (DRP), or Just-in-time (JIT) system are

preferred to ensure maximum inventory turns (ratio of sales to average inventory), reduction of cost on inventory investments, and enhancement of the bottom line and return on investments.

**Importance of inventory.** Management of inventory is a powerful driver of financial performance. Improper management of inventory leads to slow growth and pressure on profitability. Thus companies aim at improving the efficiency of inventory cycle. This helps the firm from locking up of capital, which can be invested elsewhere, and improve financial performance and create competitive advantage in delivering goods at lower prices.

**Functions of inventory.** Inventory management is an area which has strategic importance in logistics operation and thus impacts the efficiency and effectiveness of the overall supply chain system. In order to get over the uncertainties in demand and supply, goods need to be kept in stock. This is because the cycle of production and consumption never matches. However, higher inventory levels will affect the bottom line of the company. It is important to strike a balance between the two extreme goals of lower cost and higher levels of customer service, as it is a high risk and high impact area.

Companies block sizeable funds in inventories, which would otherwise have been invested in other important and productive areas. Inventories are held in the categories like Raw material and components, work in progress, finished goods, maintenance, repairs and operating supplies, in-transit inventory etc.

### **Functions of inventory**

**1. Striking a balance between supply and demand.** It is very difficult to achieve a match between the production and consumption cycle. Whenever there is a sudden requirement of product in large quantities, it is not possible to produce such quantities immediately. Thus, products are manufactured in advance, and kept in stock during the peak period to avoid any shortage.

**2. Minimize costs at acceptable inventory levels.** When inventories are replaced in extremely small quantities, they result in low investments but high ordering costs. There has to be a point where, the total carrying cost of inventory is minimum but the level of inventory is such that it doesn't affect production.

**3. Provide the desired customer service levels.** Customer demands are satisfied through inventory. The location of inventory determines time in which customer will be served, the company's policies concerning the economic order quantity, safety stocks, etc will determine the cost at which customer is getting served.

**4. Protecting the operating system.** Inventory ensures that the operating system does not have any disruption. For example, if a worker in one work center falls sick or if there is a machine breakdown, the work need not be affected if the inventory is available and others can continue the work.

**5. Advantage of quantity discounts from suppliers.** Inventory helps the firms in getting the advantage of quantity discounts from suppliers.

An inventory manager's job is to balance the conflicting cost and the pressures of determining the appropriate level of inventory. The reason behind keeping the inventories low is that firms must pay interest on the investment made on inventories.

Inventory holding (or carrying) cost is a variable cost on items such as storage and handling, taxes, insurance, interest on capital and shrinkage cost. The annual cost to maintain one unit in inventory typically ranges from 20 to 40 percent of its value.

*(Illustration.* If a firm's holding cost is 30 percent. If the average value of total inventory is 20 % of sales, the average annual cost to hold inventory is 6 % { $0.03(0.20)$ } of total sales. This cost is significant in terms of gross profit margins, which often are less than 10 %).

### **The various costs in inventory**

**Interest or opportunities Cost.** A company may obtain a loan or forgo an opportunity to invest in an attractive return. Interest or opportunity cost whichever is higher is the largest component of holding cost.

**Storage and handling costs.** This cost is incurred when a firm rents out space. Here again there is an opportunity cost, as the firm can utilize the storage space productively for some other purpose.

**Taxes, insurance and shrinkage.** When inventories are high, the insurance on the assets also increases. Shrinkage takes place in three forms: 1) pilferage or theft of inventory by customers or employees; 2) obsolescence occurs when inventory cannot be used or sold to the full value due to change in model, engineering modifications or low demand; 3) deterioration through physical spoilage or damage results in lost value.

**Ordering cost.** This refers to the cost involved in the ordering process. The paperwork faxes, phone calls etc. will add to inventory related costs.

**Carrying cost** Also called holding cost, carrying cost is the cost associated with having inventory on hand. It is primarily made up of the costs associated with the inventory investment and storage cost. For the purpose of the EOQ calculation, if the cost does not change based upon the quantity of inventory on hand it should not be included in carrying cost. In the EOQ formula, carrying cost is represented as the annual cost per average on hand inventory unit. Below are the primary components of carrying cost.

**Out of stock costs.** Incurred when the order placed by the customer cannot be filled from the available inventory.

**Over stock costs.** Incurred when the company is having some stock in hand even after the demand for the product has been terminated.

### **Reasons for carrying inventories**

Carrying Inventory can be classified under four heads: a) cycle inventory; b) ?safety stock inventory; c) anticipation inventory; d) pipeline inventory.

**Cycle inventory:** Raw materials, components, parts are required for production. This is cycle plays a crucial role in keeping the production cycle continuous. The work in progress inventory is a major part of production related inventory. Determining how frequently to order and in what quantity is called *Lot sizing*.

**Safety stock:** In order to avoid customer service problems and the hidden costs of unavailable components, companies hold safety stock. This gives a cushion against uncertainties in demand, lead-time, and supply therefore ensuring that operations aren't disrupted.

*Illustration:* Suppose the average lead-time from a supplier is three weeks but a firm orders five weeks in advance just to be safe. This policy creates safety stock equal to a two weeks' supply (5-3).

**Anticipation inventory:** This term refers to the inventory that is used to absorb uneven rates of demand or supply that businesses face. Manufacturers of air conditioners, for example, experience 90 percent of their annual demand during just three months of a year.

Hence anticipation inventory helps in evening out the volatility in demand and supply. A company may stock up on certain items if its supplier threatened with a strike or have severe capacity limitations.

**Pipeline inventory:** Inventory moving from point to point in the materials flow system is called pipeline inventory. Materials move from suppliers to a plant, from one operation to the next in the plant, from the plant to a distribution center or customer, and from distribution center to a retailer. Pipeline inventory consist of orders that have been placed but not yet received. Therefore stocking locations, improving materials handling and delays in distribution should be overcome.

### **Inventory levels**

There are three basic types of Inventory: Raw Material, Work in Progress, and Finished Goods.

*Raw Material.* This includes all the purchased parts and direct materials that go into the end product. This type of material has value added to it as it flows together as subassemblies, assemblies and finally into the shippable product.

*Work-in-Process.* Refers to the inventory waiting in the process for being assembled into final products.

*Finished goods.* These refer to the inventory, which are ready for delivery to the distribution centers, retailers, and wholesalers or to the customers directly.

*Inventory efficiency in the supply chain.* Lowering inventories is one of the quickest ways to substantially decrease working capital needs. The drive for working capital use efficiency with the need to more quickly respond to changes in customer demand, with shorter and shorter order-to-delivery cycle times is challenging to many manufacturers. In times past, manufacturers would stockpile large quantities of raw materials; load-up the shop floor with work-in-process; and, pack warehouses with finished goods. Not only do those old ways increase working capital needs, they are a big factor in contributing to erratic and longer lead times as well as increasing overall costs.

The pressures to reduce inventories, and therefore working capital requirements, are increasing even in times of relatively low interest rates. The opportunities to use a finite source of capital, not just more efficiently but in ways that yield high rates of return for employing the essentially idle capital elsewhere in the business. For example, reducing inventories could provide the necessary capital to finance such things as: new product development, expanded marketing and sales, modernization, business process redesign, improved supply chain management, expansion, acquisitions, debt reduction among others.

*Inventory control: improving the bottom line.* Inventory control requires the tracking of all parts and materials purchased, products processed, and products stored and ready for shipment. Having a sophisticated tracking system alone does not improve your bottom line; it is how you use the information that your system provides.

One should know how critical the function is to business success and the complexities involved in planning, executing and controlling the supply chain network. From a financial perspective, inventory control is no small matter. Oftentimes, inventory is the largest asset item on a manufacturer or distributor's balance sheet. As a result, there is a lot of management emphasis on keeping inventories down so they do not consume too much cash. The objectives of inventory reduction and minimization are more easily accomplished with modern inventory management processes that are working effectively.

### **Need for inventory control**

**1. Increase in the size of manufacturing units.** With the increase in the size of manufacturing units, there is a necessity to have sufficient inventory control so that increasing inventories do not become non-value added expenditure. In fact, increasing inventory can erode the profits of the company and the possibility of inventory control arises.

**2. Wide variety and complexity of the requirements.** The requirements of the modern industry have necessitated the need for conscious inventory management.

**3. High idle time cost of machine and men.** If men and machines are kept idle, it is highly uneconomical for the firm. Inventory levels have to be managed keeping this factor in mind.

**4. Liquidity.** There is an increased stress on liquidity in today's organizations, where it becomes a necessity to maintain liquidity at the levels of nearly 10-20 per cent of the total capital invested in finished goods.

### **Inventory control problems**

In actual practice the vast majority of manufacturing and distribution companies suffer from lower customer service, higher costs and excessive inventories than are necessary. Inventory control problems are usually the result of using poor processes, practices and antiquated support systems. The inventory management process is much more complex than the uninitiated understand. In fact, in many companies the inventory control department is perceived as little more than a clerical function. When this is the case, the fact is the function is probably not very effective.

The likely result of this approach to inventory control is lots of material shortages, excessive inventories, high costs and poor customer service. For example, if a customer orders a product that requires a manufacturer to acquire 20 part numbers to assemble a product and then, only 19 of the 20 part numbers are available, there are nineteen part numbers, which are excess inventory.

### **Certain performance indicators for inventory:**

- BC analysis of the assortment categorized by stock value/volume;
- Variance in throughput time of the product group in totality;
- The number of damages/claims;



- Mean throughput time of the product group / vendor wise/ location wise;
- Reliability of the inventory regarding quantity and correct place.

Inventory management decisions involve trade-offs among the conflicting objectives of low inventory, high resource utilization and good customer service. For making supply chain leaner, firms are using selective control techniques like EOQ, ABC, etc. and inventory control models like MRP, DRP, JIT, AITS. Therefore, inventory should be held only when the benefits of holding it exceeds the cost of carrying the inventory.

### *Understanding the main points*

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
liquidity	special attention or prominence given to smth
erode	an interruption to the regular flow or sequence of smth
emphasis	the amount of time between the initiation of some process and its completion
employ	to exhibit the counterpart or image of; to typify
lead time	the process of making or growing worse
stockpile	to hire smb for work or a job
threaten	an asset's property of being able to be sold without affecting its value; the degree to which it can be easily converted into cash
represent	no longer in use; gone into disuse; disused or rejected
pilferage	a supply, especially a large one of smth kept for future use
obsolescence	to destroy gradually by an ongoing process
deterioration	to menace, or to be dangerous
disruption	act of stealing items, especially in small quantities

**Task 3.** Find English equivalents to the following words and word combinations.

Запас материалов, полуфабрикаты, экономическая стоимость, избыток складских запасов, улучшать обслуживание, успешное управление складскими запасами, влиять как на стоимость, так и на обслуживание, увеличивать доход, никогда не подходить, подводить итоги, производить заранее, сокращать складские запасы, отслеживание закупленных материалов, страдать от низкого качества обслуживания клиентов, методика выборочного контроля.

**Task 4.** Find synonyms to the following words.

Catalogue; issue; back up, uphold; allocate; measure of quantity; goal, purpose; complex; acquisition; make better; diminish; grow, raise; contain; restriction; yearly; found, establish; devolve, accrue; receive.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
finished	costs
bottom	demand
financial	cost

inventory	handling
customer	time
consumption	breakdown
small	inventories
machine	control
carrying	goods
lead	cost
distribution	cycle
materials	system
working	objectives
customer	line
inventory	sheet
sophisticated	shortages
balance	service
excessive	capital
material	performance
conflicting	centre
opportunity	quantities

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

Inventory management; vast majority; liquidity; manufacturing unit; profits of the company; financial perspective; inventory control; supply chain; inventory levels; carrying inventories; obsolescence; opportunity cost; inventory costs; supply and demand; provide adequate service; excess inventory; bottom line.

**Task 7.** Review questions.

1. How is inventory defined? 2. What are idle resources? 3. Is there any relation between inventory and profitability? 4. What does the excess of inventory result in? 5. What is the role of inventory in the supply chain management? 6. Why is inventory management so important? 7. What are the functions of inventory? 8. Inventory has five main functions, doesn't it? 9. Why is it advisable to keep the inventory low? 10. What costs are involved in inventory? 11. What are the reasons behind carrying inventories? 12. What levels are singled out within inventory? 13. What factors determine a need for inventory control? 14. What problems does inventory control involve?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.)

### **Unit 5.** Inventory: Characteristics and Types, Control and Planning

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

*Nouns:* perspective, allocation, forecast, environment, proximity, wholesaler, retailer, duration, purpose, satisfaction, procedure, implementation, accountability, requirement, obsolescence, procurement, availability, scarcity.

*Verbs:* operationalize, schedule, combine, vary, push, assume, extend, require, predict, consider, reduce, implement, review, allow, obtain.

Inventory decisions are high-risk and high-impact in nature from the logistics perspective. Inventory Management is an integrated process, which aims to operationalize a firm's as well as the value chain's inventory policy. It is a strategic area in logistics and has an overall impact on the efficiency and effectiveness of the entire supply chain. It is basically a practice of planning, directing and controlling inventory so that it contributes to the profitability of business. Since it is necessary to have an optimum minimum of multiple types of inventory, inventory management is essential.

There are three methods for inventory management, the first one being a reactive or pull approach, which uses the customer demand to pull the product through the distribution channel. Another philosophy is the planning approach, which proactively schedules the product movement and also its allocation through the channel according to the demand forecast. The final approach, hybrid logic combines the former versions and results in an inventory management philosophy, which responds to product as well as market environments.

### **Characteristics of inventory**

Once an investment has been made in inventory, it cannot be reversed and that fund cannot be utilized to obtain other assets to improve corporate performance. Thus investments in inventory are risky. There are a lot of chances for the inventory to be pilfered or to become obsolete.

The magnitude of risk varies according to the position of the enterprise in the distribution channel:

a) **Manufacturer.** For the manufacturer, there is a longer dimension of risk. Starting with the raw material, and component parts, the risk includes work-in-progress, and finally the finished goods. It doesn't end here, as the inventory needs to be transferred to warehouses in close proximity to the wholesalers and retailers. Though, the product line may be narrower, the risk element is deeper and of longer duration.

b) **Wholesaler.** The wholesaler handles more product lines than the manufacturer. He purchases in bulk and distributes in smaller lots to the retailers. Also these small lots are in assortment. Especially, when the product lines are more in number, there is a grave problem. The problem escalates for a seasonal product where the wholesaler has to stock much in advance of the sale

c) **Retailer.** The risk for a retailer is wider and not deeper in the sense he stocks a wide variety of products. The number of Stock Keeping Units within a Supermarket is enormous. The risk is primarily of marketing in nature. The enormity of risk faced by the retailers makes them push the risk towards manufacturers and wholesalers by pressing them to assume greater inventory responsibility.

## **The need for inventory and its control**

Inventories of materials are necessary by all manufacturing organizations. Materials and inventories serve some social purpose in industries, which stems from some economic motives. The motive behind inventory is the following:

– **Meeting the production requirements:** A manufacturing organization needs to keep stock of raw materials, components and parts required for producing finished goods to meet the continuous production requirements.

– **Support in operational requirements:** Inventories are required for repairs, maintenance as well as operational support. Inventory for this purpose include production machinery spare parts, chemicals, lubricating oils, welding rods etc.

– **Customer Service:** Customer satisfaction is used as a tool for competitive advantage. To ensure customer satisfaction, it is necessary for suppliers to maintain parts in order to extend after sales service to their clients.

– **Speculation:** Provides ample scope for holding large amount of inventories, but this inventory is not important for industrial purpose.

– **Precaution:** Arises out of the inability to predict future demands precisely and getting the materials in time, without incurring extra costs.

## **Importance of inventory management in the supply chain**

Managing inventory has become important due to the following factors:

– Availability of resource (such as finance and space) has made the management to consider lowering the levels of inventory within the supply chain management systems to maintain margins

– Latest concepts like Just-in-Time (JIT) applications and lean manufacturing have reduced the need for inventory as an insurance buffer within the overall logistics activity

– Many companies have realized that a greater return on investment (ROI) can be obtained by developing the core business, and investment in working capital items, like inventory and debtors give lesser returns.

– With the advent of Information technology (IT), inventory management has become essential which can be used to reduce inventory. Better the information, lower is the inventory.

## **Types of inventory**

a) **Raw materials and production inventories:** raw materials and other supplies, parts and components, which enter into the product during the production process and usually form part of the product;

b) **In-process inventories:** semi-finished, work-in-progress and partly finished products formed at various stages of production;

c) **MRO Inventories:** maintenance, repairs and operating supplies consumed during production process and usually not a part of the product itself (eg: oils and lubricants, machinery and plant spares, tools and fixtures, etc.);

d) **Finished goods inventories:** completed products ready for sale;

e) **Movement or transit inventories:** arise, as there is time involved while moving stocks from one place to another;

f) **Let-size inventories:** large quantities than necessary are stocked to keep costs of buying, receiving, inspection and handling low;

g) **Fluctuation inventories:** maintained as a cushion against unpredictable fluctuations in demand;

h) **Anticipation inventories:** inventories carried to meet predictable changes in demand.

### **Inventory control**

This is a mechanical procedure, which helps in implementing an inventory policy. Control procedures are devised to implement the desired inventory management policies. Procedures for inventory control can either be perpetual or periodic. In a perpetual control process, inventory status is reviewed daily in order to determine the needs of replenishment. To ensure proper implementation of this system, there is need to have accurate accountability of all stock keeping units, apart from proper computer assistance. In a periodic review, the inventory status of an item is reviewed at regular time intervals, maybe weekly or monthly

### **Types of selective inventory control techniques**

#### **ABC analysis**

It relates to the annual usage cost of a particular item. Generally 10 per cent of items account for nearly 70 per cent of usage value, Another 20-30 percent may account for 20 per cent of usage value and the balance 60 – 70 per cent accounts for 10 per cent of the usage value. Items are classified as per their usage value.

‘A’ items costs approximately 60 – 70 per cent of the total inventory cost while they are less in number. ‘B’ items cost 20-30 per cent of the total inventory cost while ‘C’ class items are greater in number and carry less than 10 per cent of the cost of the entire inventory.

#### **VED analysis**

It is related to the Vital, Essential, and Desirable status of inventory items. As the term implies, certain parts and items are considered to be vital for meeting operational requirements and this aspect is taken into consideration while making a forecast. While making a forecast, certain items and parts, which are considered as vital for meeting operational requirements, are considered. The modified version of this is the ABC analysis. VED analysis, takes into consideration both the value and criticality of each item. Continuous review is necessary for high value and critical items and thus is ordered in low quantities. Low value, least critical items are reviewed periodically and ordered in large quantities and have lower safety stock requirements.

