MODERN LOGISTICS OPERATIONS

MBA [Logistics Management] Paper 3.3



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SYLLABI-BOOK MAPPING TABLE

Modern Logistics Operations

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UNIT 1 Logistics as a Support/Interface/Enabler of Production function: Logistics as a Support function of Procurement, Vendor Facilitation and Production-Logistics as interface function of Demand Forecasting, Global procurement, Tracking inward shipments, In-plant distribution and Storage Planning- Logistics as an enabler of Just-in-Time (JIT), Kanban (A scheduling system for lean inventory), Vendor Managed Inventory (VMI) for Vendors and the firm.	Unit 1: Logistics as a Support/Interface/ Enabler of Production Function (Pages 3-34)
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Introduction

INTRODUCTION

In simple terms, logistics refers to the management of the flow of things between the point of origin and the point of consumption in order to meet requirements of customers or corporations. The resources managed in logistics can encompass physical items such as food, materials, animals, equipment, and liquids; as well as abstract items, such as time and information. Thus, we can define logistics management as, 'The process of planning, implementing and controlling the efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption for the purpose of conforming to customer expectations.'

Logistics management in any organisation plays a crucial role, as it is the process that helps in the management of the flow of materials and inventories in such a way that the organisation is able to maximise its profit by satisfying the customer's need. The key objective of any organisation is customer satisfaction. It is very essential that the organisations are able to provide the right quality of goods, at the right time and at the right cost to its customers so as to maintain the organisation-customer relationship as well as to make profitable business.

The origins of logistics go back to military organizations of the 19th century. After the end of the Second World War, logistical operations began to play a major role in manufacturing firms. Since then, logistics operations have come a long way. A large part of modern logistical operations involves using information technology tools to ensure seamless delivery of goods from the manufacturer to the consumer. This book focuses on all the elements mentioned above so as to provide the readers with the brief understanding of logistics operations in the modern era.

This book, *Modern Logistics Operations*, follows the self-instruction mode wherein each unit begins with an Introduction to the topic of the unit followed by an outline of the Unit Objectives. The detailed content is then presented in a simple and structured format interspersed with Check Your Progress questions to test the student's understanding. A detailed Summary and a set of Questions and Exercises are also provided at the end of each unit for effective recapitulation.

UNIT 1 LOGISTICS AS A SUPPORT/ INTERFACE/ENABLER OF PRODUCTION FUNCTION

Structure

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1.0 INTRODUCTION

Logistics management is not a new area; history is replete with incidences when many wars were won purely on the basis of logistics management. Be it defeat of the British in the American War of Independence or the Second World War or the Bengal Famine or the success of e-retailing business, all these are attributed to success or failure of logistics management. The first usage of the word 'logistics' was in the military. It was the term used for the process of getting arms, ammunitions and supplies to troops. It wasn't until the 1950s, when the complexity of shipping materials to and from businesses increased, that 'logistics' referred to business functions. Today, logistics is an industry; the global logistics sector is growing and is expected to be over USD 15.5 trillion by 2023 (Source: Transparency Market Research Analysis 2016). In this unit, the focus will be to introduce students to logistics as a support function and an enabler of production.

1.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Define logistics and explain its components and process
- Describe the support function, enabler and interface function of logistics

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- Define storage and distribution planning
- · Explain the process of tracking in-ward shipment
- Recognize logistics as enabler of Kanban, JIT and VMI

1.2 LOGISTICS ACTIVITIES: AN **INTRODUCTION**

Logistics can be defined as the planning, execution, and control of the procurement, movement, and stationing of materials, personnel, and other resources to achieve the objectives of the organization. It may also be defined as the process of management of inventory at rest and in motion.

1.2.1 Logistics Activities

There are three major types of logistics activities: inbound logistics, process logistics and outbound logistics.

- 1. **Inbound logistics:** The set of activities that are related to the inflow of material and other inputs from suppliers to plant in an efficient and cost-effective manner is called inbound logistics. The management of inbound logistic requires maintaining a continuous interface with the vendors/suppliers. The movement of raw material and components for processing is a part of inbound logistics.
- 2. Process logistics: These include logistics operations related to processing. Activities like storage, movement of raw material and components within the manufacturing premises are part of it.
- 2. Outbound logistics: The set of activities that are related to the flow of finished goods and other output from the plant/ firm to the customer. The management of outbound logistic requires maintaining a continuous interface with transport operators and channels of distribution. Activities like warehousing, transportation and inventory management of the finished goods are a part of it.



Fig. 1.1 Logistics Activities

1.2.2 Scope of Logistics Activities

The scope of logistics management is spread across inbound and outbound logistics. The logistics associated with the inflow of material and other input in a smooth and cost-effective manner from suppliers to the plant is called inbound and the one associated with flow of finished goods and other related information from the plant

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to the customer is called outbound logistics. The proper management of inbound logistics requires a continuous and constant interface with the suppliers whereas the management of outbound logistics requires a continuous and constant interface with the transport operators and channels of distributions.