#### **SAP analysis**

It refers to Scarce, Available and Plenty analysis which allows to build into provision forecasts. The ordered quantity is governed by the scarcity factor. The guideline for procurement policy decisions would be the limitations in supply or the obsolescence of the firm in the near future.

## FSN analysis

The Fast, Slow or Normal analysis determines the consumption pattern of each item. However, a realistic picture for procurement action will not be available from a consumption pattern where the production run is slowed down due to various other reasons.

## SDE classification

Classification based on the availability of an item. S items are scarce items, which needs to be imported and thus take a long time to obtain. D items are difficult to obtain, and E items are easily obtainable.

## Inventory planning model

**Economic order quantity (EOQ):** This is the replenishment order quantity, which minimizes the combined cost of inventory maintenance and ordering.

Assumptions of Basic EOQ Model: a) demand is known with certainty; b) demand is relatively constant over time; c) no shortages are allowed; d) lead time for the receipt of orders is constant; e) the order quantity is received all at once.

In this model, the inventory holding/carrying cost is taken to be proportional to the average inventory held during a period. Thus, by reducing the inventory, its carrying cost can be reduced. On the other side, smaller lot sizes will increase the number of lot sizes per annum to cover the annual demand and thus the cost of ordering will be more. Thus the economic lot size must balance both these opposing costs. The mathematical formula for economical lot size is:  $Q = 2 D S / H C$

Where:

Q = Order quantity in units; S = Cost of placing an order in rupees

D = Average annual consumption in units;

H = Percentage of inventory cost vis-a-vis unit cost; C = Cost per unit

## Understanding the main points

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
obtain	the condition of smth being deficient
obsolescence	the act of procuring or obtaining; obtainment
procurement	measure of current assets of a business that exceeds its liabilities and can be applied to its operation
scarcity	a view, vista or outlook; the ability to consider things as to sense, categorize, measure or codify experience
unpredictable	a place for storing large amounts of products
quantity	to get hold of; to gain possession of; to acquire
perspective	a fulfillment of a need or desire
warehouse	unable to be forecast
satisfaction	no longer in use; gone into disuse; disused or neglected
working capital	an indefinite amount of smth

**Task 3.** Find English equivalents to the following words and word combinations.

Решения с высокой степенью риска; вся цепь поставок, управление запасами; устаревать; в непосредственной близости; перед продажей;

прогнозировать будущий спрос; уровни запасов; проводить складскую политику; надлежащая компьютерная поддержка; принимать во внимание; по разным причинам; принимать ответственность

**Task 4.** Find synonyms to the following words.

Acquire; insufficient; direction to action; survey; persistent; suggest; encounter; accomplishment; permanent; oarsman, think over; forecast; demand; reply, answer; hugeness.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
strategic	problem
close	motives
grave	responsibility
seasonal	support
enormous	advantage
greater	capital
economic	proximity
operational	procedures
competitive	materials
customer	number
working	fluctuations
raw	area
unpredictable	intervals
periodic	product
regular	satisfaction

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

High-risk; profitability of business; demand forecast; become obsolete; vary; in close proximity; a grave problem; in advance of the sale; assume responsibility; serve some purpose; competitive advantage; customer satisfaction; return on investment; working capital; reduce inventory.

**Task 7.** Review questions.

1. Why is the inventory management strategic area in logistics? 2. What are the three methods for inventory management? 3. What is inventory characterized by? 4. How is the magnitude of risk viewed from various positions? 5. Why are material inventories so important? 6. How is the importance of inventory management explained? 7. What are the inventory types? 8. What is the role of inventory control? 9. What techniques are involved in selective inventory control?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.

## **Unit 6. Transportation**

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

*Nouns:* mode, sophistication, commerce, delivery, technique, enhancement, expense, load, vehicle, capacity, destination, diversion, shipment, carrier, benchmarking, commodity, petroleum, dimension, origin, bill, globalization, clarit, railcar, lading, weight, shipper, consignee, search.

*Verbs:* assist, gain, occupy, achieve, transform, pave, serve, rely, lower, utilize, handle, catch, recognize, adapt, facilitate, incur, affect, minimize, contain, remove, imply, evaluate, expect, determine, choose, select, perform, ascertain, respond.

Transportation is basically the movement from one location to another as it makes its way from the beginning of a supply chain to the customer's hands. Transportation not only ensures movement of people but also goods from one place to another thus assisting the economy in the growth of trade and commerce. Being one of the most visible elements in the logistics operations, this function has gained a lot of importance and interest from the logistics perspective.

Transportation plays an important role in each and every supply chain because products are usually not produced and consumed in the same location. The third P in the marketing mix, 'Place' is of importance here. In fact, transportation costs occupy a significant part of the total costs in most supply chains.

With the growth in industry and commerce, transportation facilitates in achieving the social and economic objectives. As times are changing and according to the requirements, the mode of transportation is changing to keep pace with the growth of science and technology across the globe. The degree of sophistication of the various transportation equipment in use varies according to the level of economic condition and growth of any particular region/country. As the economy has transformed from subsistence agriculture to commercial agriculture, and also with the spurt of manufacturing activities, the scope of development of transportation modes has widened. In the olden days, the various modes of transportation like human beings, camels, horses, donkeys, carts and ships were being used. Today, these have paved way to newer modes of transportation to suit the needs of the modern world. In spite of the emergence of sophisticated modes of transportation, older modes continue to serve the society, but in a smaller way.

Transport, being the main component of logistics, plays an important part in all management decisions within the organization, from strategic decisions to everyday operations. Day-to-day management decisions also relies on transport, as "Just in Time" methods for both production and distribution have become the standard. With the growth in e-commerce, resulting in more and more home delivery of products, transportation costs have become very significant in retailing. Especially for products sold online, transportation cost is a larger fraction of the total delivery cost.

The appropriate use of transportation is the key to any supply chain's success. For example, Wal-Mart uses a responsive transportation system to lower overall costs. Wal-Mart uses the technique of aggregation for products leaving for different retail stores on trucks leaving to a supplier. At distribution centers (DCs), Wal-Mart uses



cross-docking, where product is exchanged between trucks such that each truck going to a retail store has products from different suppliers.

**Transportation main purposes:**

**Product movement.** The primary function of transportation is the forward and backward movement of the product in the value chain. It is necessary that product be moved only when they are necessary and there is an enhancement in the product value. This is because transportation utilizes the financial resources for expenditure like driver's labor, operation cost of the vehicle, and other administrative expenditure. The environmental resources are utilized both directly and indirectly. An example of direct usage can be the fuel and oil costs and an indirect usage can be the environmental expense caused by air, noise pollution in the environment.

**Product Storage.** Temporary storage for in – transit goods is expensive. But in circumstances where the warehouse space is limited, utilizing the transportation vehicles may be a better option. One option is where the product is loaded on the vehicle and then it takes a round about or indirect route to its destination. The vehicle can be used as a temporary storage option where the origin or destination warehouse has limited storage capacity. Another option is to take a diversion. This is done when there is an alteration in the shipment destination while the delivery is in transit. While, telephone was used for diversion strategies originally, today satellite communication handles this task efficiently.

**A transportation strategy to be successful, should recognize the following:**

**Customer requirements.** The supply chain involves continuous and efficient movement of product from vendor to manufacturer to customer. Thus the transportation program must reflect and meet the customer's needs. The vital aspects are time and service.

**Timely movement of shipments.** Customers demand their shipments be delivered as they require - on the date needed, by the carrier preferred, both shipped complete and delivered complete and in good order. A transportation program, which can do this, can provide customer satisfaction and give a competitive edge.

**Mode selection.** Selecting the mode of transport is an important consideration. The transit time has to be considered while doing so.

**Carrier relationships.** Volume catches the attention of the carrier or forwarder. The carrier attention with volume creates a competitive interest in a business. Another side to this attention is that the business cannot be divided among many carriers. The chief reason being that responsive transportation can create a competitive advantage and this can be done only with a focused relationship with a carrier.

**Measuring/benchmarking.** There is a necessity to know about the performance of the strategy as well as the carriers. Measuring and benchmarking can be of assistance to this. Measuring means comparing performance versus standards. Benchmarking means learning what other companies do--the best practices. Benchmark needs to be done with a company in the same industry.

**Flexibility.** As change is happening everywhere, the strategy has to be ready to change. There is a constant change in the customers, products, business, suppliers and

the overall corporate emphasis, which can dramatically change the company's strategy. It is important to recognize that change will occur. Just as times are changing, the strategies will also keep changing. A company must adapt itself to such an environment.

### **Participants in the transportation decisions:**

Primarily there are five key parties in transportation decisions. Each of these parties has a role in the transportation environment.

**Shipper.** The party, which requires the movement of the product between the two points in the chain. The shipper's objective is to fulfill the customer order with responsiveness but at the minimum cost.

**Consignee.** The destination party or receiver. The consignee also has the similar objective of receiving the goods at a lowest cost and with maximum responsiveness.

**Carrier.** The party, which moves or transports the product with an objective of maximizing the revenue at the least cost. Carriers have a tendency charge a higher rate and reduce their costs by trying to consolidate various individual loads into economical loads and thus would seek flexibility in pick up and delivery with the client. This motive is in conflict with the manufacturer's objective of reducing total transportation costs.

**Government.** The Government has a high interest level in the transactions because a stable and efficient transportation environment is necessary to sustain economic growth. To facilitate this, carriers must offer competitive services while operating profitably.

**Public.** The ultimate determinant of transportation by desiring goods at reasonable prices. Their concerns are related with the accessibility, expenditure, effectiveness as well as the safety and environmental standards.

### **Factors affecting carrier decisions:**

**Vehicle related cost.** Cost incurred by the carrier for purchase or lease of the vehicle to transport goods.

**Fixed operating cost.** Costs which can be associated with the airport, terminals and labour which are incurred whether vehicles are in operation or not.

**Quantity-related costs.** Usually variable in nature except in circumstances where labour for loading and unloading is fixed.

**Trip-related cost.** Includes the price of labour and fuel incurred for each trip independent of the quantity transported.

**Overhead cost.** Any cost incurred for planning, scheduling a transportation network as well as the information technology costs incurred.

### **Factors affecting shippers decision:**

**Transportation Cost.** Total amount paid to various carriers for transporting products to customers.

**Inventory Cost.** Cost of holding inventory incurred by the shipper's supply chain network.

**Facility cost.** Cost of various facilities in the shipper's supply chain network.

**Processing cost.** Cost of loading / unloading orders and the other processing costs associated with transportation.

**Service level cost.** Cost of not being able to meet delivery commitments. This cost to be considered in strategic, planning and operational decisions.

### **Modes of transportation**

- **Air.** This is the least hazardous in nature when compared to all other modes of transport. Air transport is expensive, and is very suitable for products having high value or extreme perishability. The prohibitive aspect of this mode is its high cost. From the operator's point of view, though the fixed cost is low compared to other modes like rail, water and pipeline, variable costs are very high as a result of fuel, maintenance, and the labour for crew.

Though the cargo handled by air is growing at a fast pace, it is still not important when compared to the cargo handled by other modes of transportation. Air, by whatever type of airline, is generally considered a premium means of transportation. The best justification for the high cost can be an emergency situation, which necessitates the service of air transport. Technological developments like new cargo-handling equipment at air terminals and the use of larger containers have been beneficial.

- **Sea/Water.** The oldest mode of transportation. Water transport, due to its nature, is limited to certain areas. It is the slowest modes of all the modes and a lot of delays also occur at ports and terminals. Water transport is generally suited for carrying very large loads at low cost. Usually the shipping fleet across the globe comprises of tankers, dry bulk carriers, container ships and special vessels. Some of the problems encountered with this mode are rough weather characterized by storms, ice, high waves etc in-transit. Also there is a disadvantage of a limited range of operation and speed.

- **Railways.** Generally capable of transporting large quantities of freight over long distances very economically. These are the principal carriers of men and material, and play a major role in the country's trade and commerce activities. It is the main source of supply of essential commodities, which are transported across the length and breadth of the country. Road traffic is relieved to a certain extent and also air pollution caused by trucks can be eliminated. The railways also charge competitive freight rates.

- **Roadways.** Most popular mode of transport. With the manifold growth in industrial and agricultural activities, this mode has achieved a lot of importance. The various advantages of this mode are flexibility, faster turnaround, lesser risk of delays or strikes, door-to-door service, reach to remote places and through movement from consignor to consignee.

- **Pipeline.** In India, pipelines are used for oil transportation by all public and private sector petroleum refineries. They are also utilized for transporting manufacturing chemicals, dry bulk materials like cement and flour by hydraulic suspension, and also sewage and water within cities and municipalities. This mode is unique in comparison with the other modes in the sense that they operate throughout the day, with limited time for changeover and maintenance. The basic advantage here is that they reduce the operational costs, though the initial investment is high. Also

these are eco-friendly. The disadvantage of this being its lack of flexibility where only limited commodities in the form of gas, liquid or slurry can be transported.

**Transport Economics.** The factors which influence transport economics:

1. **Distance:** This is a major influence on the cost as it is a direct contributor to variable costs like labour, fuel, and maintenance. The tapering principle, where the cost curve increases at a decreasing rate as a result of the distance function is relevant here.

2. **Volume:** It is viable to consolidate smaller loads into larger loads to take advantage of the economies of scale.

3. **Density:** The product density or weight is discussed here, where the product density can be increased within a truckload for better capacity utilization.

4. **Stowability:** This refers to the product dimensions and how they affect the vehicle space utilization. It is easier to stow standard shaped items than odd-shaped items, which occupy more space.

5. **Handling:** While loading or unloading trucks, railcars, or ships, there is a necessity for special handling equipments like trolleys, forklift trucks, conveyors etc to load or unload trucks, railcars or ships.

6. **Liability:** These are product characteristics, which basically affect the risk of damage and the resulting incidence of claims.

7. **Market Factors:** Factors like lane volume and balance. A transportation lane refers to the movements between the points of origin and destination. When a vehicle is sent from the point of origin, it may return empty-handed or may bring back load. Due to the imbalances in demand in both the manufacturing and consumption locations, a balanced (volume is equal in both directions) move is nearly impossible.

It is the responsibility of the logistics managers to understand the influence these factors have on the transportation cost and minimize such expense.

### **Documents Used in Transport Decision Making:**

**Bill of Lading:** A computerized, basic document, which is, utilized in purchasing transport services. This serves as a receipt of the commodities and quantities shipped. It also serves as the basis for damage claims in case of loss, damage, delay etc. The terms and conditions of the carrier liability and gives in documentation form the responsibility for all possible causes of loss or damages.

**Freight Bill:** This is how the carrier charges for the transportation services he performs. The information contained in the bill of lading is utilized for preparation of this.

**Shipping Manifest:** This document is used when multiple shipments are placed on a single vehicle. The document provides a comprehensive list, which informs the entire load content, making it unnecessary to view individual bills of lading as all details relating to the stops, bills of lading, weight, case count etc for each shipment are listed in this manifest.

### **Transportation Management**

Factors like globalization and technological improvements in the past years have changed the logistician's view of transportation. The logistics manager is expected to be more proactive in identifying the desirable combination of carrier services and also the suitable pricing structures in order to meet the objectives of the firm.

Transportation, when managed independently of other value added logistics operations often represents the weaker elements. Transportation decisions, which are made in co-operation with, related functions remove this weakness.

The two main fundamental principles in transportation management and operations are economy of scale and economy of distance. Economy of scale means the transportation cost per unit of weight decreases with an increase in the size of shipment. Economy of distance implies that there is a decrease in the transportation cost per unit with an increase in the distance. These principles are essential while evaluating alternative transportation strategies or operating practices.

Thus, transportation management is an important activity for the organization which involves the following processes:

**Analysis and understanding of environment.** There is a necessity to understand the transport environment, to make sound transport decisions. The environment consists of the five parties – shipper, consignee, carrier, government and public.

**Clarity in objectives.** The order of preference in performance of transportation functions has to be decided. The manufacturer must determine his objectives at a level at which service can be performed and the levels at which customers expect, the amount of trade-offs that can be expected. Such setting of objectives can enable the company to choose an efficient mode of transport.

**Selecting mode of transportation.** A choice between single mode and intermodal transport has to be made to achieve objectives efficiently.

**Insource or outsource.** After selecting the mode, the company must decide whether to in source the activity or outsource to third parties. According to the mode selected, the company must perform the functions.

**Evaluation and control.** The efficiency of the transport system can be ascertained by measuring the customer satisfaction.

Modern transportation has undergone a sea-change with a change in the point of view of an operational function to a strategic one. In the new era, transportation requires a constant search for methods to ensure that the customers order will arrive at their doorstep when required, in the right quantities and in undamaged condition. Additionally, transportation has to continually improve its flexibility and ability to respond to the market place, at a short notice, while providing better avenues for communication and also cost reduction. This makes transportation a continuous perennial activity rather than a one-time exercise.

### *Understanding the main points*

**Task 2.** Match the words with their definitions.

<i>A</i>	<i>B</i>
supply chain	a good that is bought or sold
vendor	a person or a company in the business of shipping freight
customer	an airfield, including one or more runways and one or more passenger terminals
carrier	a group of vessels or vehicles for transportation of goods

benchmark	a flammable liquid, consisting mainly of hydrocarbons, occurring naturally in deposits under the Earth's surface
shipping fleet	to influence or alter; to move to emotion
means of transportation	a system of organizations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer
commodity	a single aspect of a given thing
petroleum	a client, one who purchases or receives a product or service from a business or merchant
airport	spending or consuming, often a disbursement of funds
dimension	a person or a company that vends or sells
affect	any of the different kinds of transport facilities used to carry people or cargo
expense	to measure the performance or quality of an item relative to another similar item

**Task 3.** Find English equivalents to the following words and word combinations.

В руки клиентов; рост торговли; привлекать много внимания; в том же самом месте; занимать значительную часть в общих издержках; вид транспортирования; двигаться с такой же скоростью; оборудование для транспортировки; натуральное сельское хозяйство; прокладывать путь; удовлетворять потребности; современный мир; общие издержки; магазины розничной торговли; движение вперед-назад; труд водителя; расходы на защиту окружающей среды.

**Task 4.** Find synonyms to the following words.

Help; get; reach; make track; count on; expenditure; ephemeral; end; a load of goods; initially; effectively; show; very important; carrier; emphasis.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
continuous and efficient	consideration
competitive	loads
important	responsiveness
constant	investment
maximum	price
various individual	quantities
economical	cost
economic	change
reasonable	equipment
environmental	movement
high	advantages
cargo-handling	growth
various	sector
large	advantage
private	standards
initial	loads

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

Transportation; mode of transportation; pave way; serve the society; technique of aggregation; product storage; supply chain; company's strategy; have a tendency; points of origin and destination; minimize expenses; fundamental principles; fast pace.

**Task 7.** Review questions.

1. How is transportation generally understood? 2. Why does transportation play a significant role in the supply chain? 3. Is transport involved in all management decisions? 4. The appropriate use of transportation helps Wal-Mart to lower costs, doesn't it? 5. Which two main goals does transportation serve? 6. What contributes to a successful transportation strategy? 7. Who are the participants in the transportation decisions? 8. What factors affect carrier decisions? 9. What modes of transport can be singled out? 10. What are the factors that influence transport economics? 11. What documents are used when making transport decisions? 12. What are the economy of scale and the economy of distance?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.

## **Unit 7.** Warehousing and Distribution

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

*Nouns:* producibility, assistance, quantity, cross-docking, postponement, assortment, advantage, fertilizer, distributor, license, personnel, facility, bulk-breaking.

*Verbs:* attain, process, remove, facilitate, consolidate, join, enable, provide, operate, suit, design, expand, improve, result, relate, view, cater.

Warehousing is a support function for logistics and plays an important role in attaining the overall objectives of an organization's supply chain system. Warehouse is a place where inventory is stored. It is basically an area of interface for production, market, customers as well as suppliers. The performance of warehouse is often judged by its productivity and its cost performance.

In today's highly interconnected and interdependent supply chain networks, successful warehouse management involves a thorough understanding of how the basic warehouse management functions impact the supply chain. The warehouse, being a critical link in the supply chain, serves as the source of order status information for the customers, provides inventory visibility for the supply chain partners and for the enterprise as a whole.

While focusing on warehouse objectives of improving profit through reducing cost and enhancing customer service level, the following have to be taken into consideration: utilizing the storage space to the maximum; higher productivity of

labour; reduced material handling; reduced order filling time; maximum utilization of assets; reduced operating cost.

### **Functions within the warehouse:**

**Receiving.** Collection of activities involved in proper receipt of all materials coming into the warehouse, providing the assurance that the quantity as well as quality is as per ordered, and distributing the materials to storage or to the other organizational functions which require them.

**Pre-packing.** This is done in the case when products are received in bulk from a supplier and repacked into single consignments. The entire merchandise, which is received, may be processed at once, or a portion may be held in bulk for processing later.

**Storage.** Putting away the inventory received to complement order picking. It can be explained as the physical holding of merchandise while it awaits demand. Method of storage depends on the size and the quantity of the items in inventory and the handling characteristics of the product or its container.

**Order picking.** Physical selection of the products from their locations after receiving the customer orders. In other words, process by which items are removed from storage in order to cater to a specific demand. A document named Pick List containing details like sales order number, shipment details, item details, quantity etc facilitates order picking.

**Packaging and / or pricing.** This is basically optional which may be done after the picking process.

**Sortation and/or accumulation.** When a warehouse stores multiple products, this activity is done.

**Packing and shipping.** Performance of tasks related to dispatching an order. This includes the following tasks like checking whether order is complete or not, packing material in an appropriate shipping container, preparation of shipping documents, including packing list, address label, and the bill of lading, weighing the shipments to determine shipping charges, accumulate orders by outbound carrier, loading trucks etc.

**Traffic management.** Choosing the best mode of transportation for inflow and outflow.

### **Benefits of warehousing:**

**Economic.** Refers to the overall reduction in the logistical costs by utilizing one of more benefits. The major benefits are as follows:

*Consolidation.* Material from a number of manufacturing plants destined to a particular customer on a single shipment are consolidated and received by the consolidating warehouse which results in reduced transportation cost. The advantage is that it combines the flow of logistics from several small shipments to a specific market area. Several firms may also join together and use this consolidation service, which will benefit each shipper individually.

*Bulk breaking.* Various combined customer orders are received from a manufacturer and shipped to individual customers. A break bulk warehouse sorts or splits individual orders and delivers them locally.



*Cross docking.* This facility is similar to bulk breaking but involves multiple manufacturers. Truckloads of products arrive from multiple manufacturers, which are sorted customer wise. Then they are loaded into the truck destined for the appropriate customers. This system is widely used by retailers.

*Postponement.* A warehouse with facilities for light manufacturing activities like packaging and labeling can enable postponement of final production until the exact demand is known. The benefit here is a reduced level of risk and lower inventory as the final labeling and processing activity is done only on knowledge of the actual demand and thus the basic product is used for a variety of labeling and packing configuration.

*Stock Piling.* Stocks piled in the warehouse act as buffer inventory which help to tide over situations of material constraints and customer demands.

*Service.* Service benefits may not reduce costs and the justification for a warehouse based on service is an increase in the market share, revenue and thus an increase in margin. The benefits are as follows:

*Spot Stocking.* A selected amount of a firm's product line is placed in a warehouse to fulfill customer orders during a key period of maximum seasonal sales. Features include a narrow product assortment and stocks placed in many small warehouses catering to specific markets over a limited time horizon.

*Assortment.* Various product combinations are stocked in an assortment warehouse in anticipation of customer orders. This is similar to spot stocking except that this has a broader product line, is limited to a few strategic locations and functions throughout the year.

*Mixing.* Similar to the bulk breaking process with an exception that various different manufacturer shipments are involved. Truckloads of products are shipped from manufacturing plants to warehouses and upon arrival at mixing warehouses these are unloaded and the desired combination of specific product for a particular customer or market is selected. Inventory is sorted to suit specific customer requirements.

*Support in production.* Production support warehouses provide a constant supply of components and materials for assembly units. Such a warehouse supports production by supplying components or sub-assemblies in a regular and timely manner.

### **Warehousing alternatives**

The various warehouse strategies are as follows:

**1. Private warehouse.** Refers to having the entire facility under the financial and administrative control of the firm, i.e. the firm owns the product and also operates the warehouse. The actual facility can be either owned or can be taken on lease, for a short period. The major benefits of this warehouse are:

**Control.** The enterprise has complete decision-making authority over all activities in the facility thus enabling integration of warehousing operations with other internal processes of the firm.

**Flexibility.** Operation policies and procedures can be formulated and altered to suit individual needs.

**Cost.** The basic objective of this warehouse is not profit-making, thus the cost aspects are less compared to public warehouses.

**Marketing.** An intangible benefit is a marketing advantage over other firms due to the firm's name attached with the warehouse thus enhancing customer perception.

**2. Public warehouse.** These are similar to private carriers in transportation service. Services are provided to others by firms that have warehousing space, storage facility, and material handling equipment for their own use and are used a lot in logistical systems. These are designed to handle the most general packaged products or commodities, which would not require specialized storage or handling arrangement. The products usually stored are food grains, paper rolls, bulk material (cement, fertilizers), furniture, chemicals etc.

A major advantage of a public warehouse is that they provide financial flexibility and economies of scale. More operating and management expertise is provided, as warehousing is the core business for such firms. Variable costs are lower compared to private facilities. With more customers and higher volumes, the fixed costs are spread over resulting in economies of scale. Public warehouses are of great use to firms, which are newly formed, and have the desire of expanding their distribution network and thus needn't invest in developing a private warehouse. They can alternatively hire a space in a public warehouse or channel their funds into other activities, which generate more revenue. This would improve their performance and thus increase the return on investment. Location flexibility is also available through public warehouses. Firms can also close storage facilities in one market and open at other places without any financial losses.

**3. Contract warehouse.** Combine features of both public and private warehouses. The risk is shared and there is a long-term relationship that will result in lower costs. Benefits include economies of scale, flexibility, information, and equipment sharing among clients.

### **Other types of warehouse**

**General merchandise warehouses:** Deal in all commodities except specialized or commodity items. These can either be public or private.

**Refrigerated/cold storage warehouses:** Used for storing perishable items, which are kept at low temperatures to preserve quality. These are expensive and a variation of this type of warehouse is known as the controlled temperature warehouse, which is lesser expensive and is used for storing fruits, milk etc.

**Bonded warehouses:** A special type of warehouse whereby distributors can produce, transfer and store products without paying excise taxes and duties on them. The government licenses these to various parties.

**In-bond warehouses:** Bring in imported merchandise, store as well as display the merchandise in shops, which sell for export or sell merchandise, which is directly exported.

**Special commodity warehouses:** These are specialized and handle a specific or a bulk commodity.

**Combination warehouses:** Warehouses, which combine all the above facilities.

**Nature of warehousing costs:**

The warehousing costs can be either a) fixed costs (incurred irrespective of how much or how little throughput is experienced) and b) variable costs (vary with the throughput).

Association	Costs
Land	Rent
Building	Rent & Rates
Storage and material handling equipment	Maintenance
Labour	Pickers, Packers
Supervision	Warehouse Management
Services	Electricity, Telephone

**Decisions in planning the warehouse:**

**Warehouse site selection.** Cost and service are the key considerations here. The other supplementary factors are:

1. **Nature of product.** This influences the number and location of warehouses. For perishable commodities, proximity to the consumption centers is essential. It is preferable to have limited number of warehouses, which have delivery limitation in terms of distances and geographical reach.

2. **Infrastructure.** The efficiency of the warehouse operations improves with the availability of suitable infrastructure like roads, utilities (water, electricity, communication etc) and labour, the unavailability of which will increase the transportation cost. For example, for cold storage, availability of electricity is a major influencing factor.

3. **Access.** Again, when there the warehouse is located at a place where there is little accessibility, the transportation costs will escalate.

4. **Availability.** The availability of warehouse space is an issue, especially in the metros. In the case of non – availability, alternative location at the outskirts will be the alternative, but which will increase the transportation costs.

5. **Market.** To offer better service to customers, warehouses need to locate in proximity to consumption centers so that frequent deliveries by customers in small quantities can be organized at a limited time.

6. **Regulations and local taxes.** Government regulations guide the site selection for certain hazardous chemicals, explosives etc. In such cases, there are limited options for site selection. Also the regional sales tax and octroi charges influence the site selection. With a lack of uniformity in the sales tax structure across the States, warehouses will be planned to make maximum utilization of this.

7. **Product-mix Consideration.** The product mix is directly related to the design and operation of a warehouse. Considerations such as product sales, demand, weight, bulk, packaging etc needs to be made.

**Future Expansion**

Some consideration about the estimated requirements for future operations in case of expansion must be made. A five-to-ten-year expansion plan must be considered

while establishing the warehouse facilities so that normal operations are not disturbed during expansion.

**Selecting the material handling system.** As movement is the primary function within a warehouse, it is necessary to select the appropriate material handling system.

**Warehouse layout.** The warehouse layout needs to fit specific needs. Considerations to be made while planning the layout and operation are:

- deciding on the receiving and shipping locations;
- identify minimum paths for movement of equipment and people, for speedy storage and retrieval;
- classifying items as slow, medium and fast and then allocating separate area for these;
- placing the material handling systems at their assigned location.

**Determination of warehouse space and design.** A sales forecast or total tonnage expected is used to estimate the final size of the warehouse required. A number of techniques like linear programming, simulation etc are used to determine warehouse size.

Warehouse designing is a specialty planning activity usually done by an architect. Specifications like size of warehouse, lay-out, path of material-handling equipment, are required. The warehouse must be designed for maximum utilization of available space and material handling equipments.

#### **Factors to be considered while initiating warehouse operations:**

– While stocking the warehouse, a complete list of inventory needs to be obtained. Quantities of individual stock keeping units to be determined while planning the warehouse.

– Hiring and training of personnel is an important issue. There must be clarity about the role played by personnel hired for specific requirements and each group of employees needs to be given special training.

– The management must ensure that work procedures are developed and also understood by personnel.

– Protection against theft of merchandise must be ensured. Adequate security measures to be undertaken by allowing only authorized personnel to enter the premises, where computerized inventory control and processing systems are of use.

– Product deterioration arises from careless storage and non-compatibility among products stored in the same facility. Careless handling by warehouse employees is a matter of concern.

– When firms handle a large number of products it is economical to utilize computers for billing and inventory control. The computer inventory needs to be compared with the physical stock

– Accident prevention is an important consideration.

#### **Warehouse Management Systems**

This is a software solution to control movement and storage of materials within a warehouse, transportation management, order management, and a complete accounting system. The following activities are managed through a WMS:

1. **Inbound.** Functions like addition of a new purchase order, palletisation, receipt of goods, putting away received goods etc.

**2. Inventory Management.** Transferring inventory, holding and adjusting inventory, awareness of inventory balances etc.

**3. Outbound.** Tasks such as creating an order of shipment, shipping multiple orders, allocation of orders, shipping order status etc.

Warehouse being the interface area for production, market, customers and suppliers performs a number of functions in the supply chain. In many logistical system designs, the role of warehouse is viewed as a switching facility when contrasted to a storage facility. While the role of a traditional warehouse was to maintain a supply of goods to protect any uncertainty, the contemporary warehousing offers a host of much other value-added services. Effective warehousing has become the order of the day.

*Understanding the main points*

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
interface	a retails sales company or salesman
operating cost	products as objects of large-scale trading in specialized exchanges
location	the contents of a full truck or lorry
costs	money paid to the government other than for transaction-specific goods and services
retailer	the stock of an item on hand at a particular location or business
truckload	the basic facilities, services and installations needed for the functioning of a community or society
configuration	a particular point or place in physical space
inventory	the characteristics of a production process in which an increase in the scale of the firm causes a decrease in the long-run average cost of each unit
facility	amount of money, time, etc. used in production cycle
commodity	of a brick or stone: laid with its length across the thickness of a wall
furniture	the connection between a user and a machine
economy of scale	a structured arrangement of items within certain limits; a plan for such arrangement
infrastructure	the physical means or conveniences to make smth (especially a public service) possible
tax	amount of money, time, etc. that is required or used
inbond	form, as depending on the relative disposition of the parts of a thing's shape
lay out	large movable items which enhance the rooms characteristics

**Task 3.** Find English equivalents to the following words and word combinations.

Достигать общие цели; производственные расходы; сети цепей поставок; улучшать уровень обслуживания клиентов; предприятие в целом; оптом; процесс отбора; заказы клиентов; основные преимущества; приводить к снижению транспортных издержек; сниженный уровень риска; напряженность с поставками материалов; узкий ассортимент продукции; поступление на склад;

предоставлять финансовую гибкость; расширять дистрибьютерскую сеть; приводить к меньшим затратам; максимально использовать складское пространство; товары.

**Task 4.** Find synonyms to the following words.

Gain, reach; have/form an opinion; firmness of mind; point of interconnection; price; goods; replace; make easier, help bring about; combine; make able to do; restriction; collection; prepare for smth; favourable condition; rise as a consequence; official permission.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
overall	consignment
thorough	product
critical	manufacturers
single	benefit
specific	benefits
multiple	flexibility
appropriate	demand
major	production
actual	consideration
basic	products
final	container
administrative	carriers
intangible	objectives
private	control
packaged	link
financial	demand

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

Warehousing; critical link; improve profit; distribute materials; cater to a specific demand; products; cross-docking; advantage; inventory, retailers; warehouse; selection; attain; commodity; facilitate; constraint; advantage; provide; license.

**Task 7.** Review questions.

1. How can you characterize the role of warehousing within an organization?
2. How is successful warehouse management understood nowadays?
3. What functions does a warehouse perform?
4. What are the benefits of warehousing?
5. What are the two most important types of a warehouse?
6. What are the major benefits of a private warehouse?
7. What services does a public warehouse perform?
8. What are other types of warehouses?
9. What are the two types of warehousing costs?
10. What are the key issues when decisions about planning a warehouse are taken?
11. What requirements are usually taken into consideration in case of a warehouse expansion?
12. What issues must be considered when starting warehouse operations?
13. What activities are managed through WMS?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.

## **Unit 8.** Packaging and Materials Handling

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

*Nouns:* packaging, impact, convenience, assessment, objective, environment, damage, vulnerability, pilferage, precaution, vehicle, compression, puncture, strap, efficiency, unitization, consignment.

*Verbs:* prevent, depend, refer, protect, exercise, influence, determine, mention, include, attract, involve, wrap.

Packaging is a marketing tool related to the performance of marketing function. The basic objective behind packaging is to prevent damage to the product during storage, transportation and handling, when it is in movement for distribution in the market. It forms an important cost element of goods and represents 5 – 30 per cent of the value of goods, depending on the type of product. It has a significant impact on the cost and productivity of the logistical system. The main cost elements are the purchase of packaging materials, introducing automated or manual packing operations, and further the need for disposal of material. A systems approach is necessary to manage packaging. Any central planning logic, which is designed to control total distribution costs, must keep in mind the costs related to packaging.

There are two main types of packaging: consumer and logistical/industrial packaging:

1) **Consumer packaging.** This packaging is done with a marketing emphasis. The packaging design focuses on aspects like customer convenience, market appeal, shelf utilization, product protection etc. The proper package design should have its base on a complete assessment of the logistical packaging requirements, which requires a complete evaluation of how all the components in the logistical system influence packaging.

2) **Industrial packaging.** The concept of containerization or unitization where the individual products are grouped into carton, bags, bins, or barrels for handling efficiency. The master cartons are grouped into larger units for handling, the combination that is referred to as containerization or unitization. Logistical packaging is designed to meet the distribution objectives.

Determining the degree of protection required to cope with anticipated physical and element environments is an important issue in package designing.

### **Functions of packaging:**

– **Damage protection.** The master carton protects products from damage while movement and storage, in addition to being a restraint to pilferage. The cost of protection increases according to the degree of value and fragility of the product. The vulnerability of damage is related to the environment in which it is stored and transported. The physical environment relates to the logistical system. When the firm

has more control over its physical environment, lesser the packing precautions are required. An example can be the utilization of privately owned transportation, which will move the product in a controlled environment. But if common carriers are used for transportations, more precaution needs to be exercised as the product may be transported in a variety of vehicles and there is lesser control. Certain situations in which the product will cause in-transit damage to the product are vibration, compression, puncture and impact. Securing the package with a tight strap or to load the carrier in a right pattern can reduce this.

The outside elements also influence the packaging. There are certain factors like temperature, humidity etc which are beyond the control of logistical management. It has to be determined in advance how the contents of the packing will react to each of these factors and design the packing accordingly.