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Fig. 1.2 Scope of Logistics Activities

Theses inbound and outbound activities can be further divided into two part: key activities and support activities.



Fig. 1.3 Further Division of Logistics Activities

Key Activities

Key activities of logistics are those activities which are directly related to the process of logistics management. These are the activities a company must engage into for the successful implementation of the business. The key activities of logistics include customer service standards, transportations, information flow and order processing and inventory management.

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- **Customer service standards:** The ultimate aim of any business is to meet customer needs and the same is true for logistics management. In order to optimize profit, all activities of the business are directed towards creating a satisfied customer. In case of logistics, the same is achieved by managing the physical distribution in the most efficient way. Activities like offering goods in right frequency, quick response system, optimized transportation cost, improving the level of customer service, effective warehousing and inventory management, and so on, add to this.
- **Transportations:** The other key function of logistics management is to manage the movement of products from the point of origin to the point of consumption and in many cases to the ultimate point of disposal as well. The major activities involved in transportation management are: Selecting mode/ modes of transportation (road, air, water, pipeline or rail), compliance with the regulations in the region of the country where shipment is occurring, selection of the carrier, routing of the shipment, etc. This is one of the activities with the highest cost.
- **Information flow and order processing:** Order processing involves getting orders from customers, checking orders on the status of the order and communicating to the customer about the same. It also includes the activity of making the order available to the customer. Beside these activities, order processing and information flow includes invoicing, checking inventory, identifying account receivable customer credit, etc. In general, we can say that order processing follows the following five stages: Order receipt, acknowledgement receipt, order processing and transit and unloading delivery vehicle, inspect material and sorting.



Fig. 1.4 Ordering Process

It is heavily automated and a broad area. The way to manage it has a direct impact on customer satisfaction. The smooth flow of information at the various stages of the order flow is the key to the success of the process. The sharing of information between suppliers, customers and various functions of the organizations is necessary for the successful implementation of the process.

• **Inventory Management:** Inventory management includes the policies related to inventory control; activities like stock level, order tine, cycle time, order size, service level, material to be stored, etc. are decided. The purpose of inventory management is to keep a check on the cost of holding inventory and, at the same time, not to compromise with the service level.

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Support Activities

Logistics' support activities can be defined as those activities that are not related to the process of logistics but add value to the logistics management and allow the operations of the process more efficiently and effectively. They assist the organization as a whole and provide infrastructure and input. The support activities of logistics management includes Purchasing, Warehousing, Materials handling, Packaging, Logistics Communications, and post-sales activity.

- **Purchasing:** The activities like expression of interest for purchase, publishing tender, identifying suitable supplier, negotiating terms and conditions of purchase, sending a purchase order, organizing delivery, arrangements of insurance and other payments, etc. are part of purchasing. Earlier, it was considered as a part of the order processing, but now it is acknowledged as a part of upstream activities
- Warehousing: The process of movement of materials for storage is called warehousing. The goods are stored at the warehouse for future selling or distribution. It takes care of the material until they are needed. They help the organization in monitoring inventory and safe storage. Certain products like pharmaceutical, frozen products or the products emitting too much heat require special care and so special warehousing facility; warehousing ensures that such products are taken care well. It also ensures that products are available quickly when needed.
- **Materials handling:** The movement of the material within an organization is called material handling. It involves the movement of material from warehouse to plant, movement of material at various stages of operations, movements of goods from plant to warehouse and the movement from store to the place where they are needed. The purpose of material handling is efficient movement of goods within the shortest span of time with minimum wastage or damage.
- **Packaging:** Packaging is important both as a form of advertising/marketing element and as for protection and storage for logistical perspective. It has the ability to convey important messages to the customer and, at the same time, it can attract them toward the product. It has a direct impact on the activities performed in logistic management and can increase or decrease the efficiency of the outbound logistics. Its ability to provide safety to the product is very important, especially during long distance or multiple mode transportation like international shipping.
- Logistics Communications: Logistics communication includes collection, storage, processing and analysis of information and messages across various stakeholders. It provides all the information needed for planning, control and organization of logistics activities. Communication is the key to the success of any organization, be it logistics or any other functional area.
- **Post-sales activity:** Selling and making the product available to the customer is not the end to the logistics management. Even when the product has been delivered, the job of logistics is not finished. For example, there could be a problem with the delivered material a wrong type or too many of them would have been delivered. It is also possible that a faulty product is being delivered; all these materials are required to be collected and brought back. The set of activities involved in bringing the material back to the facility is called reverse logistics.

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Warehousing: It is the process of moving materials for storage.

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1.3 LOGISTICS MANAGEMENT

Logistics management can be defined as the process of planning, implementing and controlling the efficient flow of raw-materials, work-in-progress and finished goods (and the relevant information) between the point of consumption and the point of origin in the most efficient manner. According to the Council of Supply Chain Management, 'Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements.'

Logistics Management Process

Logistics management as a process includes five stakeholders: suppliers, procurement, operations, distributions and customers. The system of logistics management can be viewed as a mean by which the needs of the customers are satisfied through the coordination of the materials and information flows that extend from the marketplace, through the firm and its operations and beyond that to suppliers.