– **Utility/convenience.** This refers to how packaging can affect the logistical productivity and efficiency. When products are packed in certain configurations and order quantities, it increases the logistical output. Packaging thus provides convenience of handling and storing. Also the concept of unitization is very significant here. Unitization refers to the process of grouping the master cartons physically into one restrained load for easier material handling and transportation.

– **Communication.** Packaging plays a significant role by assisting all channel members to identify the contents of the package. An attractive surface decoration can serve as a display item. Information such as the manufacturer's name, quantity, code number etc is mentioned on the package. The labels must be visible from reasonable distances. Handling and damage instructions are provided on the package. Especially for hazardous products such as chemicals such instructions can be of great assistance. Tracking is one more feature of logistical packaging. The consignment moves along multiple storage locations, transportation systems at various points with other consignments. For a well-controlled material handling system to track the product as it is received, sorted or shipped, packaging identifiable through a bar code is essential.

– **Packaging Cost.** The packaging cost depends upon factors like nature of product, physical dimensions, value, regulations etc. Delivery of the product at minimum overall packaging cost is essential. These are the costs included in packaging:

– **Unit Package Cost.** Basic material or container price. This will depend upon factors like volume, freight charges, and methods of over packing and development costs. An increase in the volume attracts lesser price.

– **Operation Cost.** The packaging equipment must have the strength and ability to withstand the stress of high speed filling equipment, in order to make the production process cost effective and efficient.

– **Warehousing.** The packed product is shipped to the user's warehouse for storage before shipment. Shape of the package and strength of the package are the factors of key importance here.

– **Distribution.** Moving the product from the user's warehouse involve several forms of transport. The costs of these are referred to as transport costs, which are governed either by the weight of the finished pack or the volume. They may also depend upon the shipping distance and value of the item being handled.



## **Types of packaging material**

– **Shrink-wrapping.** Form of packing where a pre-stretched plastic sheet or bag is placed over platform and master cartons. Heating locks the cartons. Advantages of this packaging are adaptability to various shipment sizes, low cost, and the ease of identifying contents and damage. A major disadvantage is disposal of waste material.

– **Stretch-wrapping.** The unit load is wrapped with a tightly drawn external plastic material. Then it is rotated on a turntable to place the stack under tension. Platform is wrapped directly into the unit load.

– **Aluminium.** The main area of usage is foil. These are used as a replacement for beverage cans, stackability being the main advantage. Metal tubes and moulded trays are the other two forms. While metal tubes are used in pharmaceuticals, crafts, and cosmetics, moulded trays are used in the food industry.

– **High-density plastic boxes.** Containers with lids similar to those purchased for home storage applications. These are rigid and sturdy, thus ensuring high protection.

– **Plastic strapping.** A load is unitized so that many smaller containers can be handled as a single larger container. The strapping, which is usually about one to one and a half inch wide, is bound tightly around the containers.

– **Plastic foam dunnage.** Used to pack irregular shaped products into standard shaped boxes. These are light and do not increase the transportation cost and also provide substantial protection. A major issue here is the environmental problems related to disposal.

– **Film-based packaging.** This utilizes flexible materials instead of rigid packaging like corrugated fibre-board boxes. Corrugated fibre-board cases represent an important part of the paper and board industry, in terms of both tonnage and value. Corrugated fibre-boards are commonly used for television, washing machines, refrigerators, cigarettes, personal care products, etc among a host of other products. The advantages here include automatic operation, reduced labour costs of manually boxing products.

– **Blanket-wrapping.** A traditional form of packing, which is generally used in household packing. This packing is most suitable for irregular shaped products like chairs, tables and other furniture. Generally household goods carriers use these services.

– **Returnable containers.** These are mostly re-usable packages like steel or plastic and sometimes corrugated fibreboard boxes. These are used by automobile manufacturers to pack inter-plant shipment of body parts.

– **Intermediate bulk containers.** Used for granular and liquid product shipment quantities smaller than tank cars but larger than bags or drums. Resin pallets, food ingredients, and adhesives are packed in these containers.

– **Plastic pallets.** The rapid growth in the utilization of plastic in packaging is noticeable. These are lightweight and recyclable.

– **Pallet pools.** Third-party supplies maintain and lease high-quality pallets all through the country. Palletization has contributed immensely to logistical productivity. Advantages include reduced damage, lesser costs of disposal, and improved use of pallet resources. The disadvantage is the costly investment in pallets.

– **Refrigerated pallets.** A self – contained refrigerated shipping unit, which can be placed inside a regular dry van as a Less Than Truck Load shipment. This integrates the demands of environment and unitization.

### **Unitization**

Products are grouped together in cartons, bags and barrels for handling efficiency. The containers used to group individual products are called master cartons. When the master cartons are grouped together, it is called unitization. The concept of Unitization has its base upon the theory that all shippers must pack their cargo in such a manner that it is moved and handled entirely by mechanical equipment, like lifts and cranes, all through the distribution network. It enables faster loading and unloading by transportation equipment, results in more efficient distribution center operations and also a reduced level of pilferage.

#### **According to the unit load concept:**

– Small, heavy and expensive items are enclosed in containers with double or triple wall to avoid pilferage and damage.

– The boxes or containers are secured to pallets with shrink-wrap or steel strapping.

– Large items can be directly secured to pallets, with assurance that they are completely protected from damage.

#### **Palletisation for unitization**

Pallets enable unifying dry cargo loads. Basically, it is a flat tray upon which a lot of articles can be placed, and can be handled as one article. For securing the articles to the pallets, metal strapping, plastic films or more elaborate forms of devices are used.

Benefits of palletisation include reduction in time required to load or unload the products from the vehicle, and better utilization of warehouse space. Other benefits include assembly of individual packages according to a single customer order, easy handling of pallets for road as well as rail vehicles, and reduction in the rate of damage in transit, and reduced delivery time. A drawback can be the lack of uniformity in pallets.

#### **Containerization:**

Container refers to physical equipment, which is used for unifying a number of shipments, which then move as individual units. These are used to handle bulk commodities as well as merchandise and are especially adaptable for inter-modal transport.

#### **Benefits of containerization:**

- reduced door to door shipment
- reduced freight costs
- reduced damage and pilferage, thus eliminating intermediate handling of packages
- higher productivity of labour
- lesser documentation
- reduced warehousing and inventory costs
- better utilization of capital equipment through uniformity of cargo

- environmental control

### **Drawbacks of containerization:**

- all cargo need not necessarily suite containerization
- heavy capital investment in equipment required
- difficult to thrust liability as there are several carriers and also no intermediate inspection
- proper equipment to handle containers may not be available
- system not comfortable with air freight

### **Movement of containers**

While moving the container, the consignor is faced with several choices such as the follows:

- **By road.** This is done by using equipments like direct lifting cranes, forklift trucks, portal frames and other self-loading devices.
- **By rail.** For long distances, road may prove uneconomic and thus the rail transport can be used to transfer containers.
- **By port terminals.** The container finally arrives at the port to be shipped whether road or rail transport is used to transfer containers.
- **By ships.** To secure benefits of rapid loading and unloading and thus to ensure efficient utilization of space, containers are built or customized. Wide hatches give complete access to holds in these ships.

### **Designing a Package**

Designing the package involves the following steps:

**Briefing the designer.** The person who is designing the package needs to understand what is in the mind of the manufacturer. A complete marketing analysis may be given to the designer or some specific objectives may be given. The designer needs to list his views about the problem.

**Gathering information about the package.** Meeting the people involved in the production process, various channel members like sales personnel, dealers etc. has to be done. Facts about the packaging materials need to be gathered.

**Writing the design platform.** The designer gives a report giving details of what he has understood and what must be done to achieve the objectives he has laid down. The product and packaging engineers need to work together.

**Creative phase.** Here, the creative people are involved. They are given a precise definition of the problem and a set of objectives to work upon. They are required to find visual solutions to the problems stated within the boundaries outlined in the platform of design.

**Consulting suppliers.** Then, the appropriate suppliers of materials need to be called in. The ideas are synchronized with reality. The ideas need to be practical and also cost effective.

**Initial presentation.** The ideas are presented at a first visual presentation meeting. The client actually sees the work being done. The designs should be judged in relation to the design platform.

**Modification.** Modifications, if any which need to be done after the first presentation, must be made.

**Design testing.** To test package, a number of tests have been developed, a few of which have been listed below:

**Image tests.** Use the qualitative and quantitative research to assess consumer attitudes, preferences and message communicated.

**Usage tests.** Examine the functional related attitudes towards packaging and usually involve in-placement tests.

**Visibility tests.** Are designed to evaluate legibility of pack graphics, relative impact of different pack elements, and the relative impact of different designs they include the use of

**Brainwave analysis.** Used for both advertising and package designing. Method is based on “Alpha” and “Beta” brainwaves.

**Final Design Phase.** A final meeting with client is held to finalize the design. In this stage the various aspects of packaging like labels, contents, colour schemes, artwork on label etc need to be finalized.

**Production design.** The complete designs are presented to the clients for approval.

The design is approved and also set as per the initial discussions concerning the marketing strategy. Any variance needs to be resolved by consulting the experts in the respective fields.

**Finishing the job.** The finalized artwork is turned over to the suppliers for producing the packs.

**Factors effecting choice of packaging materials:**

- characteristics of materials to be packaged;
- destination;
- kind of transportation;
- handling, stowability and storage considerations;
- conditions of usage and distribution;
- cost;
- availability of the type of package and choice of substitutes.

Packaging has a key impact on the cost and productivity of the logistical system. A central planning logic designed to control the total distribution costs must incorporate all the relevant costs and trade-offs, also those related to packaging. The cost of every logistical activity is affected by packaging. Inventory control is dependant on the accuracy of the manual or automatic identification systems that are keyed by product packaging. The order selection speed, accuracy, and efficiency are affected by the identification of product, configuration and ease of handling. The capability of unitization and techniques influence the handling cost. Package size and density influences the transportation and storage costs too. From the customer perspective, factors like quality control during distribution, providing consumer education, compliance with environmental regulations explain the importance of packaging. Given the complexity in the global supply chain and the costs of locating new facilities, the concept of packaging postponement to achieve strategic flexibility

is gaining importance. With so much influence of packaging in every logistical activity, an integrated logistics approach towards packaging operations can yield substantial savings.

**Understanding the main points**

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
tool	special weight or forcefulness given to smth considered important
goods	a disadvantage, smth that detracts or takes away
emphasis	the force on an object due to the gravitational attraction
bar-code	a portable platform, usually designed to be easily moved by a forklift
weight	a layer of anything; a heavy loosely woven fabric usually large and woolen, used for warmth while sleeping or resting
volume	that which is produced, then traded, bought, or sold, then finally consumed
blanket	a material made from wood chips or shavings, which are compressed and bonded with resin and formed into stiff sheets
pallet	a mechanical device to make a task easier
drawback	any set of machine readable parallel bars or concentric circles varying in width, spacing, or height, encoding information according to a symbology
fiberboard	a three-dimensional measure of space that comprises a length, a width and a height

**Task 3.** Find English equivalents to the following words and word combinations.

Предотвратить ущерб; представлять; важный; руководить упаковкой; использованный материал; с упором на маркетинг; рыночная привлекательность; требование к упаковке; справляться; хрупкость; меры предосторожности; разнообразие транспортных средств; опасный; характер продукта; обертка; паллета; время поставки.

**Task 4.** Find synonyms to the following words.

Plan; part of a larger entity; productiveness; manipulate; packing; conversion into a unit; prevention of misfortune; important; cover; wood-chips material; sticky, glutinous; detriment, hindrance, weakness; handling; sophisticated, intricate; size, volume, huge structure; adaptive.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
manual	environment
industrial	van
complete	regulations
controlled	management
tight	flexibility
logistical	materials
great	costs

elaborate	packaging
regular dry	discussions
packaging	facilities
appropriate	forms
qualitative	education
initial	strap
total distribution	packing
logistical	research
consumer	productivity
environmental	assessment
new	suppliers
strategic	assistance

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

Packaging; basic objective; to have a significant impact; types of packaging; consumer packaging; industrial packaging; functions of packaging; packaging material; unitization; palletisation; containerization; benefits; drawbacks; movement of containers; to design a package; choice of packaging materials; a key impact.

**Task 7.** Review questions.

1. What is the objective of packaging? 2. What are the main cost elements of goods? 3. What are the two main types of packaging? 4. What is the difference between consumer packaging and industrial packaging? 5. What are the functions of packaging? 6. How can master carton help to protect products? 7. What outside factors are taken into consideration when designing packaging? 8. What do they mean when they talk about utility/convenience? 9. What costs are included in packaging cost? 10. What materials can be used for packaging? 11. How is unitization defined? 12. What is a pallet? 13. What are the benefits and drawbacks of containerization? 14. What stages does designing a package involve? 15. Is nearly every logistical activity influenced by packaging?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.

### **Unit 9.** Logistics as a Service Function

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

*Nouns:* force, facility, reliability, responsiveness, customer, proximity, extension, background, implementation, environment, congruence, cross-docking, consignment, vendor, replenishment, clearance, implementer.

*Verbs:* deliver, perceive, emerge, exhibit, respond, gain, retain, carry out, perform, dedicate, affect, conduct, compare, force, determine, identify, influence, involve, require, include, view, encompass, implement.

In the modern day dynamic business environment, competitive pressures and customer demands force a large number of firms in shifting their priorities towards understanding the logistics supply chain process for delivering superior value to customer. In order to achieve this objective, the historic role of warehousing, transportation, storage, and handling have started with a more comprehensive role, which pervades the entire supply chain. Logistics strategy facilitates gaining a competitive edge to support emerging technologies.

As a service function logistics involves the four basic features:

**Reliability.** Influences the degree of trust, which a supplier can have, in a company's capability for honoring commitments. The supplier has to be perceived as reliable and for this the supplier needs to exhibit certain service characteristics. A high degree of reliability in terms of inventory and material delivery is expected from the supplier end. Thus a key objective of the logistical system needs to be reliability in meeting the needs of the customer, according to the resource planning.

**Responsiveness.** The speed with which customer demands are being responded. Responsiveness is expected at all levels of the supply chain. Response to pre-sales enquiry by using latest available information and communication technologies is an important strategy. Supplying material as per customer needs, and frequent deliveries in fewer lot sizes are important. Deliveries can also be made at the various assembly centers, which are in proximity to the markets. A firm will gain a winning edge in competitive markets through a responsive strategy.

**Relationship.** Firms spend huge amounts in Customer Relationship Management (CRM) related activities for development of long term relationships to retain customers, and also reduce the element of risk in demand management. Partnering with the right supplier and considering the supplier operations, as an extension of its own operations will enhance the efficiency and effectiveness of the supply chain.

**Rationalization.** This refers to reducing the supplier base and partnering with select suppliers. The supplier's facility is treated as an extension of the buyer's facility and there is sharing of information, experience and resources for mutual advantage.

### **Requirements for an effective logistics strategy**

Characteristics of an effective logistics strategic planning and project management are as follows:

**Dedicated planning resources and programs:** Unless proper resources are set aside for long term planning, it will not be carried out to the level of necessity to assess ways of changing economic, technological, competitive, demographic and regulatory environments affecting long-range requirement of logistics. A dedicated logistics planning team needs to be organized. The logistics planning team should include analytical and operational backgrounds that are required to resolve complex issues.

**Formal logistics planning methodology:** Logistics is filled with interdependent activities, which impact other areas of the organization. Planning activity goes through three important phases such as investigation, vision and implementation. In the investigation phase, a logistics audit is conducted and the company's current performance and practices are compared with world-class practices. The vision phase

involves application of world-class practices to the current environment. In the implementation phase, detailed project plans for completing the recommended initiatives are developed and monitored.

### **Strategic logistics planning**

Business firms have been forced to reengineer or redefine their business process so that efficiency and effectiveness can be brought into the operations. The main reason for this has been the increasing globalization of business activities, intense competition, and uncertain markets. Different firms have different process of strategy formulation and implementation. The process of strategic logistics planning has the following steps:

- Analyzing the external and internal environment, which will help to determine the resource requirements, limitations and any other factors.
- The environmental analysis identifies the company's strengths, weaknesses, opportunities and threats in customer service.
- SWOT enables in formulating the appropriate resources and the logistics mix or resources required for achievement of organizational goals.
- A structural design is needed to implement the strategy. The primary concern here is the strategic planning of warehouses; transportation and information flow in the entire supply chain. A proper interface between channel structure of the firm and its logistical network can be done with the help of a structural design. The efficiency of the functional elements in the movement of information and inventory across the supply chain will influence the success of the strategy implementation.
- Selection of transportation route, mode and carrier operator is a key aspect for offering and maintaining a reliable and consistent service level.
- The role of material procurement and management also cannot be ignored.
- Implementing the strategy is absolutely important and its success depends on efficiency of the human resources, equipment and the interfaces involved. A major task at the level of operation are order registration, processing, picking, replenishment and dispatching.

Thus, the process of strategic logistics planning will improve the overall responsiveness of the organization.

### **Components of information decisions in supply chain strategy:**

**Push versus pull.** While designing the pieces of supply chain, it is necessary to determine whether these are part of the push or pull phase in the supply chain. Push systems require an elaborate Master Production Schedule (MPS) and Master Requirements Planning (MRP). The Master Production Schedule rolls the Material Requirements Planning (MRP) system. In contrast, for pull systems, information is required on actual demand for quick transmission throughout the entire chain so that the real demand is reflected.

**Competitive strategy.** This defines the customer needs to be satisfied through its products and services. A firm's competitive strategy depends upon the customer requirements. It targets the customer segments with a main objective of providing products and services to cater to the customer needs.



**Product development strategy.** Mentions clearly the portfolio of new products, which needs to be developed by a company giving an indication whether efforts towards these are done internally or externally.

**Marketing and sales strategy.** Specifically mentions about market segmentation and details relating to positioning, pricing and promotion of the product.

**Supply chain strategy.** A wide term, which includes supplier, operations and logistics strategy. Includes decisions relating to inventory, transportation, operating facilities and information flows. The strategy specifies the activities of supply chain such as operations, distribution and service.

**Other strategies.** A company also devises additional strategies for finance, accounting information technology and human resources.

### **Logistics strategies**

Formulating a logistics strategy can be viewed from the following three angles:

- customer demands satisfied through strategy implementation;
- targeting customers;
- resources required for implementing strategies.

Formulating a strategy is not an isolated process. Logistics strategy needs to have congruence with the overall goal and strategy of the business. A synergy with the other domains of the organization is necessary. An example of this can be the Management Information Systems of an organization encompassing all the functional areas of business.

The MIS, being an information sharing system across the supply chain has considerable synergy with logistics operation.. Considering the importance of formulating a logistics strategy, the following are the possible approaches:

### **Competitive and generic strategies pursued for logistics operations:**

**1. Cost Leadership.** Achieving cost leadership is facilitated by logistics cost reduction to a major extent. This can be achieved by many ways. Examples of achieving logistics cost reduction are:

- reducing transaction costs through IT support;
- warehouse operations based on scale economics;
- JIT, cross docking and postponement, which results in reduction of inventory and related costs;
- reduced vendor base and co-partnerships with suppliers.

**2. Differentiation:** This strategy focuses on offering superior service. Examples of offering logistics services for differentiation:

- on time and consistent delivery;
- logistics solutions to suit individual requirements;
- tracking consignments.

**3. Collaboration.** A strategy where the customer works in collaboration with the suppliers. An example here is Vendor Managed Inventory (VMI). In VMI, customer places no orders but instead shares information with the vendor. This information relates to actual usage or sales of their product, their current on hand inventory and details of additional marketing activity. On the basis of this information, the supplier takes responsibility for replenishment of the customer inventory.

**4. Diversification.** Firms having a lot of operations adopt this strategy. The basic objective here is the lower cost and better control over operations thus providing superior customer service.

**5. Outsourcing.** Outsourcing services to logistics service providers having expertise in this area in order to bring efficiency and effectiveness into the logistics operations. An example in outsourcing is Customs Clearance service providers. As a majority of exporters and importers do not have a proper expertise in this area of logistics operations, many logistics service providers offer customs clearance services to their clients. This can reduce the overall transaction cost.

### **Implementation of Strategy**

Implementation of the strategy is an important activity after the formulation. The firm needs to evolve a proper framework to successfully implement its logistics strategy. Important aspects for implementation of strategy are:

- financial dimensions of control such as net income return on equity, net profits etc.;
- non-financial parameters of control such as quality of service, customer satisfaction, delivery time etc.;
- the organizational culture and employee motivational programmes initiated by the company facilitate behavioral controls for employees;
- the structure of the organization is of importance. Organizational structure with a wide span of control give higher motivation to employees to perform well and strategy implementation can be done successfully in such organizations;
- skills of the implementers of the strategy are also an important consideration.

The successful implementation of logistics strategy depends to a great extent on the information shared with internal and external customers and also logistics partners. Transparency at both the buyer and seller's end helps to build an element of trust, thus adding value to the customer delivery chain, which makes the task of implementation simpler.

### ***Understanding the main points***

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
priority	a stretching out; enlargement in length, breadth or time; an increase
value	a goal that is striven
objective	the surroundings of; the natural world or ecosystem
inventory	smth that one uses to achieve an objective
resource	the process becoming a more interconnected world
extension	an item's relative importance
background	any condition, circumstance, opportunity or means, or chance to success
environment	a less important feature of scenery (as opposed to the foreground)
advantage	the degree of importance given to smth
globalization	the stock of an item on hand at a particular location or business

**Task 3.** Find English equivalents to the following words and word combinations.

Рабочая среда, устанавливать приоритеты, определять цели, доступная информация, огромное количество, долгосрочные отношения, удовлетворять потребности, частые поставки, обращаться (с кем-либо), пересмотреть рабочий процесс, определить требования, вся цепь поставок, человеческие ресурсы, основная цель, охватить все функциональные области, в сотрудничестве с поставщиками.

**Task 4.** Find synonyms to the following words.

Contemporary; surrounding; seniority; aspiration, striving; complete, exhaustive; feature; regular; closeness; lengthening; fulfill; consecrate; strained; decide; perform; circumscribe, bring about.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
competitive	information
superior	resources
competitive	relationships
available	approaches
huge	strategies
long-term	role
strategic	environment
external	areas
human	process
basic	pressures
additional	expertise
functional	amounts
proper	objective
isolated	value
possible	planning

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

Business environment; set priorities; the role of warehousing; degree of reliability; meet the needs; customer needs; long-term relationships; strategic planning; proximity to the markets; redefine a business process; resource requirements; customer service; success of the strategy.

**Task 7.** Review questions.

1. Why does the understanding of the logistics supply chain process acquire such an importance nowadays? 2. What is logistics strategy aimed to achieve? 3. What are the four basic features of logistics? 4. How is reliability defined? 5. What aspects of logistics activities does responsiveness embrace? 6. What are the main requirements for an effective logistics strategy? 7. What determines bringing efficiency and effectiveness into the operation of business firms? 8. What measures are involved into the process of strategic logistics planning? 9. What are the positions from which

logistics strategy can be viewed? 10. What are the most important aspects for implementation of a firm's strategy?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.

## **Unit 10.** Logistics Information Systems

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

*Nouns:* means, flexibility, thread, assignment, transaction, measurement, utilization, exception, vehicle, probability, execution, decision-making, pay-off, bottleneck, failure, data mining, clarity, constraint.

*Verbs:* capture, result, manage, build on, link, initiate, evaluate, refine, incorporate, enable, design, improve.

Logistics information systems are the means of capturing, analyzing, and communicating information related to logistics and supply chain management. Information was largely paper-based during the past and thus resulted in slow, unreliable, error-prone transfer of information. Now, with technology becoming user friendly and also less expensive, logistics managers can effectively and efficiently manage information electronically.

Earlier, logistics focused on efficient flow of goods through the distribution channel. Information flow was not given that much of importance. Now, timely and accurate information is critical owing to the following reasons:

– total customer service includes information related to order status, product availability, delivery etc.

– to reduce supply chain inventory, information is very essential as this can minimize demand uncertainty

– there is more flexibility with information as there is clarity as to how, when and where resources may be utilized to gain strategic advantage

This has triggered the need for an effective Logistics Information System.

### **Functions of a logistics information system:**

- planning;
- co-ordination;
- customer service and communication;
- control.

Logistics information systems are the threads, which link the various logistics activities into an integrated process. The system builds on four levels of functionality.

### **Building blocks of LIS:**

**Transaction system.** Initiates and records individual logistics activities. Activities include order entry, selection, inventory assignment, shipping, pricing, invoicing and customer enquiry. In this system, the customer order performance cycle is completed through a series of information system transactions.

**Management control systems.** Focus is on performance measurement and reporting. Performance measurement provides management feedback regarding the service level and resource utilization. Customer service, productivity, financial and quality indicators are the commonly used performance measures. While, the Logistics Information System (LIS) reports past performance, it is also essential that exceptions are identified as and when they are processed.

**Decision analysis.** Focuses on decision applications to assist managers to identify, evaluate and compare logistics strategic and tactical alternatives, vehicle routing and scheduling, facility location cost – benefit analysis etc. Evaluates future tactical alternatives and thus need to be unstructured and flexible to consider a wide range of options. To benefit from its capability, user requires a lot of expertise and training.

**Strategic planning.** Focus is on information support to develop and refine the logistics strategy. Decisions are typically more abstract in nature, are lesser structured and have a long-term focus. This level requires incorporating lower-level data collection into a range of business planning as well as decision-making models, which help in evaluating the probabilities and payoffs of strategies.

### **Logistics data warehousing, data mining, and decision support systems**

Logistics Data Warehousing serves as the foundation for the entire Information System. The data warehouse contains data structures, which are anticipated and developed ahead of the requirements for the other execution as well as planning systems, which makes the design, selection and implementations of those systems easier, and less time consuming. It contains information, which describe past activity levels as well as the current status, which serves as the basis for planning future requirements. This enables access of data. Data access usually becomes a bottleneck as it causes a lot of system failures, delays and response time problems. Also, profiling the logistics activity and data mining is not possible until the logistics data warehouse is designed and developed.

Logistics Data Mining is key to any logistics improvement initiative and is a methodical and systematic analysis of supply and demand activities. The process is designed to identify the root cause of materials and information flow problems, to identify major opportunities for improving processes, and also enables objective decision-making.

Logistics Decision Support Systems are computer based decision support tools, which provide solutions to logistics problems. Examples include QAD, SAP and JD Edwards.

### **Information architecture**

Logistics system architecture includes both the information that which maintains the data warehouse as well as the execution components. Data warehouse contains past as well as current information. Execution components include activities such as initiation, monitoring, and measurement of activities required fulfilling customer as well as replenishment orders.

These activities are as follows:

◆ **Planning and co-ordination.** These form the information system backbone for manufactures as well as merchandisers. Activities include material planning within

the organization as well as between channel members. Components of planning and coordination include:

- **Strategic objectives** – These are the primary information drivers in many organizations, which basically define the financial as well as marketing goals. These objectives are developed for a time period ranging for many years and usually include quarterly updates. A combined marketing and financial objective define markets, products as well as the services and indicate the activity levels for logistics managers during the planned time frame. A combined marketing and financial plan also serves as a direction for other enterprise plans.

- **Capacity constraints** – These evolve from the strategic objectives. Capacity constraints identify the material bottlenecks using the defined activity levels and thus effectively manage resources to satisfy market demands. The place, time and quantity for production, storage and movement are determined by capacity constraints. Aggregate production and throughput limitations like annual or monthly capacity are considered. Time dimension is introduced into an organization's strategic objectives by considering factors such as facility, financial and human resource limitations. These constraints have a great influence on logistics schedules. The enterprise's aggregate plan is linked by capacity constraints, which have a great influence on the production for every location. A high level of integration across all planning and co-ordination components is highly essential for a good organization.

- **Logistics requirements:** These co-ordinate the facility, equipment, labor, as well as inventory resources, which are necessary for accomplishment of logistics objectives. Distribution requirement planning (DRP) is used for implementation of logistics requirements. Future requirements and forecasts are based on customer orders, sales and marketing conjunction with historical activity levels. Logistics requirements need to be integrated with capacity constraints as well as manufacturing requirements in order to obtain optimal system performance.

- **Manufacturing requirements:** Production resources are scheduled by manufacturing requirements and attempt to resolve day-to-day capacity bottlenecks within the material management systems. The Master Production Schedule (MPS) and Materials Requirements Plan (MRP) are determined by manufacturing requirements. Weekly or daily production schedules are defined by the MPS. Once the MPS is given, MRP enables co-ordination of purchase and arrival of materials to provide support to the desired manufacturing plan.

- **Procurement requirements:** These facilitate the material releases, shipments and the receipts. Long-term material requirements and release schedules are demonstrated by procurement requirements, which build on the capacity constraints, logistics and manufacturing requirements.

- ◆ **Operations.** Include information activities, which are required for receipt, processing and shipment of customer orders and also to ensure co-ordination of receipt of purchase orders. Components are as follows:

- **Order Management:** Serves as the point of entry for customer orders and inquiries. Enables entry as well as maintenance of customer orders using various technologies of communication such as mail, phone, fax, EDI etc. Functions include retrieval of requisite information, editing appropriate values, and retention of

acceptable orders for processing done. Information relating to inventory availability as well as delivery dates to confirm customer expectations can be obtained. Order management creates and maintains customer as well as replenishment orders base that affect the remaining operations components.

- **Order Processing.** Available inventory is assigned to open customer and replenishment orders. Orders may be allocated on receipt basis or in batch mode. Real-time allocation is more responsive, and batch allocation provides more control over situations of low inventory. Generating an order solution satisfying both customer requirements as well as enterprise resource constraints is a suitable order processing application.

- **Distribution Operations.** Direct all activities within the distribution centers using a combination of batch as well as real-time assignments. In the case of batch environment, LIS develops list of instructions or tasks for guiding each material handler (a person who handles material handling equipment such as fork trucks or pallet jacks) in the warehouse. In a real-time situation, information-directed technologies operate in interaction with LIS to prevent time elapse between decision and action.

There is more operational flexibility and reduction in internal performance-cycle time requirements in case of real-time distribution.

- **Transportation and Shipping.** Include LIS functions of planning, execution and management of transport and movement activities. Activities include scheduling and planning shipment, consolidation, notification, transport generation and carrier management. There are three parties involved in transportation and shipping LIS-shipper, carrier and consignee. A basic level of information integration needs to exist for information to be shared. Increased planning as well as performance measurement capability can be incorporated with the help of state of the art transportation and shipping LIS.

- **Procurement.** Procurement systems have not been considered a part of LIS. But the importance of integrating procurement is inevitable while managing the entire supply chain. Procurement manages preparation of purchase orders, modification, as well as their release. A desired procurement LIS needs to provide planning, direction of outbound activity movement.

- ◆ **Inventory deployment and management.** Serves as the primary interface between planning, co-ordination and operations. It plans requirements and manages finished inventory from the production till customer shipment. The primary component here is the forecast module, which predicts product requirements of customers for every distribution centre and thus supports enterprise planning. Other components include simple reactive models to complex planning tools. Customer service objectives established by management are of significance in inventory deployment and management. With effective inventory deployment and management, level of inventory assets required can be significantly reduced. An important function of this is measurement of inventory performance by continuous monitoring. An integrated forecast information facilitates inventory deployment and management and this results in low inventory requirement.

## *Understanding the main points*

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
efficient	a unifying structure; the structure and design of a system or product
transfer	the manner in which smth is used
performance	A restriction; an irresistible force
utilization	to include smth as a part
alternative	to move or pass (person or thing) from one place to another
incorporate	the ability to hold, receive or absorb
architecture	a geographical area where a certain commercial demand exists
merchandiser	making good, thorough or careful use of resources, not consuming extra
market	a choice between two or more possibilities
capacity	carry into execution; achievement; accomplishment
constraint	a trader, seller or merchant, especially in the retail trade

**Task 3.** Find English equivalents to the following words and word combinations.

На бумажной основе; дружественный к пользователю; эффективное движение товара; канал распределения; соединить различную логистическую деятельность; запрос клиента; помогать менеджерам; много компетентности и подготовки; содержать структуры данных; уровни активности; теперешний статус; доступ к данным; инициатива для улучшения логистики; определить глубинную причину; проблемы, связанные с движением информации; заказы, связанные с пополнением запасов; ограничения пропускной способности.

**Task 4.** Find synonyms to the following words.

Seize; flakey, sporadic; dissemination; connect; involve; to make done; very important; help; include as a part; to know before; in front of, preceding; to make able; postponement; bettering; change, transform; restriction.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
error-prone	analysis
productivity	information drivers
tactical	decision-making
wide	influence
future	alternatives
systematic	information
major	deployment
objective	indicators
current	capacity
primary	system performance
planned	requirements
annual	tools
great	transfer
optimal	time-frame
complex planning	range of options
effective inventory	opportunities



**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

Information; efficient flow; transactions system; management control systems; decision analysis; strategic planning; logistics data warehousing; logistics data mining; strategic objectives; capacity constraints; logistics requirements; inventory deployment.

**Task 7.** Review questions.

1. How are logistics information systems characterized? 2. On what was logistics mostly focused in earlier times? 3. To what are logistics information systems compared? 4. What are the building blocks of logistics information systems? 5. What is the role of transaction system? 6. What do management control systems focus on? 7. What does decision analysis envisage? 8. What is strategic planning mostly concerned with? 9. What role does logistics data warehousing play in the entire information system? 10. What does the data warehouse and execution components include? 11. What aspects do planning and coordination include? 12. What are the main objectives of inventory deployment and management?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.

## **Unit 11.** Organization for Effective Logistics Performance

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

*Nouns:* purpose, aggregation, loyalty, distinction, decentralization, challenge, personnel, empowerment, willingness, counterpart, extent, software, requirement, belief, hierarchy, manufacture, framework, workforce, access, guardian.

*Verbs:* prescribe, disperse, ignite, encourage, adopt, exist, concern, establish, commit, occur, engage, elevate, guide, modify, replace, identify, contribute, connect, treat, serve, mean, realize.

Organization structure helps in creating, implementing and evaluating plans. The organization structure gives concrete shape to the organization. Basically it is a pattern in which various parts or components are interrelated or interconnected. It prescribes the relationship among various positions and activities.

Logistics is generally viewed as a facilitating or support function prior to the 1950s. The organizational logistics responsibility is dispersed all through the firm. This resulted in duplication and waste, with fragmentation and aspects of logistics related activities were performed without any cross-functional co-ordination. The primary idea behind functional aggregation was done with a belief that grouping all functions of logistics into a single organization would increase the integration.

Basically, the organizational chart for a company represents a pyramid, which gives a clear view of how and where everyone fits and also the reporting relationships.

**Logistics significance is highlighted by the following concepts:**

**Structural Compression.** The role of the chief logistics executive is changing and this ignites the motivation for logistical structural compression. An environment with restricted head count as well as intensive control of assets has enabled the senior logistics manager to emerge as an important part of the firm's continuous move towards gaining and maintaining customer loyalty.

**Centralization/Decentralization.** An enterprise is considered decentralized if their basis of function is autonomous. Every unit would be responsible for their own logistical planning as well as its execution. A centralized organization has the opposite policy. A central headquarters group directs logistical planning and execution. In today's organization, which is information-intense, the distinction between centralization and decentralization is becoming hazy. Recent trends have seen a shift towards centralized organizations. But with the recent developments in distributed information processing, a centralized logistics organization is no longer required for efficient data processing. Logistical responsibility gets pushed down the organization, as a result. Basically, there is a direct relationship between the desired degree of centralization and the complete nature of business operations.

Customers who desire a host of products sold by different business units of a conglomerate have encouraged many cross-divisional or various business units. The availability of information technology is considered a major benefit of decentralization. To conclude, today's organizations, which are agile simultaneously, enjoy both centralization and decentralization.

**Line and Staff Distinction.** Traditionally, line performed or executed day-to-day operations, while the staff was engaged in planning. Today this distinction is no longer relevant. Logistics managers in all levels are involving themselves in both planning and operations. Direct involvement and assumption of responsibility with regard to the reason and methodology of performing work is the key to a leading edge practice in logistics. One of the major reasons for the elimination of line/staff distinction is the impact of logistics information systems. A desired balance of the nature of work for line and staff needs to be communicated which results in an organization which reflects the total employee resources dedicated to serve customers through maximum integration.

In line organizations, logistics activities are centralized into departments and placed under the responsibility of a single manager. Activities are divided on the basis of importance to the achievement of the overall organization objectives. The manager is in the operational role. In a staff organization, functions are more of planning and measuring nature. There is not much requirement of reassignment of people. This type of structure can be implemented in a very short time. A drawback is the resistance from line personnel who refuse to follow the logistics manager and opts to follow their own views. An organization to have the best of both the structures needs to opt for staff and line function organizations. Providing a structure for logistics reduces the conflict among various activities of physical distribution. But this leads to an additional functional area within an organization and thus interfunctional conflict increases.