Fig. 1.5 System of Logistics Management

Objectives of Logistics Management

The major objectives of logistics management are as follows:

- 1. **Cost Advantage:** There are many industries in which one can find out a competitor who will be low cost producer and often holds the maximum market share. It is mainly because of the economy of scale. Traditionally, it is believed that the way to reduce cost is to produce and sell in volume. However, it may not be always true, especially in case where the product is to travel a lot before it reaches the final consumer. Hence it is argued that through better logistics management one can achieve significant reduction in the unit cost due to improved efficiency and productivity. The logistics activities should be so planned that they should be able to give cost advantage to the organization.
- 2. Value Advantage: Another objective of logistic management is to add value to the existing process. 'Customers do not buy products, they buy benefits,' is an old saying. In another way, we can say that the product and service should be able to add some value to the customer's life or experience. These benefits may be tangible or intangible. Hence the companies are needed to identify the way to offer these values. There are many companies who offer delivery services, after sales services, technical support, financial packages, route

tracking, insurance of goods, etc. as part of the logistics activity. Effective logistics management should be able to manage these services effectively.

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Fig. 1.6 Logistics and Competitive Advantage

Those companies which are in the bottom left hand side of the matrix are the one which are selling in-differentiable products/ service and they do not have a cost. These are like commodity market where there is not much product differentiation; the only way for these companies to move to a comfortable position is by being a cost leader or by being a service leader. But cost leadership is greatly influenced by economies of scale and hence service leader is the only option. They can become service leader by adopting new technologies, improving service response time, reducing wastages and damage at various stages and developing a time-bound system of feedback and feed-forward communication and hence develop service excellence.

Logistics management can lead to both value advantage and cost advantage. Value advantage can be achieved through tailored services, improved reliability and responsiveness whereas cost advantage can be achieved through capacity utilization, inventory reduction and better integration with suppliers at the planning stage, safe speedy and economical transportation and improved warehousing facility

- 3. **Operational Advantage:** Providing operational advantage is another objective of the logistics management. Both in-bound and out-bound logistics should be able to provide operational advantage, be it on-time delivery of material, utilization of raw material, semi-finished goods in the production process or the utilization of the production capacity; logistics should be able to manage it. It should be capable of providing a sound inventory management system
- 4. **Competitive Edge:** It should be able to provide competitive edge to the organization by arranging reliable and agile delivery, providing better customer support and service and avoiding order processing error.

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Source: Porter, M.E., Competitive Advantage, The Free Press, 1985

Fig. 1.7 Primary and Support Activities

It should be capable of integrating its activities with the various functions of the organization. Both primary and support logistics activities should integrate procurement, technology development, human resource management and firm infrastructure and helps in efficient management of inbound, outbound logistics, operations and sales activities. It should be capable of providing efficient communication across various stakeholders/ functions.

Production System and its Component

Planning and operating a production unit involves many activities carried across various functional areas. Activities like design and testing of product, forecasting of demand, testing the quality of the product, decision about the inventory or the stock level to be maintained, service level, managing suppliers and distributors, and so on, are carried out to ensure the seamless functioning of the system. But all these activities involve coordination and hence production is viewed as a system. A system can be defined as the relative action of two or more activities as they are carried out or as they operate. A manufacturing organization is one which engages in the conversion of raw materials into finished goods. The process of conversion includes three main stages: input, process and output.

The focus of the logistics management in manufacturing is to achieve the production flow and streamline the activities at the above three stages. Logistics management helps in providing timely delivery of materials and parts from the suppliers to plant. It also ensures delivery of the manufactured goods to the immediate customer. Activities like order processing, inbound transport, purchase, inventory management, warehouse management, distribution and delivery transport, feedback and response management etc. are part of the logistics management. All these activities require movement of goods from one place to another. These movements of goods, big or small, have its own importance in the process and hence should be carried out with utmost care.

Check Your Progress

- 1. Define logistics.
- 2. What is the purpose of inventory management?
- 3. What are the stakeholders of the logistics management process?

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1.4 PRODUCTION FUNCTIONS OF LOGISTICS

Logistics acts as enabler, support and interface in the production and operations of an organization. What started as a support function for keeping the army in the field, fighting a war is now being used for keeping the companies lean and cost efficient. The major role of logistics in operations is into order-processing, inbound transport, purchases, warehouse management, production plans and schedules, distribution and delivery transport, inventory management and management of information's systems like customer response management, materials requirements planning and distribution requirements planning.