**Matrix to horizontal structure.** Under a functional structure, logistical activities like transportation and warehousing are grouped into clusters and authority and

responsibility create a direct relationship. The matrix model of authority and responsibility has been gaining a lot of popularity in service organizations like consulting and public accounting. The matrix organization's potential has gained a lot of interest as managers are struggling with the challenges of process management. A technical resource group, which can be deployed geographically in order to satisfy line-unit requirements, is required by a matrix approach.

This approach helps in sharing scarce assets and technical resources on a flexible basis. It also reduces the duplication of skilled personnel among business units. A horizontal organization is a modern extension of a matrix approach. While an organization is restructured, the key issue for the logistics managers is concerned as to how innovative he can make the new structure.

**Empowerment.** The main concept in empowerment is the availability as well as willingness of senior management to freely share the relevant information. Empowerment ranges from accommodating all requirements of an order on a single call basis to an on the spot resolution of discrepancies of delivery. An organization that is empowered allows middlelevel management to resolve problems as well as utilization of pro-active judgement. The response speed shows the extent to which an organization is empowered. From logistics point of view, empowerment makes it necessary for frontline managers to be positioned in order to complete all the aspects of their respective work. Empowerment, to be effective in an organization, requires fully established ways as well as means of gaining differential advantage.

**Teaming.** A self directed work team (SDWT) has originated from the idea that multiple viewpoints are better than the one which have a long standing in administrative practice. The SDWT is not structured typically for any specific assignment or problem solving. From logistics point of view, a special purpose work group can be formulated in order to facilitate the development of a new software application or for handling a unique requirement, like selecting a new location for distribution warehouse. A self-directed team is unique in the way its performance is planned and executed. The team members are empowered to perform whatever it takes so effectively as well as efficiently perform the designated work.

**Strategic and Operational structure.** Position of logistics in light of other enterprise functions. Logistics is considered as a strategic element of the overall organizational structure or an operational element. By this, its activities are spread under various other functions i.e., marketing, finance and production. If it is treated as a strategic element then various activities of logistics need to be grouped together. In the recent times, logistics has become a strategic department equivalent to marketing, production and finance as it helps in achieving interdepartmental objectives and also helps increase customer satisfaction.

### **Stages of functional aggregation in an organization**

#### **Stage I Organization.**

During the late 1950s and 1960s an initial attempt at grouping logistical activities had emerged. Organizations with even minimal degree of formal unification have emerged only after the senior management has become committed to the belief that improved logistics is the result. Two or more logistics functions have emerged, which can be operationally grouped without changing the overall organizational hierarchy to

a great extent. Such an aggregation initially has occurred both at the staff as well as line levels of the organization. During this initial development stage, organization units were rarely engaged in the purchasing and physical distribution integration.

### **Stage 2 Organization**

This stage of organization has begun to evolve with the overall enterprise gaining operational experience with logistics and cost benefits. The position of logistics has been elevated to that of a higher organization authority and responsibility. Positioning logistics at a higher organizational level has increased the likelihood of strategic impact. Logistics has been managed as a core competency due to the independent status given to logistics. The stage 2 organizations have been established as it was necessary to reassign functions and position newly created organization at a higher level within the overall enterprise structure.

Though logistics has been given a lot of importance, the concept of a fully integrated system has not yet been achieved. An important factor for this is the lack of cross-functional logistics information systems. Another feature here is that the integrated physical and material management has begun to be accepted among the financial, manufacturing, and marketing counterparts.

### **Stage 3 Organization**

Emerged in the 1980s with the beginning of logistical renaissance. Grouping many logistical planning and operational functions under a single authority and responsibility is the feature of this organization. Every area of logistics – purchasing, manufacture and physical distribution is given the structure of a separate line operation. Operational responsibilities are well defined and thus purchasing and physical distribution.

Logistical resource planning covers the full potential of management information to plan and co-ordinate operations. Logistical resource planning facilitates integration. Overall planning and controllership exist at the highest level of the organization. This organization serves as a single source for guiding the efficient application of financial and human resources right from sourcing of materials to customer delivery.

### **Stage 4 Organization: a shift in the focus from function to process**

A conventional organization had a vertical design. There were functions with clearly identified tasks and within these functions there is a formal hierarchy that employees need to progress. This approach had a shortcoming in the sense that it is inwardly focused and the primary concentration is on the utilization of resources more than creating the outputs.

Measuring the outputs of any business can be done only if these can be in terms of customer satisfaction achieved at a profit. These outputs can be realized only when there is co-ordination and co-operation horizontally across the organization. The materials and information flows, which connect the customers with business and suppliers, have horizontal linkages, which mirror these. These are basically the core processes of the business. There are many challenges in managing logistics as a process. Efforts need to be focused only on those activities, which contribute to customer value. Systems integration is required to stimulate synergism. A shift from functional to process orientation, has both positive and negative aspects. Positive aspects include general adoption of a process orientation builds on the basic

principles of integration. Shifting the emphasis from function to process means it will be positioned as a chief contributor to all initiatives, which will focus on development of new products, customer order generation, fulfillment and delivery. The negative aspect is a lesser understanding of how the process will be performed and managed.

**Stage 5 Organization beyond structure: virtuality and organizational transparency – extended enterprise**

An extended enterprise is a boundaryless organization where the internal functional barriers are eroded favoring a horizontal process management. There is very little separation between vendors, distributors, customers and the firm. A virtual organization exists without a formal recognition. Basically it consists of an informal electronic network replacing the formal hierarchical command and control in the structure. Key work teams may be linked electronically for performing critical activities in an integrated fashion. Formal organizational charts may not relate to the actual workflow.

It is essential for the structure and strategy to be aligned for achieving the business objective of superior customer service at lowest cost. A three-level framework can be adopted for achieving this integration for a enabling a transition to a customer-oriented organization:

The revolution in information is making logistics managers reconsider the traditional organizational logic. The idea of middle managers serving as guardians of information has been replaced with a frontline workforce having access to the entire information. A continuous redesign and re-engineering of the basic nature of work has made hierarchical organizations modified to accommodate networking of information and self-directed work teams.

*Understanding the main points*

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
dispense	to raise to a higher position
commit	a feature that causes someone or something to stand out as being better
elevate	to give permission, or the legal right to do smth
personnel	the rate at which a flow of work takes place; a process or procedure by which tasks are completed
empower	mental acceptance of a claim as true
workforce	to put into charge or keeping
software	someone who guards, watches over or protects
belief	employees; office staff
distinction	to issue, distribute, or give out
guardian	encoded computer instructions, usually modifiable
workflow	all the workers employed by a specific organization or state, or in a specific project

**Task 3.** Find English equivalents to the following words and word combinations.

Организационная структура; придавать конкретную форму; иметь результатом; усилить интеграцию; значение логистики; сокращение

логистической структуры; контроль над активами; отвечать за логистическое планирование; эффективная обработка данных; непосредственная связь; желаемая степень централизации; основное преимущество; множество продуктов; заниматься планированием; общие цели организации; принятие на себя обязательств.

**Task 4.** Find synonyms to the following words.

Look at; previous; scatter; earliest, first; importance; chief officer, administrator; limited; come into view; transfer; self-contained, independent; modern; not any more; multitude; accessibility; nimble, active; equilibrium.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
operational	conflict
physical	management
interfunctional	requirement
logistical	practice
technical	hierarchy
senior	times
pro-active	unification
administrative	activities
unique	status
designated	organization
recent	redesign
interdepartmental	judgment
formal	organization
organizational	distribution
conventional	work
independent	resources
continuous	role
virtual	objectives

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

Logistics performance; organization structure; to be viewed; logistics significance; structural compression; centralization; line and staff distinction; logistics activities; organization objectives; share information; unique requirement; strategic element; functional aggregation; initial attempt; core competency, gain advantage.

**Task 7.** Review questions.

1. What is the role of organization structure? 2. How is logistics spread within a firm? 3. What issues prove a growing role of logistics significance? 4. What does the concept of 'structural compression' imply? 5. Is there a clear-cut distinction between centralization and decentralization concepts? 6. What was the staff traditionally engaged in, as opposed to line performed operations? 7. Is this distinction still

preserved nowadays? 8. What is the main reason for the elimination of such contrasting between line and staff? 9. How are logistics activities organized in line organization? 10. What kind of activities are more typical of a staff organization? 11. Is there any resistance on the part of line personnel as to logistics changes within an organization? 12. What kind of combining authority and responsibility gains popularity in a service organization? 13. What group of specialists is required if matrix approach is employed? 14. What is the benefit of a matrix approach? 15. What issues does an empowerment concept include? 17. How is empowerment perceived from the point of view of front line managers? 18. What are the stages of functional aggregation that are singled out within an organization?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.

## **Unit 12.** Financial issues in logistics performance

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

*Nouns:* feedback, capitalization, supplier, profit, margin, depreciation, cycle, frequency, discount, impact, visibility, accuracy, blockage, asset, fleet, reference, metrics, capacity.

*Verbs:* align, share, manage, allocate, assign, contribute, capture, increase, encourage, analyse, achieve, replicate, forecast, affect, enable, improve, establish.

The need for supply chain performance measures is to align activities and share joint performance measurement information and to explain 'line of sight' within the chain. It is required to allocate benefits and burdens resulting from financial shifts within the supply chain. Financial performance has been the primary measure of success in most supply chains. Financial issues also encourage cooperative behavior across corporate functions and chain. It is required to establish dynamic supply chain performance measurements and measurement-enabling systems to effectively manage supply chain operations and meet financial and non-financial business objectives.

The link between efficient supply chain operations and financial performance can be deduced by linking elements of balance sheets as well as income and cash flows to various supply chain activities.

The criticality of feedback and reorientation makes measurement important. Setting objectives, tolerance limits, developing action plans, allocating resources, assigning responsibilities, implementing plans, and measuring performance for feedback and corrective action are all part of a close looped supply chain management process

Factors, which contribute to a management's need for new types of measures to manage, supply chain:

- lesser number of measures capturing the entire supply chain;
- going beyond internal metrics and taking a supply chain perspective;

- determining an interrelationship between corporate and supply chain performance;
- the increasing complexity of supply chain management;
- requirement to align activities and share joint performance measurement information for implementing strategy which helps in achieving supply chain objectives;
- encouraging co-operative behavior across corporate functions and across firms in the chain.

The following are the steps to develop good financial measures:

- point-of-origin to point-of-consumption mapping of the supply chain;
- utilizing the customer-relationship management and supplier relationship management processes to analyze links;
- develop customer and supplier P&L statements;
- re-align supply chain processes and activities to achieve performance objectives;
- compare shareholder value and market capitalization across firms with supply chain objectives;
- replicate above steps at each link in the chain.

### **Key Financial Metrics are as follows**

Overall financial performance:

- return on capital (investments and assets);
- cash flow;
- economic profit.

These are further broken down into the following:

- revenue growth;
- operating income margin (profitability);
- capital utilization.

**1. Revenue growth.** Revenue is the value of products and services sold. Revenue growth measures the year-over-year percentage change in revenue. Important activities which affect revenue are forecasting, supply chain responsiveness lead-time and availability of new products.

**2. Operating income margin (profitability).** Measures the percentage of operating income generated per unit of revenue. It is the revenue less total operating expenses, which is the sum of the following three components.

- Cost of goods sold (COGS)
- Selling, general and administrative Expenses
- Depreciation and Amortization

Calculated by taking the difference between percentage of cost of goods (services) sold and percentage of selling, general and administrative expense.

**3. Capital Utilization.** Capital utilization can be broken down into the following:

- a) Cash operating cycle
- b) Fixed asset utilization

**a) Cash operating cycle.** This is a key component of capital utilization, which measures the number of days from the time a rupee is invested in inventory and the time it is converted back into cash with a profit. Cash operating cycle = Days in Inventory + Days Sales Outstanding – Days Purchase Outstanding.



**The three components are as follows:**

◆ **Days in inventory (DII):** Inventory includes raw materials, work in progress and finished goods. This measures the number of days of operations held in inventory.

•Activities in SCM that affect Days in inventory (DII) are as follows:

•Procurement: - Procurement practices like order frequency, special buys, supplier discounts etc, have major impact on DII.

•Transportation management: - The mode of transportation affects inventory through lead times, which impacts safety stocks, and inventory in transit.

•Warehouse management: Warehouse efficiency impacts Days in Inventory through visibility and design. Poor visibility and design lead to higher inventory.

•Forecasting: A higher inventory is attributed to lower forecasting accuracy.

•Demand planning: - Better demand planning leads to lower inventory and less capital blockage.

•Network design: More consolidated networks require less investment in inventory.

◆ **Days sales outstanding (DSO):** Accounts receivable money owed to a company by its customers. This measures the number of days on an average, which a company takes to collect credit sales from its customers.

•Activities in SCM that affect DSO: -

•Fill rates: - Low fill rates always lead to higher account receivables and days sales outstanding.

•Shipment integrity: - Poor shipment integrity leads to higher DSO.

•Invoicing accuracy: - Discrepancies and incomprehensible invoices lead to higher DSO.

•Poor communication: - Poor communication between shipping and invoice leads to higher DSO.

◆ **Days purchase outstanding (DPO):** Accounts payable money, which a company owes to suppliers and vendors. This measures the number of days on an average a company takes to pay its debts.

•Activities which affect Days Purchase Outstanding:

•Procurement terms: Procurement managers generally trade-off purchase price for credit terms to purchase goods and services at the lowest total cost.

•Payment practices: - Paying on the exact date of an invoice compared to fixed date (paying quickly) impacts DPO. Paying on fixed days reduces DPO and cash flow.

**b) Fixed Asset Utilization:** - Measures the amount of revenue generated per unit of currency invested in net property, plant and equipment. It is computed by dividing Revenue by Net property, plant and equipment. Net property, plant and equipment include assets like manufacturing facilities, warehouses and corporate offices.

Activities in SCM that affect fixed asset utilization:

• Transportation management. For a company managing its own fleet activities such as load management, routing and scheduling impact the size of the fleet required which is relative to shipments and in turn fixed asset utilization.

• Warehouse management. Impacts fixed asset utilization through automation, physical layout, and other activities.

- Network design. Lesser investment in distribution assets is required by more consolidated networks.
- Selective outsourcing. Outsourcing of manufacturing, warehousing and distribution facilities increases fixed asset utilization.

### **Supply chain performance measures:**

#### **1. The Supply Chain Council's SCOR Model**

The Supply-Chain Operations Reference-Model (SCOR) has been developed and endorsed by the Supply Chain Council. This is a process reference model that is used as cross-industry standard diagnostic tool in supply chain management. This enables users to address, improve and communicate supply chain management parties within all parties in the chain.

The SCOR model describes the business activities that are associated with all the phases in satisfying the customer demand. This model has been very successful in providing a basis for supply chain improvement for global projects. This model also provides guidance about the types of metrics which might be used for obtaining a balanced approach in measuring one's overall supply chain. The model advocates a set of supply chain performance measures that are a combination of cycle time, cost, quality and asset metrics. At the core level of the SCOR model is a four-level pyramid that guides supply chain members on the road to integrative process improvement.

**Level One** defines the scope and content for the SCOR model. This level broadly defines four key supply chain process types (i.e., plan, source, make, deliver and return). This is the point at which supply chain competitive objectives are established.

**Plan.** Processes that balance aggregate demand and supply to develop a course of action which best meets sourcing, production and delivery requirements. Under this process the company should assess supply resources, aggregate and prioritize demand requirements, plan inventory, distribution requirements, production, material and rough-cut capacity of all products and all channels. Long-term capacity and resource planning, product phase decisions are taken in this phase.

**Source.** Processes that procure goods and services to meet planned or actual demand. Under this process-sourcing infrastructure is managed. Various activities like vendor certification and feedback, sourcing quality monitoring, vendor contracts are conducted. Also activities involved with receiving of material such as receive, inspect, hold and issue material are under taken here.

**Make.** Processes that transform products to a finished state to meet planned or actual demand. This process is concerned with production, execution and managing "make" infrastructure. Specifically under production execution activities like manufacturing, testing, packaging, holding and releasing of product are undertaken here.

**Deliver.** Processes that provide finished goods and services for meeting planned or actual demand, typically including order management, transportation management, and distribution management.

**Return.** This consists of processes associated with returning or receiving returned products for any reason. These processes extend into post-delivery customer support.

**Level Two** defines the 26 core supply chain process categories which have been established by the Supply Chain Council with supply chain partners can jointly present their ideal or actual operational structure. At this stage, each SCOR process can be further described by process type:

**Planning.** This process aligns expected resources to meet expected demand requirements. The planning process involves balancing aggregated demand and supply, considering consistent planning horizon, and contributing to the supply chain response time.

**Execution.** This process is triggered by planned or actual demand that changes the state of material goods. The process involves scheduling or sequencing, transforming the product and moving product to the next process.

**Enable:** This process prepares, maintains, or manages information or relationships on which planning and execution processes rely.

**Level Three** provides partners with information useful in planning and setting goals for supply chain process improvement.

**Level Four** focuses on implementation of supply chain process improvement efforts.

## **2. The Logistics Scoreboard**

This approach to measuring supply chain performance was developed by Logistics Resources International, a consulting firm specializing in supply chain. The company recommends the use of an integrated set of performance measures falling into the following general categories:

- Logistics financial performance measures (e.g., expenses and return on assets)
- Logistics productivity measures (e.g., orders shipped per hour and transport container utilization)
- Logistics quality measures (e.g., inventory accuracy and shipment damage)
- Logistics cycle time measures (e.g., in-transit time and order entry time)

## **3. Activity-based costing technique**

The Activity-Based Costing (ABC) approach was developed to overcome some of the shortcomings of traditional accounting methods in linking financial measures to operational performance. The method involves breaking down activities into individual tasks or cost drivers, while estimating the resources (i.e., time and costs) needed for each one. Costs are then allocated based on these cost drivers rather than on traditional cost-accounting methods, such as allocating overhead either equally or based on less-relevant cost drivers.

Activity-based costing techniques tend to fall into one of three major categories:

**Diagnostic.** Provides snapshot cost information at widely spaced intervals of typically three to six months apart. Critically needed information such as activity costs, output costs, resource consumption, activity consumption etc.

**Reengineering.** The activity analysis attempts to identify the performance of any non-value added activities.

**Integrated cost management system.** Most mature forms of activity based costing. They differ from the above because they are updated frequently, fully relational, flexible to changes, have automated feeds from other systems, and have on-line reporting and query capabilities.

## Understanding the main points

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
measure	to adjust or form to a line; to arrange or form in line; to bring into line
allocate	to make a copy of
enable	to arrange or list a group of things in order of priority or importance
replicate	to succeed in smth; to carry out successfully; to accomplish
forecast	to direct or be in charge of
align	to make smb able; to give sufficient ability or power to do or to be
increase	to determine, estimate or judge the value of; evaluate
achieve	to designate or set apart smth for some purpose
assess	an unspecified portion or quantity
map	to become larger or greater
manage	to represent by means of a map
assign	to set aside for a purpose; to distribute according to a plan
prioritize	to estimate how smth will be in the future

**Task 3.** Find English equivalents to the following words and word combinations.

Общие эксплуатационные качества; первостепенная мера; измерение производительности; финансовые вопросы; эффективно управлять цепью поставок; вся цепь поставок; изображать цепь поставок; рост доходов; цикл операций с текущими денежными средствами; кредиторская задолженность; оплачивать долги; основные активы; совокупный спрос; связанный с производством; принимать возвращаемые товары; разбивать деятельность на отдельные задачи; связывать финансовые меры с текущими показателями работы.

**Task 4.** Find synonyms to the following words.

Set aside for a purpose; make a copy of; to suggest smth in advance; to evaluate; to direct or be in charge; reduction in price; strong disapproval; exactness; critical assessment; to arrange in order of priority; put into practice; smth that has value; support, approve.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
financial	utilization
cooperative	visibility
revenue	price
administrative	growth
capital	approach
safety	accuracy
warehouse	tool
poor	behaviour
forecasting	demand
shipment	expense

purchase	activities
fleet	efficiency
diagnostic	performance
balanced	integrity
planned	stocks

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

In favour of; defend by argument; supply chain performance; business; actively manage; cycle; financial measures; market capitalization; revenue growth; capital utilization; warehouse management; asset utilization; aggregate demand and supply.

**Task 7.** Review questions.

1. What does the need for supply chain performance mean? 2. How important is enterprise financial performance? 3. Where from can the link between efficient supply chain operations and financial performance be perceived? 4. What factors contribute to the need of new supply chain management styles? 5. What steps can help develop good financial measures? 6. What is the most essential component of capital utilization? 7. What are the three components of cash operating cycle? 8. What does fixed asset utilization measure? 9. What are the benefits of the supply chain operations Reference Model? 11. What does the Logistics Scoreboard help go measure? 12. What is the essence of the Activity Based Costly Technique?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.

### **Unit 13.** Integrated Logistics

**Task 1.** Before reading the text check the meaning of the key words in the dictionary.

*Nouns:* enterprise, imperative, contribution, collaboration, revenue, lack, supplier, distributor, rationalization, confirmation, category.

*Verbs:* link, refine, initiate, partner, deliver, entrust, articulate, examine, reconsider, extend, require, replace, originate, transfer, challenge, overlap, reward.

Logistics links an enterprise with its customers and suppliers. Information flows through the enterprise from and to customers in the form of sales activity, forecasts and orders. Such information is refined into specific manufacturing and purchasing plans. A value-added flow of inventory is initiated as products and materials are procured. This ultimately results in transfer of ownership of finished products to customers.

Supply chain integration focuses on defining key linkages across functional areas both within and among companies partnering along a supply chain. Integrated logistics is a process-oriented integrated approach to procure, produce, and deliver products and services to customers.

### **The following are the imperatives for successful integrated logistics:**

- **New Culture.** Enabling employees to adapt to the new operating realities in cross-supply chain collaboration are a key component of integrated logistics. Core capability teams, which consist of professionals, must be focused on key integrated logistics activities, which synchronize activities across the entire supply chain. Senior executives entrusted with the task of integration and synchronization has to articulate the strategy for a new cross supply chain culture, which will be shared by all partners.
- **Agreements on cost-sharing and revenue-sharing:** Building a benefit structure balancing rewards with each partner's understanding of their contribution is important for maintaining close partnering relationships. A generally agreed upon framework for equitable revenue and cost sharing amongst all participants is necessary. Analyzing the supply chain economics examines the role and costs of each of the different participants of the supply chain. Detailed practices and performance metrics will help in understanding the participant's competitive advantage.
- **Establish Transparency:** Establishing of an integrated logistics system is challenged by participants' unwillingness to forgo any degree of control, which is a symptom of lack of trust. This lack of trust will hinder acceptance of integrated logistics while lack of standard communication and business processes will hinder implementation.

### **Need for Integration**

A significant feature of a responsive organization is the priority the organization attaches for integration. Not only integration within the organization but also integration upstream with suppliers and downstream with distributors and customers is important. There is also a lot of emphasis on linking organizations through information. Information systems nowadays drive companies to reconsider their relationships with customers and suppliers. Process integration is achieved through logistics integration, which means both upstream and downstream integration. The objective in an extended enterprise is creation of an 'end-to-end' process so that innovative products are created and delivered at higher levels of quality and in lesser time frame to markets. This is achieved through the following means:

- **Rationalization of supply base.** Companies try to rationalize their supply base by reducing the number of suppliers. In fact, companies are looking at these suppliers to provide systems rather than components. Companies are basically trying to rationalize their supply base. For example: the automotive sector is trying to integrate tier 1, tier 2 and tier 3 suppliers.
- **Centralized inventory.** The extended enterprise not only includes upstream suppliers but also the downstream flow of finished products through dealer networks. Traditionally, when dealers did not have the product demanded by customers, they used to swap this with another dealer who had that product variety in stock. Today, enterprises have centralized inventory and also take responsibility for its management. The dealers have only demonstration models; they have on-line access of the enterprise supply system and can give the customer an immediate confirmation about the availability of the product of their choice and when it can be delivered. For those products not available from stock, dealers enter order directly into the production schedule and the product required is made to order.

- **Integrated Information Systems.** The benefits of a fully transparent information system are being considered with the use of Electronic Data Interchange (EDI) together with the growing acceptance of 'just-in-time' philosophy. Suppliers can now manage the flow of materials into the plant on the basis of advance notification of a company's production schedule. With integrated information systems, there are no manual orders, invoices or delivery notes. A single source of information provides the basis for a timely physical response, which automatically triggers payment to the supplier.

- **Supplier Development Programmes.** Supplier development has replaced the traditional purchasing function. A cross functional team of specialists work closely with suppliers and seek improvements in supplier processes as well as in the interfaces with the enterprise's processes.

- **Supplier involvement.** Innovations in industries are supplier originated. By bringing suppliers closer to the process of new development, it has been found that innovation can be embodied in new products continually and simpler cost effective designs can be created.

### **Activity Centers in integrated logistics**

Refers to the activities that make up business logistics. These are studied in the following two categories:

- ◆ **Key activity centers.** These are the activities forming the core of logistics function and also take place in every logistics channel. These are as follows:

- **Customer service standards.** The customer has become more and more demanding in overall performance terms. The manufacturer needs to create a competitive advantage on the basis of customer-service. Co-operating with marketing to determine customer needs and wants determine the customer response to service and set customer levels.

- **Transportation.** This is one of the most expensive activity centers in logistics. It is concerned with movement of raw materials to the plant and semi-finished goods or finished goods to the market. Any problems in the transportation service can result in the company holding inventory for more days than planned for. An efficient transportation planning and management is a pre-requisite function of logistics.

- **Inventory management.** The operational aspects of logistical management are concerned with movement and storage of materials and finished goods. Logistics operations start with the initial shipment of material from a supplier and finalized when a manufactured or processed product is delivered to a final customer. As material gains value at every step of its conversion into finished inventory, work-in-progress inventory needs to be moved to support final assembly for supporting manufacturing. A meaningful value-addition is done only when the final ownership is transferred to customers wherever specified. For better understanding of the inventory it is divided into the following three areas:

- **Physical distribution.** Concerns with movement of a finished product to customers. Here, customer is the final destination of a marketing channel. Availability of a product is a key part in the marketing efforts of every participant. A major part of the overall marketing effort will be lost unless a proper assortment of products is delivered efficiently wherever needed. Time and space of the customer

service becomes an integral part of marketing through the process of physical distribution. The common feature of all physical distribution systems is that they link manufacturers, wholesalers, and retailers into marketing channels that provide product availability as a key aspect of the overall marketing process.

- **Manufacturing support.** This area focuses on managing work-in-progress inventory as it flows between various stages of manufacturing. The overall concern of manufacturing support is the method by which production occurs. Manufacturing support is different when compared to physical distribution. Physical distribution attempts servicing the desires of customers and thus needs to accommodate uncertainty of consumer and industrial demand. Manufacturing support involves movement requirements under the control of the manufacturing organization.

- **Procurement.** This area focuses on with purchasing and arranging the inbound movement of materials, parts or finished goods from suppliers to assembly plants or retail stores. It involves availability of the desired material wherever needed. All the above three areas of inventory flow in logistics overlap in a typical enterprise. Looking at each as an integral part of the overall value-adding process gives an opportunity for capitalizing on the unique attributes of everything while facilitating the overall process. A major concern area for integrated logistics is co-ordination of overall value added movement. All these three areas combine to provide an integrated management of materials, work-in-progress and finished products moving between various locations.

- **Information flow and order processing.** Completing activities of the order cycle are very important in customer service. A lot of management attention is being given to activities involved in processing orders. An effective order processing system should have an effective order status reporting system also.

♦ **Support Activity Centers:** These are the activity centers necessary for achieving synergy in key activity centers. This category includes:

- **Warehousing.** Storing goods that are waiting for sale. This function is necessary as there is rarely a match between production and consumption. Organizations choose between warehouses and distribution centers. Distribution centers are larger, automated warehouses designed to receive goods from various plants and suppliers.

- **Material Handling.** Efficient material handling methods in warehouses can improve customer satisfaction by decreasing the damage in handling, maintaining the quality of storage, facilitating order processing and moving the right goods at the right time to make them available to the right customers. Costs are also reduced through proper material handling techniques.

- **Customer service.** Information enables reducing the gap between actual and benchmark and also assists in strategy formulation – a key activity in logistics.

- **Packaging.** Packaging protects the goods and acts as a source of information for customers. It is also used as a marketing tool to attract customers. The concept of packaging has paved way to ‘Unitization’, where various package are handled together as one unit.

### **Barriers to Internal Integration**

Implementing internal logistics integration is not possible in a vacuum. There are certain barriers to integration, which are as follows:



**Organization structure.** The traditional organization structure prevents implementation of any cross-functional process being implemented. Traditional structure is to divide authority and responsibility according to functional work. Organizations are generally concerned with achievement of functional excellence and this structure can hinder success of the goal of integration – which is co-operation among functional areas. Also, managers are usually rewarded for achieving functional excellence. Successful integration of logistics process requires managers to look beyond their organizational structure and facilitate cross-functional co-ordination. This may not be possible by creating a new organization structure. Thus, regardless of whether organizational structure is realigned or not, organizations dealing with cross-functional matters are required for successful integration of processes.

**Ownership of inventory.** Inventory can facilitate a specific function to achieve its mission. A traditional approach to ownership of inventory is to maintain adequate supply for gaining ease against demand and operational uncertainty. Availability of inventory also results in economy of scale. While such practices create benefits, they also have a related cost. The critical issue is cost-benefit relationship.

**Measurement systems.** Traditional measurement systems make cross-functional coordination difficult. A new scorecard needs to be developed for facilitating integration of logistics functions. The measurement system must facilitate logistics managers to view their specific functions as part of a process and not just stand-alone activities.

**Transfer of knowledge.** Ability to share experience is an additional barrier. Failure to transfer information or knowledge tends to nurture functional orientation by development of specialized employees. Many firms also fail to develop procedures and systems to transfer cross-functional knowledge. When work is done in a series of processes and involves many employees, transfer of this type of knowledge and experience is difficult.

**Information technology.** IT acts as a key resource to achieve integration. IT applications need to be designed along organizational lines. Databases are mostly limited to specific functions are not easily accessed on a cross-functional basis. Data warehouses have emerged due to the need to share information. Schemes to transfer information are required to be developed as existing applications can serve as a barrier to process integration as critical data cannot be shared readily.

*Understanding the main points*

**Task 2.** Match the words with their definitions.

<b>A</b>	<b>B</b>
articulate	to do without; to abandon; to renounce
refine	smth that places a company or a person above the competition
forgo	to trust to the care of
hinder	benefits resulting from combining different groups , people, objects or processes
entrust	to initiate smth

competitive advantage	to purify; to reduce to a fine, unmixed or pure state; to free from impurities
closely	to connect two or more things
trigger	to move or pass from one place, person or thing to another
link	to make clear or effective; to speak clearly; to enunciate
transfer	In a close manner
overlap	to make difficult to accomplish; to act as an obstacle; to frustrate
synergy	to extend over and partly cover smth

**Task 3.** Find English equivalents to the following words and word combinations.

Прогноз; в конечном итоге; владение; синхронизировать действия; рамки, система взглядов; тесные партнерские отношения; отсутствие доверия; существенная особенность; непрерывный процесс; сокращенные временные рамки; конечный продукт; прозрачная информационная система; принятие; конечный пункт; функциональное преимущество; дополнительное препятствие; непревзойденный, не иметь себе равных; не смочь разработать.

**Task 4.** Find synonyms to the following words.

Purify; acquire, obtain; direct attention, concentrate; cause to happen at the same time; speak clearly; able to receive and respond; consider again; against the current; see-through, clear; act of notifying; to initiate; bring into existence; to back, to help; congregation of people; partaker; comprise, include; characteristic, quality; recompense.

**Task 5.** For nouns in column **B** find suitable attributes in column **A**.

<b>A</b>	<b>B</b>
value-added	relationships
integrated	enterprise
entire supply	ownership
partnering	flow
competitive	management
responsive	structure
extended	logistics
immediate	part
cost-effective	customers
logistical	chain
final	locations
integral	excellence
desired	confirmation
various	material
right	advantage
functional	designs
organizational	organization

**Task 6.** Work in small groups. Make up sentences with the following words and word combinations.

Logistics; integration; imperative; new culture; to balance rewards; transparency; priority; extended enterprise; supply base; to make up business logistics; barriers to integration; facilitate; key resource.

**Task 7.** Review questions.

1. What does logistics do in relation to enterprise, its customers and suppliers? 2. How can you define integrated logistics? 3. What are the imperatives that can help build successful integrated logistics? 4. What does integration mean in relation to an organization? 5. How can a supply base be rationalized? 6. How can you define the concept of centralized inventory? 7. What are the key activity centres in integrated logistics? 8. What role do support activity centres play? 9. Are there any barriers to internal integration? 10. How does the traditional organization structure hinder logistics improvements? 11. How can inventory ownership affect logistics specific function? 12. How can IT help to achieve logistics integration?

**Task 8.** Pair work. (Before you speak, plan what you are going to say, using selected words and phrases from the text. Speak for about a minute. While listening to your partner's talk, think of questions to ask at the end of it.

**Part II.** Individual Reading

**Supply Chain Management**

The supply chain, which is also referred to as the logistics network, consists of suppliers, manufacturing centres, warehouses, distribution centres, and retail outlets, as well as raw materials, work-in-process inventory, and finished products that flow between the facilities. In a typical supply chain, raw materials are procured and items are produced at one or more factories, shipped to warehouses for intermediate storage, and then shipped to retailers or customers. Consequently, to reduce cost and improve service levels, effective supply chain strategies must take into account the interactions at the various levels in the supply chain.

The *supply chain* is the network of organizations that are involved through upstream and downstream linkages in the different process and activities that produce value in the form of products and services in the hands of ultimate customers. *Supply chain management* is an external integration of interrelated functions of the firm with its channel members, vendors, and all third-party logistics service providers who contribute in the flow of goods (raw materials, semi-finished and finished products) and related information from the point of inception to the point of consumption with efficiency. It can be defined as: "Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements." This definition leads to several observations.

First, supply chain management takes into consideration every facility that has an impact on cost and plays a role in making the product conform to customer requirements: from supplier and manufacturing facilities through warehouses and distribution centres to retailers and stores. Indeed, in some supply chain analysis, it is necessary to account for the suppliers' suppliers and the customers' customers because they have an impact on supply chain performance.

Second, the objective of supply chain management is to be efficient and costeffective across the entire system; total system wide costs, from transportation and distribution to inventories of raw materials, work in process, and finished goods, are to be minimized. Thus, the emphasis is not on simply minimizing transportation cost or reducing inventories but, rather, on taking a systems approach to supply chain management.

Finally, because supply chain management revolves around efficient integration of suppliers, manufacturers, warehouses, and stores, it encompasses the firm's activities at many levels, from the strategic level through the tactical to the operational level.

The definition of supply chain management developed and used by The Global Supply Chain Forum: "Supply Chain Management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders."

### *The evolution of supply chain management*

In the 1980s, companies discovered new manufacturing technologies and strategies that allowed them to reduce costs and better compete in different markets. Strategies such as just-in-time manufacturing, lean manufacturing, total quality management etc. and vast amounts of resources were invested in implementing these strategies. Unfortunately, this huge investment typically includes many unnecessary cost components due to redundant stock, inefficient transportation strategies, and other wasteful practices in the supply chain.

For instance, experts believe that the grocery industry, a notoriously low-margin industry, can save about \$30 billion, or 10 percent of its annual operating cost, by using more effective supply chain strategies . To illustrate this issue, consider the following two examples:

1. It takes a typical box of cereal more than three months to get from the factory to a supermarket.

2. It takes a typical new car, on average, 15 days to travel from the factory to the dealership. This lead time should be compared with the actual travel time, which is no more than four to five days. Where transportation cost is by far the largest cost component; inventory cost is slightly higher than half of the transportation costs.

Thus, in the 1990s many companies focused on strategies to reduce their costs as well as those of their supply chain partners. For example Procter & Gamble estimates that it saved retail customers \$65 million in a recent 18-month supply chain initiative. "According to Procter & Gamble, the essence of its approach lies in manufacturers and suppliers working closely together . . . jointly creating business plans to eliminate the source of wasteful practices across the entire supply chain". As the example suggests, an important building block in effective supply chain strategies is strategic partnerships between suppliers and buyers, partnerships that can help both parties reduce their costs.