Fig. 1.8: Production Function of Logistics

1.4.1 Logistics as a Support Function of Procurement, Vendor Facilitation and Production

Support functions are those functions that are not directly linked to the main activity but are needed for the efficient and effective delivery of products and services. In operations, the logistics support functions can be categorized into three main categories:

- 1. Support function of procurement
- 2. Support function for vendor facilitation
- 3. Support function for production

I. Support Function of Procurement

Materials are the building block of the manufacturing process but they do not appear magically, they are required to be procured. Procurement can be defined as the act of receiving or buying goods and services. The process includes activities like purchase planning, supplier research and selection, specifications development, price negotiation, value analysis, making the purchase, standards determination, inventory control and stores, supply contract administration. It aims to achieve the perfect flow by encompassing all the activities required to source materials from upstream link. It requires liaising with suppliers to effectively obtain all the inputs required for the production of goods or delivery of services. Logistics as a Support/ Interface/Enabler of Production Function

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Procurement cycle

There are six stages in the process of procurement. These are as follows:

- **Requirement Defining:** this requires defining the quality, quantity and specification of the material to be procured.
- **Tendering of Sourcing:** once the requirement is defined, tenders are floated to seek the expression of interest to deliver required material as per the predefined standards.
- Evaluation and Selection: on the basis of the tenders, various suppliers can apply for the supply of the material. Procurement department evaluate theses suppliers and identify the one which is most suitable as per its requirement.
- **Contract Award:** Once the most suitable supplier is identified, a contract agreement is made and the contract is awarded to it.
- **Procurement Planning:** The awarded supplier is responsible for the supply of the material as per the agreed contract. The orders are placed and upstream logistics is managed.



Fig. 1.9 Procurement Cycle

The major requirement of the procurement process is:

- The procurement process consists of identification of suppliers capable of providing required raw materials/ parts/components.
- Placing orders to the suppliers to deliver the quoted quantity is another requirement of the procurement process. The order is required to be placed according to the requirement of the manufacturing process or as per the preagreed terms and conditions. A procurement order consists of information like quantity to be delivered, material reference number, delivery date, place of delivery, etc.
- Once the order is received, the next requirement of procurement process is to receive the material and components on time.

• Another requirement of the process is to evaluate the suppliers. The evaluation consists of activities like keeping a track on the delivery date, quality of the product delivered, meeting of the timelines and delivering the promised goods.

The procurement agreement can be of 'fixed quantity' or for 'minimum quantity' or it could happen in the form of 'blanket order'. The fixed quantity contract required the company to send a fixed quantity order per month to the suppliers whereas the minimum quantity contract predefines the minimum quantity to be ordered per lot to ensure the delivery of the material. In blanket order, the suppliers agree to provide the quantity as per the requirement of the company; there is no fix or minimum quantity or minimum number of orders to be placed. Procurement is a continuous process.

Role of Logistics in Procurement

Procurement cannot happen in isolation, an entire chain of logistics and supply chain is involved in it. It requires a dedicated logistics team to manage purchasing, shipping, organizing and storing the various materials at the procurement warehouse. In the changing business environment, where the companies are looking for low defect rate, just in time supply, reduced cost and agility (quick adaptability to change), the cohesiveness between procurement and logistics becomes more important. The procurement and logistics should be able to work together; where procurement ensures the placement of the orders to the selected suppliers the logistics should ensure that the order reached in time, without breakage or defect.

The logistics is also expected to ensure that the shortest and the most economical route is followed for the transportation of the material so that the cost of materials can be kept under control. Every small cost during transit would add to the cost of the final good and has a direct impact on the revenue of the organization.

Logistics also ensures that the product/ material is packed appropriately so that breakage during material handling and transit can be avoided and cost can be kept under control. Every broken or defective product also adds to the cost of the final product and hence avoiding it would lead to the cost reduction and profit maximization.

Another role of logistics in procurement is to track on the quantity of goods reaching the warehouse. It is expected to verify the quantity and the state of goods during unloading. This helps in tracking the order placed and the order received.

If the purchase involves lengthy supply chain, the way to reduce the length should be identified. Measures like identifying single suppliers, finding new vendors, and negotiating contract terms can come handy in this case. Logistics can identify the ways to reduce the cost of transportation and hence helps in keeping the cost of material low.

II. Support Function for Vendor Facilitation

Vendors can be defined as businesses or individual that sells products to another business or individual. The fundamental responsibility of the vendor is to keep their words and provide the goods/ material as promised.

The major responsibilities of the vendor are as follows:

• **Quality:** Vendors are responsible for the quality of products provided to the customer. All the products should meet the basic minimum requirement and quality standard.

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vendors: They refer to people or companies offering something for sale, especially a trader in the street.

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- **Punctuality:** Another major responsibility of the vendor is to provide products on time and adhere to the time frame. A vendor having bad record of meeting the time frame can create troubles for the business. If the punctuality is not maintained, the company may end up selecting a new vendor and if they have to continue with the existing one only, the functioning will not be flawless.
- **Honesty:** The other responsibility of the vendor is to be honest with the customer. All the claims ranging from product effectiveness to the billing practices must be followed with complete honesty.
- **Safety:** Another responsibility of the vendor is to create safety for products and equipment. The products supplied by the vendors should be tested for safety under regular and extreme working condition.