Indeed, manufacturers such as Procter & Gamble and Kimberly-Clark and giant retailers like Wal-Mart have used strategic partnering as an important element in their business strategies. Firms such as 3M, Eastman Kodak, Dow Chemical, Time Warner, and General Motors turned over large portions of their logistics operations to third party logistics providers (3PLS- service of external agencies/organizations that

could handle non value adding services). At the same time, many supply chain partners engage in information sharing so that manufacturers are able to use retailers' up-to-date sales data to better predict demand and reduce lead times. This information sharing also allows manufacturers to control the variability in supply chains (known as the bullwhip effect) and by doing that reduce inventory and smooth out production.E 1-5

Among the first companies to utilize real-time information was Milliken and Company, a textile and chemicals company. Milliken worked with several clothing suppliers and major department stores, all of which agreed to use data from the department stores to "synchronize" their ordering and manufacturing plans. The lead time from order receipt at Milliken's textile plants to final clothing receipt at the department stores was reduced from 18 weeks to 3 weeks.

The huge pressure during the 90s to reduce costs and increase profits pushed many industrial manufacturers towards outsourcing; firm considered outsourcing everything from the procurement function to production and manufacturing. Indeed, in the mid 90s there was a significant increase in purchasing volume as a percentage of the typical firm's total sales. More recently, between 1998 and 2000, outsourcing in the electronic industry has increased from 15 percent of all components to 40 percent.

Finally, in the late 90s (2000), the Internet and the related e-business models led to expectations that many supply chain problems would be solved merely by using these new technologies and business models. E-business strategies were supposed to reduce cost, increase service level, and increase flexibility and, of course, increase profits, albeit sometime in the future. In reality, these expectations frequently were not met, as many ebusinesses failed. In many cases, the downfall of some of the highest-profile Internet businesses can be attributed to their logistics strategies. The Internet introduced new channels and helped to enable the direct-to-consumer business model. These new channels required many companies to learn new skills, and added complexity to existing supply chains.

The landscape has changed in recent years. Industry recognized that trends, including outsourcing, off shoring, lean manufacturing, and just-in-time that focus on reducing manufacturing and supply chain costs significantly increase the level of risk in the supply chain. As a result, over the past several years, progressive firm have started to focus on strategies that find the right balance between cost reduction and risk management. A number of approaches have been applied by industry to manage risk in their supply chains:

- Building redundancy into the supply chain so that if one portion fails, for example, a fire at a warehouse or a closed port, the supply chain can still satisfy demand.

- Using information to better sense and respond to disruptive events.

- Incorporating flexibility into supply contracts to better match supply and demand. Improving supply chain processes by including risk assessment measures.

- Using service of fourth-party logistics (4PLS). The 4PLS is a supply chain integrator that assembles and manages the resources, capital, technology and capabilities of its own organization and other organizations who provide complementary service to design, build, and deliver a comprehensive supply chain solution.(outsourcing entire supply chain process from a single organization) The

implementation of ERP systems(Enterprise Resource Planning), motivated in many companies by year 2000 concerns, as well as new technology such as tools for supplier performance assessments, have created opportunities to improve supply chain resiliency and responsiveness. Similarly, advanced inventory planning systems are now used to better position inventory in the supply chain, and to help firms better understand the impact of product design alternatives on supply chain costs and risks, thus facilitating the integration of the development chain and the supply chain.

The urgency of supply chain challenges has not diminished over the years with the recent increase in supply chain costs. With complexity driven by globalization, high transportation costs, poor infrastructure, weather-related disasters, and terrorist threats, managing the supply chain has become even more challenging.

#### *Supply chain components/participants*

Supply chain participants generally include:

**1. Raw materials providers.** Raw materials providers sell raw materials like steel, fuel or other commodities to manufacturers who need these to run their operations or incorporate into the goods that they manufacture. Raw materials providers also sell raw materials to others in the supply chain for resale or consumption.

**2. Manufacturers.** Manufacturers manufacture or produce: a) their own off-the-shelf products; or b) Custom products based on third-party specifications.

The term manufacturer is also used to refer to a product manufacturer or producer that outsources the actual manufacture or production of its products to a third party. Manufacturers sell their goods to others in the supply chain for resale, but also sell goods directly to end users for consumption.

**3. Distributors.** Distributors are typically middlemen that purchase goods from manufacturers or other middlemen for their own account with the intention of reselling them to others in the supply chain, for example:

a) Wholesalers

b) End users, for example, consumers or companies that need the goods. Distributors also include manufacturers that distribute their own products. Distributors typically bear inventory risk and the risk of loss regarding the goods, as well as credit risk related to their customers.

**4. Resellers.** The meaning of "reseller" varies from industry to industry. A reseller may refer to an entity that purchases goods from manufacturers or distributors with the intention of reselling them to end users for consumption or incorporation into another product. A reseller that resells goods to consumers is commonly referred to as a retailer. Resellers typically bear inventory risk and the risk of loss regarding the goods, as well as credit risk related to their customers.

**5. Franchisers.** Franchisers are owners of business systems and processes who grant one or more third parties (franchisees) the right to use their business systems or processes, as well as trademarks or trade names to produce and market goods (or services) according to uniform specifications in exchange for a one-time franchise fee plus a percentage of sales revenue (royalty).

**6. Sales representatives.** Sales representatives market, advertises, promote and solicit the sale of the goods on behalf of the seller (such as a manufacturer or distributor) to the seller's customers in the specified territory. Sales representatives do

not take title to the goods or bear inventory risk or risk of loss regarding the goods. They also do not bear the credit risk of the customers.

**7. Logistics providers.** These entities provide a variety of services on behalf of other participants in the supply chain to move the goods between the participants. Logistics providers may take temporary custody of the goods, but do not take title to the goods.

Logistics providers include:

- a) warehousemen, which are entities engaged in the business of storing goods for hire;
- b) carriers, which are entities like trucking companies that issue bills of lading; and
- c) Customs brokers, which are entities engaged in the business of clearing goods through customs barriers for importers and exporters.

**8. Financiers.** In addition to sellers who provide seller-financing, such as extended or deferred payment terms, these entities include banks, factoring companies and other entities who provide:

- a) purchase-money financing for a buyer to pay the purchase price of goods;
- b) commercial letters of credit to buyers to further the payment of goods in the ordinary course of a transaction; or
- c) Factoring to sellers who sell or assign their *receivables* to accelerate their cash flow.

**9. Credit support providers.** These entities provide credit support to any party that is insecure about the payment or other obligations of the other party, for example:

- a) banks that issue standby letters of credit; and
- b) Sureties like insurance companies that provide surety bonds.

**10. End users.** These include any participant in the supply chain who purchases goods for:

- a) their own use or consumption; or
- b) Incorporation as raw materials or components into their own products.

**11. Lessor.** Some users do not own the goods (for example, equipment) that they use in their businesses. Rather, they lease equipment from others in the supply chain who own the equipment. The party that owns the equipment is commonly referred to as the lessor.

The party that has the exclusive right to use the equipment is commonly referred to as the lessee. Lessor and lessees engage in equipment leasing for a variety of reasons including:

- a) allocation of the equipment's life-cycle between the parties;
- b) tax advantages; and
- c) Accounting treatment.

### **The concept of supply chain management**

Companies are increasingly emphasising on their *core competencies* ('to do what you are best at and leave all other non-value-added activities to more suited players.') and working on to build strong relationships with their supply chain partners who possess essential complementary capabilities. Success will depend on *how well companies collaborate* to manage important processes and activities across company boundaries to better meet customer requirements and demand. The efforts to *align*

goals, share resources, and collaborate across company boundaries are the essence of supply chain management.

### **Objectives of supply chain management**

The fundamental objective is to "*add value*". That brings us to the example of the fish fingers. During the Supply Chain Management'98 conference in the United Kingdom this fall, a participant in a supply chain management seminar said that total time from fishing dock through manufacturing, distribution, and final sale of frozen fish fingers for his European grocery-products company was 150 days. Manufacturing took a mere 43 minutes. That suggests an enormous target for supply chain managers. During all that time, company capital is-almost literally in this case--frozen. What is true for fish fingers is true of most products. Examine any extended supply chain, and it is likely to be a long one. James Morehouse, a vice president of consulting firm A.T. Kearney, reports that the total cycle time for corn flakes, for example, is close to a year and that the cycle times in the pharmaceutical industry average 465 days. In fact, Morehouse argues that if the supply chain, of what he calls an "extended enterprise," is encompassing everything from initial supplier to final customer fulfilment, could be cut to 30 days, that would provide not only more inventory turns, but fresher product, an ability to customise better, and improved customer responsiveness. "All that add value," he says. And it provides a clear competitive advantage. Supply Chain Management becomes a tool to help accomplish corporate strategic objectives:

- a) reducing working capital,
- b) taking assets off the balance sheet,
- c) Accelerating cash-to-cash cycles,
- d) Increasing inventory turns, and so on.

### **Supply chain planning**

Supply Chain Planning enables manufacturers to synchronize enterprise-wide production and supply with enterprise-wide demand. The solution allows manufacturers to aggregate total demand and centrally plan for the production capacity and supplies required to satisfy that demand. Supply Chain Planning consolidates sales, production, inventory and purchasing information to help companies become more demand-driven and actually manufacture items based on real demand.

In today's demand-driven market, it is critical for manufacturers to optimize and integrate sales and logistics and incorporate such data into the production schedule in a timely manner. Supply Chain Planning delivers substantial benefits to manufacturers including:

1. Increased responsiveness to market changes
2. Improved visibility into aggregated demand as well as enterprise-wide production and supply
3. Reduced inventory levels
4. Improved customer service and on-time delivery performance
5. Optimized supply to meet demand profitably
6. Lowered inventory, distribution and transportation costs
7. Increased demand forecast accuracy with compressed planning cycle times



**Move planning closer to demand:**

Supply Chain Planning helps manufacturers increase responsiveness by shifting the planning process closer to actual demand. Manufacturers can then more effectively synchronize production and procurement activities with actual demand and in the process lower costs, decrease inventory levels, and improve customer service. By synchronizing internal and external supply chain processes, Supply Chain Planning helps manufacturers transform themselves into demand-driven organizations that are more flexible and can respond quickly to changes in the market.

**Total demand visibility:**

Supply Chain Planning increases manufacturers' visibility into enterprise-wide demand by aggregating forecasts and sales orders created by customers and local sales offices into one, comprehensive demand stream. This demand stream can be organized in a wide variety of ways — by corporate entity, customer, customer type, product family or end-item — to allow corporate planners to see when, where and what kind of demand is being generated. The enterprise planning solution provides users with complete visibility into aggregated demand through a single, easy-to-use screen. Planners can adjust this demand based on the historic accuracy of the various demand streams.

**Enterprise-wide planning:**

Supply Chain Planning provides visibility into demand and also allows manufacturers to determine the optimal way to fulfil that demand based on available enterprise-wide supply and production resources. From the same screen, planners can see the production and inventory required to meet demand in user-defined time-buckets.

Supply Chain Planning allows users to drill into demand details to see how supporting production and supply plans were created as well as to make any changes necessary to meet the demand or achieve business objectives more effectively. This ability to plan production and procurement activities centrally against aggregated demand is essential for manufacturers who wish to realize strategic business objectives such as cost reduction or improved responsiveness.

The enterprise planning capabilities enables manufacturers to allocate demand intelligently to the most appropriate production facility based on lowest manufacturing cost or available resources including capacities and inventories, transport costs, and lead times from facility to customer.

Supply Chain Planning ensures that manufacturers optimize their production and procurement activities on an enterprise-wide basis. The module enables planners to allocate demand to individual factories for further planning and fulfilment.

**Support for global PSI planning:**

Supply Chain Planning provides full support for Global PSI (Production, Sales, and Inventory) planning commonly used by leading electronics and high-volume manufacturers.

The solution contains a global model of production resources and inventory that can be used to fulfil demand. The Global PSI model is created from multiple Local PSI models generated from the production planning or materials planning systems in use at each factory.

### *Key Capabilities:*

Supply Chain Planning provides advanced capabilities for manufacturers, including:

- Accurate visibility of demand across product lines, geographies and customers by aggregating information from multiple sources
- Accurate visibility of enterprise-wide production capacity and supply requirements
- Optimization of key activities within a manufacturer including production, procurement and distribution
- Multi-tier, multi-enterprise planning collaboration between trading partners.

### **Supply chain management process**

The Global Supply Chain Forum identified eight key processes that make up the core of supply chain management:

- Customer Relationship Management
- Customer Service Management
- Demand Management

#### **Order Fulfillment**

- Manufacturing Flow Management
- Procurement (supplier relationship management)
- Product Development and Commercialization
- Returns (returns management).

The term “procurement” is defined as “...the act of buying... all those activities necessary to acquire goods and services consistent with user requirements” The procurement process renamed as “supplier relationship management”. The name of the returns process to returns management.

The eight key business processes run the length of the supply chain and cut across firms and functional silos within each firm. Functional silos include Marketing, Research and Development, Finance, Production, Purchasing and Logistics. Activities in these processes reside inside a functional silo, but an entire process will not be contained within one function.

Each process is described at strategic and operational levels. The strategic portion consists of the establishment and strategic management of each process, and provides a blueprint for implementation. This is a necessary first step in integrating the firm with other members of the Supply chain. The operational portion is the actualization of the process once it has been established.

### **Customer relationship management**

The customer relationship management process provides the structure for how the relationship with the customer is developed and maintained. Management identifies key customers and customer groups to be targeted as part of the firm’s business mission.

Customer teams tailor Product and Service Agreements (PSA) to meet the needs of key accounts and segments of other customers.

Teams work with key accounts to improve processes, and eliminate demand variability and non-value-added activities. Performance reports are designed to measure the profitability of individual customers as well as the firm’s financial impact on those customers.

## **The strategic process**

At the strategic level, the customer relationship management process provides the framework for managing relationships with customers, and is comprised of five sub processes. In the first, the Process team reviews the corporate and marketing strategies to identify customer segments that are key to the organization's success now and in the future.

Next, the team identifies the criteria for categorizing customers and provides guidelines for determining which customers qualify for tailored PSAs and which customers will be grouped into segments and offered a standard PSA that is developed to provide value to the segment. Potential criteria include: profitability, growth potential, competitive positioning issues, access to market knowledge, market share goals, margin levels, level of technology, resources and capabilities, compatibility of strategies, and channel of distribution. As part of this sub process, the team develops the firm's strategy for dealing with segments of customers who do not qualify for individually tailored PSAs.

In the third sub-process, the team develops guidelines for the degree of differentiation in the PSA. This involves developing the differentiation alternatives and considering the revenue and cost implications of each. The output is the degree of customization that can be offered to customers. The goal is to offer PSAs that enhance the profitability of the firm and the customers. To find and understand the differentiation opportunities, this sub-process will interface with all of the other processes.

Developing the framework of metrics involves outlining the metrics of interest and relating them to the customer's impact on the firm's profitability as well as the firm's impact on the customer's profitability. The customer relationship management process has the responsibility for assuring that the metrics used to measure all of the other processes are not conflicting. Management needs to insure that all internal and external measures are driving consistent and appropriate behaviour.

In the final sub-process, the team develops the guidelines for sharing process improvement benefits with customers. The goal is to make these process improvements win-win solutions for both the firm and the customer.

In summary, the objective of customer relationship management at the strategic level is to identify customer segments, provide criteria for categorizing customers, provide customer teams with guidelines for customizing the product and service offering, develop a framework for metrics, and provide guidelines for the sharing of process improvement benefits with the customers.

## **The operational process**

At the operational level, the customer relationship management process deals with writing and implementing the PSAs. It is comprised of seven sub-processes.

First, customers are differentiated based on the criteria developed at the strategic level. Key customers are identified and other customers are grouped into customer segments.

Next, the account or segment management teams are formed, including the salesperson who will be the account or segment manager. The teams are cross functional with representation from each of the functional areas.

In the case of key accounts, each team is dedicated to a specific account and meets regularly with the customer. In the case of customer segments, a team manages a group of customers and develops and manages the standard PSA for the segment.

Each account team reviews their account or segment of accounts to determine the products purchased sales growth and their position in the industry. Once the team has an understanding of the customer(s), they work with each account or segment of accounts to develop improvement opportunities in sales, costs and service. These opportunities might arise anywhere, so the account teams need to interface with each of the other processes.

In the fifth sub-process, each team develops the PSA for their account or segment of accounts. This team first outlines and drafts the PSA, and then gains commitment from the internal functions. For key accounts, they present the PSA for acceptance, and work with the customer until agreement has been reached. It is important that the PSAs for key accounts include a communication and continuous improvement plan. For other accounts, the PSA is presented to the customer.

In the sixth sub-process, the team implements the PSA, including regular meetings with key customers. At this point, input is provided to each of the other processes that are affected by the customizations in the PSA.

In the last operational sub-process, the team captures and reports the process performance measures. Metrics from each of the other processes also are captured in order to generate the customer profitability reports. These profitability reports provide information for measuring and selling the value of the relationship to each customer and internally to upper management. The value provided should be measured in terms of costs, impact on sales, and associated investment; otherwise the efforts incurred will go unrewarded.

### **Customer service management**

The customer service management process is the firm's face to the customer. It provides the single source of customer information, such as product availability, shipping dates and order status. Real-time information is provided to the customer through interfaces with the firm's functions, such as manufacturing and logistics. Customer service management is responsible for administering the PSA.

### **The strategic process**

At the strategic level, the customer service management process is concerned with designing the process for managing the PSA. Customer relationship management Develop Customer Service Strategy provides the set of products and services the firm can offer its customers. The strategic customer service management process is responsible for planning how each of the possible products and services to be included in the PSA is going to be delivered and managed. Strategic customer service management has four sub-processes.

In the first, the customer service strategy is developed for the set of PSA features identified in the customer relationship management process. The team identifies the deliverables of the customer service process, operationalise the triggers for initiating action, and defines the staffing needs. The deliverables of the process are standardized responses to standardized events that occur while administering the PSA. The output of this first subprocess is a list of events with its corresponding triggers and deliverables.

In the second sub-process, the team develops response procedures for each of these events. This includes developing the internal and external coordination required to respond. Next, the process team identifies the infrastructure for implementing the response procedures. This involves identifying the sources of the information needed to handle each of the events and determining the appropriate communication means for internal and external coordination. This sub process provides the information technology and communication needs for managing the PSAs efficiently and effectively. If there are technical constraints restricting the establishment of this infrastructure, the products and services that are affected have to be re-evaluated and eventually modified to make them feasible.

As in the other processes, the last sub-process of customer service management at the strategic level is to develop the framework of metrics. The metrics should provide management with the information necessary to identify problems and improvement opportunities in the administration of the PSA. These measurements are used not only for managing the process, but also for improving its efficiency. The team interfaces with the customer relationship management team to assure that the metrics developed are consistent with the firm's objectives. In short, the objective of customer service management at the strategic level is to develop the necessary infrastructure and coordination means for implementing the PSA and providing a key point of contact to the customer.

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