They play a critical role in the overall profit of the organization. They are pivotal to any organization's processes and activities, hence it is very important to manage them effectively and facilitate them. Vendor's activity do not happen in isolation, they work in close connect with the procurement and production department. In order to get the best value for money, the companies need to manage their vendor strategically. One of the steps in this direction is facilitating them in logistic management; it can add great value to the vendor management. The benefit of facilitating vendors via logistics is as follows:

- Increase Administrative Efficiencies: Integrated logistics can significantly improve the administrative efficiency of the vendor. Logistics management helps in reducing the duplication of information; they are already working with the procurement department and now working with the vendor gives them a holistic view. This saves time, administrative labour cost, and improves the efficiency.
- **Mitigate Risks:** Logistics can help in reducing the supplier's risk. Working in close connections with the vendor, they can help the vendor in identifying the orders and verifying the information from the purchase end. It helps in aligning the transportation, loading and unloading of the product as per the order placed and hence reduces the risk of order mismatch, wrong or delayed order.
- **Reduce Costs:** Logistics arrangements like 3PL and 4 PL can provide cost effective measure for the movement of product and hence leads to the reduction of the cost. This is good both for the vendor and the organization.
- **Optimize Performance:** They act as a link between the procurement and the production department. Logistics can provide important information like status of order, delivery time, location of the order which can help in improving the performance of the vendor and organization.
- **Increase Order Processing Speed:** Logistics also helps in improving the speed of the order processing by the vendor. As they already have the information related to the procurement, and supply chain, they can always aid the vendor in speedy transfer.
- **Safety of the Goods:** Integrated Logistics ensures that the goods movement is safe. This is taken care by ensuring packaging standard, transit standards and balancing stock level by collaborating with procurement and production.

III. Support Function for Production

Logistics activities are responsible for the availability of the raw materials that are utilized in the production process. The role of logistics in production is to ensure that materials are available in the plant before every step in the production process. This includes inventory of raw material, semi-finished goods and finished goods.



Fig. 1.10 Support Function for Production

The major activities taken care by the logistics in the production are as follows:

(a) Production Scheduling

Production scheduling includes decisions about the quantity to be manufactured over a period of time. Scheduling of production is done with the assistance of the logistics staff. The attempt is to balance the demand and supply in the light of the available plant capacity.

Factors affecting scheduling

There are mainly two types of factors that affect production scheduling. These are external factors and internal factors.

- External factors: These are the factors that are not within the control of the organization. Organizations have to adjust according to these factors. These include Customer demand, Delivery date and Stock of goods already lying with dealers and distributors
- **Internal factors:** These are the factors that are within the control of the organization. The organization can take decisions related to these factors and streamline the production. These include the stock of the finished production, available capacity, feasibility of economic production run and processing time on each machine.

(b) Material Handling

Material handling can be defined as the function of moving the right materials, in the right time, to the right place, in the right amount, in the right condition and in sequence, to minimize production cost. It covers almost all aspects of all movements of raw materials, work-in-process, finished goods, packing materials, disposal of scraps, etc., within the manufacturing or production unit. During these movements of goods from one place to other or from one department to other, thousand tons Logistics as a Support/ Interface/Enabler of Production Function

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of materials are handled daily leading to a huge requirement of human capital and hence contribute significantly to the total cost of manufacturing.

Though material handling is considered as a non-value adding activity, in the era of online retailing, mass customization and assembly-based businesses it has gathered more importance. The growing need of reducing the manufacturing cost has made it further more important.

The major objectives of material handling are cost reduction, waste reduction, improve working conditions, and improve distributions.

- Cost reduction: The cost reduction objective of material handling is achieved by better utilization of the existing space, decreasing the inventory level and increasing productivity.
- Waste reduction: The major waste that is created while material handling is due to breaking and damage. Material handling should be aimed towards reducing this by reducing distances, better packaging, designing smooth passage for the movement of material and equipment, and establishing a control over the stock while moving in and out of the unit.
- Improve working conditions: Safe and an ergonomically designed working condition improve the efficiency and reduce the accidents; all these lead to improved efficiency and promote productivity. Reducing the breakdown time of machines and smoothing workflow also lead to reduces manufacturing cycle time and hence better productivity.
- Improved Distribution: reducing the distance to be travelled by the product leads to less damage during transit. The location of the store and the shipping facilities available also has impact on the material handling. Moving material in volume and at shorter distance in a straight line are few ways to improve distribution.

(c) Plant and Warehouse Site Selection

The finished goods produced by the production process is required to be stocked. The stocks can be kept at a single location or at different locations. The role of logistics is to ensure the safe and most economic movements of goods to the warehouse. The availability of the space, the location of the warehouse, retailers or distributers or wholesaler served, etc. are considered while planning the movement. The plant and warehouse site selection is an important activity as it determines the overall supply chain of the plant.

Check Your Progress

4. What are the three categories of logistics support function?

5. Who are vendors?

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1.5 LOGISTICS AS INTERFACE FUNCTION OF DEMAND FORECASTING, GLOBAL PROCUREMENT, TRACKING INWARD SHIPMENTS, IN-PLANT DISTRIBUTION AND STORAGE PLANNING

Let us analyse the essentials of logistics as interface function of demand forecasting, global procurement, tracking inward shipments, in-plant distribution and storage planning.

1.5.1 Demand Forecasting

Demand forecasting can be defined as the process of predicting the future demand of the product for the company. It consists of series of steps that help in anticipating the demand for the product under controllable and uncontrollable conditions. The forecasting also takes into consideration the uncertainty of the business environment, internal and external risks, etc. for predicting the future demand. There are many companies which operate on a mix of actual and forecast order. In most of the cases, the companies which are more distant from the consumer or whose manufacturing or processing cycle is long depend more on forecast as compared to the one with shorter production or processing time. A good forecast helps in avoiding the cost of over or under stocking of the goods.

Demand forecasting is carried on in conjunction with the firm's marketing staff and is used to forecast the annual sale. It is this sales target that ultimately gets translated into the number of products to be manufactured. Depending upon the production quantity, the planning for the raw material and work in process goods is done. It is this raw material requirement or the requirement of the semi-finished goods that leads to the placement of orders and the purchase order is made. As is already discussed, the logistics department is associated with the procurement; it does have information about what customers are ordering.

The following points should be considered while deciding upon the approach of forecasting demand:

- A single forecasting method should be used for the entire supply chain and the information should be shared with all stakeholders.
- The final decision on the quantity to be produced should be made by evaluating a number of internal and external factors and expert opinions.
- The accuracy of the past forecast should also be considered while accepting the current forecasted value.
- The decision on quantity to be produced should also consider the collaboration between suppliers and the buyers.



Fig. 1.11 Logistics and Demand Forecasting

As the logistics management department is responsible for the providing input and supply of the output to the final customer, they must have the accurate information specifying the demand (Specifying what is needed, where is it needed and in what quantity it is needed.). This helps in planning and scheduling of the operations. Logistics as a Support/ Interface/Enabler of Production Function

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Demand Forecasting: It is the process of predicting the future demand of a product for the company.

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Demand forecasting gives information about the number of products to be made. It also identifies the warehousing and storage need of the product and arrange for the same. Once the product is ready, the storage and warehousing of the finished product and the supply chain management of the product is also taken care by the logistics. The supply chain management includes identification of the modes of transport, identification of the vendor, packaging design and size of package, insurance and other documentation and ensuring safety of the goods while in transit. Most of the time logistics is forced to work upon the forecasted value rather than generating any forecast from the logistics data. An effective logistics system helps in meeting the requirement of the forecasted demand by providing sufficient inbound, process and outbound logistics.

1.5.2 Global Procurement

Global procurement can be defined as a process of buying products or services needed by the organization for its work from all parts of the world. With the growing competition on cost, the companies look out for suitable partner across the world to remain competitive. It is a way to meet the challenges of global competitors and new market.

Characteristics of Global Procurement

The major characteristics of global procurement are as follow:

- **Geographical distance:** Global procurement frequently requires the transportation of supplies, accessories, parts, essential and finished goods over a longer distance as compared to domestic purchase.
- Understanding of Regulations: Understanding of the rules and regulations of the procurement process and clarity on the memorandum of agreement is very important in global procurement as it has direct impact on the cost and the turnaround time.
- Foreign Exchange Fluctuations: There is always a risk of currency fluctuation, a small increase in the foreign exchange rate may lead to increase in cost and hence may wipe out the advantage of purchasing globally.
- Engagement of Foreign Intermediaries: An effective and efficient procurement strategy requires a strong connect with all the stakeholders
- **Mode of Transport:** Selecting the right mode of transport is another characteristics of global procurement. It is important to consider 'value to volume ration' while determining the modes of transport.
- Security of Cargo: In case of global sourcing, there are certain sea routes which are infested by Pirates and hence considered risky or unsafe. It is important to have information of all such routes. On these routes, there is risk of cargo security and life and the cost of insurance is high.

In global procurement, logistics management includes the following functions:

• Freight Transportation: Transportation modes like sea freight, air freight, surface transport like rail, truck, etc. are available for the movement of goods. The logistics has to identify the most appropriate mode of transportation for materials. Sea freight is the most economical mode of transportation but takes more time as compared to other modes. Almost 90% of the international goods are moved using this mode. Air freight is relatively faster but costlier.

Surface transport is dominated by trucks as at many places, the end to end rail connectivity is not available. Each of these modes has their own characteristics, limitations and value preposition which make them suitable in different conditions. In most of the global procurement, multimodal (more than one kind) transport is used.

• Warehousing: In global procurement, warehousing facility can be used for storing raw material or finished goods. The focus is to minimize the cost of holding the goods. The role of logistics is to identify whether the warehousing will be 'in-house' or 'off-site facility' or will be an 'onsite' facility. Role of logistics is also to identify the possibility of outsourcing the warehouse to a third part in order to optimize cost.



Fig. 1.12 Global Procurement and Logistics Functions

- **Material handling:** In global procurement, the needs to take care of the safety of the material during loading and unloading at various transit points is also an important function of logistics as damage at this stage would increase the per unit cost of the product.
- **Protective packaging:** Protective packaging insures the safety of the product. It protects from damage during transit due to manhandling or extreme conditions.
- **Cross docking:** Cross docking is defined as the practice of unloading materials from a supplier or manufacturer (delivered by an incoming railroad car or semi-trailer truck) directly into the outbound trailer, truck or rail car with little or no handling or storage time in between. The name 'cross docking' explains the process of receiving products through an inbound dock and then

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transferring them across the dock to the outbound transportation dock. This may be done to sort material planned for diverse destinations, to alter the type of conveyance, or to combine goods or materials from diverse origins into transport vehicles (or containers) with the same destination or similar destinations.



Fig 1.13 Cross Docking

It helps in reducing inventory carrying cost, labour cost, warehousing cost, and speeds up the supply chain. But, as the number of fleet required in this case is higher and it requires very strong coordination, the role of logistics is to identify whether it will increase the efficiency or not.

• Order processing: The primary function of the order processing is to provide a communication network that links the customer to the manufacturers. Processing the received order includes lots of activity and paperwork and hence should be done carefully. A typical order processing cycle consists of following steps:



Fig. 1.14 Order Processing Steps

It involve steps like order preparation and transmittal, order receipt and order entry, order processing and documentation, retrieval from warehousing and packaging, checking out of stock and order transportation, delivery to the customer and unloading. It should also take into consideration delivery reliability, claim procedure, documentation quality, order completeness, order status information, technical support.

Logistics ensures the delivery of the material according to the order. It also acknowledges the receipt of the order, unload the vehicle, inspect the material for damage and breakage and send them to the warehouse after sorting them. Logistics also takes care of assigning the available inventory to the customer and managing replenishment order. The information flow and the order status reporting system of logistics take care of the order processing.

• **Documentation:** As there are multiple agencies involved in the global operations, documentation becomes very important. Documents related to trading, financials, agreements, account processes, etc. are important for both buyer and seller and are important for the reorganization of the value of consignment, sale and also effect payment.

The entire logistics operations involve set of standardized documentation from seller and buyer. Also as per the accounting practices followed in the organization, detail documents of purchase are required as per the bookkeeping practices and norms. Document are also required at the custom points; only the person carrying relevant and authentic documents are allowed to claim the goods. There are many more aspects, like terms of carriage by the carrier coupled with insurance liabilities and coverage that call for set of documentation covering specific aspects of each transaction.

Few of the mandatory documents for export and import are given below:

As per the Directorate General of Foreign Trade (Govt. of India) notification dated 12-3-2015, for export and import, only three documents are mandatory.

MANDATORY DOCUMENTS FOR EXPORT & IMPORT		
S. No.	EXPORTS	IMPORTS
1	Bill of Lading/ Airway Bill	Bill of Lading/ Airway Bill
2	Commercial Invoice cum Packing List	Commercial Invoice cum Packing List
3	Shipping Bill/ Bill of Export	Bill of Entry

Whereas, World Bank's 2015 Report listed 7 and 10 mandatory documents, respectively for export and import from/to India.

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MANDATORY DOCUMENTS LISTED BY WORLD BANK IN DOING BUSINESS REPORT 2015		
S. No.	EXPORTS	IMPORTS
1	Shipping Bill	Bill of Entry
2	Commercial Invoice	Commercial invoice
3	Packing List	Packing List
4	Bill of Lading	Bill of Lading
5	Foreign Exchange Control Form (SDF)	Foreign Exchange Control Form (Form A-1)
6	Terminal Handling Receipt	Terminal Handling Receipt
7	Technical Standard Certificate	Certified Engineer's Report
8		Cargo Release Order
9		Product manual
10		Inspection report

The logistics has to ensure that all the documents are complete. The 'Bill of Lading' is the most important document that is used in transporting goods. 'Bill of Lading' is defined as a contract for the carriage of goods and a document of title to them. It consists of all the information that will be required by the carrier to transport the goods.

Key Performance Indicators in Global Logistics

The major performance indicators of global logistics are:

- 1. The quantity of item available for delivery should be within the customer specified delivery window.
- 2. The packaging should be as per the requirement of the item.
- 3. Selecting correct quantity of the correct item.
- 4. The packaging should contain information about the customer.
- 5. Shipping of product without damage.
- 6. Right documentation and customer specified documentation
- 7. Timely communication. On time order status report or report as per the expectations of the customer.
- 8. Accurate billing.
- 9. Delivery within the customer specified time and customer specified location.
- 10. Feedback and customer handling.

1.5.3 Tracking Inward Shipments

The activities of receiving, storing, and disseminating goods or material for use in the manufacturing process are called inward shipment. The process starts with the shipping of the goods by the vendor and ends when the same is acquired by the receiver. The various activities that are involved in the process of inward shipping are:



Fig. 1.15 Stages of Inward Shipping

- **Receiving:** Receiving is defineding as the act of taking possession of goods and subjecting them to inspection or puting them in inventory. While receiving the goods, the receiving staff must ensure that the goods that are delivered are in line with the details mentioned on the purchase order. If there is any mismatch between the goods ordered and the goods received, it must be notified immediately. Deviations like product substitute, under shipment, over shipment, etc. must not be accepted in any condition unless properly documented.
- **Inspecting:** Inspecting the goods involves examining goods that have been delivered for conformance to quality. The objective is to determine whether the goods received is in line with the one which was ordered via purchase document. The quantity, quality and the dimensions of the goods are inspected. Goods are also inspected for damage, breakage, packaging, documentation, etc.
- Acceptance Testing: Acceptance testing is done to test the acceptance of the delivered goods. Here either all the items or some part of it is tested for their conformance to the supply contract, technical specification, performance, etc. If the sampling happens in part, the goods can be selected randomly or from the first lot or from the last lot. In most cases random sampling is done if the quantity of goods is huge but if it is a high-value product, all the items units are tested.
- Acceptance or Rejection: Once the inspection and acceptance testing is done, the goods are either accepted or rejected. The acceptance of the goods by the company implies that the goods are as per the terms and condition of the purchase order.

The role of logistics in inward shipment is to ensure that all the four stages discussed above are managed appropriately.

At the receiving of the goods, logistics have to ensure that all the required documents are available to the person receiving the goods. The person should also be aware about the action to be taken if the goods are not as per the document. Logistics also have to ensure that the appropriate storage and warehousing facility is available for the received goods. For this warehousing arrangements should be made in advance. Also the person receiving the goods should enter the date, quantity Logistics as a Support/ Interface/Enabler of Production Function

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received and note for any defect in the receiving document. Once the process is complete, the original receipt is forwarded to the account department and a copy of same is provided to the purchase department for filing in the procurement file. All these documents must bear the signature of the receiving officer.

Once the goods are received, the logistics conducts and inspects the goods to verify the product specification, model, description, brand, quantity received and the quantity ordered, etc. It also inspects the goods for breakage, damage, functionality, and for physical condition like leakage or damage. Goods are also inspected for their expiry and consumption and packaging date. This inspection is expected to be complete within a fix duration and the inspection report is shared with the purchase department. The inspection report contains information like the details of the person who inspected the goods, date of inspections, criterion inspected and the result of the inspection.

After the inspection of the goods, the logistics has to ensure that the product is tested for the conformance to the standards and hence acceptance testing of the product is conducted by the department. Logistics has to ensure that the product meets the entire criterion mentioned in the order form. The products/ goods should be run in the testing phase and a report of the same should be submitted and the same should be filed in the purchase file.

Based on the result of the above stages, the logistics decides to accept the goods for the use in the organization or reject it. The reason for the rejection should be communicated to the supplier in written and same should be documents. Till the time the supplier takes possession of the rejected goods, the logistics has to ensure that the goods are held protected at a safe place and are taken good care of. If the supplier is not able to remove the defected goods within a stipulated time logistics can ship back the goods at the suppliers cost or can store the goods with the reimbursement claim from the supplier for any incurred cost. Hence logistics plays a crucial role at each and every stage of the inward movement of the goods.

1.5.4 In-plant Distribution and Storage Planning

The movements of goods within the manufacturing plants are called in-plant distribution. These movements include movement of the raw material, sub-assemblies and components either from or to the stocking point or line-sides for converting them into finished goods or taking finished goods out of factory.

In doing so, logistics has to ensure that the updated documents for goods received, goods issued, stock transfer and transfer posting is maintained.



Fig. 1.16 In-Plant Distribution

Self-Instructional 24 Material **Goods Received:** logistics needs to take care of purchase order and work order and streamline the things.

Goods Issued: The record of goods issued, material withdrawn from the inventory, material consumed in the production process and shipment of goods to affiliates is to be maintained and updated on the regular basis.

Stock Transfer: Logistics has to manage the movement of material and goods from one plant to other or from one storage location to another storage location or from one bin to another storage bin.

Transfer Posting: The movement of stock type conversion like material to martial conversion, changing the batch number and updating it, etc. is also required to be done by the logistics.

Results of Goods movement: Logistics needs to keep records of all goods movement in the organization like material document, accounting document, updated stocks like type, quantity and detail of updated inventory like balance, quantity and cost, etc.

The movement of the material in the plant is significant as it affects the efficiency and productivity of the plant. Any delay in the distribution because of poor organization or response can affect the production and cost the organization.

1.6 ENABLER OF PRODUCTION FUNCTION

Production function can be defined as the functional relationship between output and input or the functional relationship between the quantity of goods produced and the factors of production. It can also be defined as the technological relation indicating the amount of output produced with the given amount of input via a given technology. Mathematically it can be expressed as

Q = f(L, C, N)

Where L = Labour, C = Capital, N = Land and Q = Quantity of output

In a business environment, which is shaped by intense global competition and mass customization, the companies are forced to optimize their production. Logistics management plays a very crucial role in optimizing this production function. Logistics can help the production function in optimization by managing the inventory and providing the required material to the suppliers and customers as per demand. The focus is to identify an inventory level that will be able to meet all the required demand and at the same time will lead to a very low cost of inventory. But all these require a strong coordination between production unit, vendor/ supplier and the logistics department.

Inventory can be defined as the stock of goods and materials that is held for doing business. These are necessary for meeting the production requirement and support the customer and operational requirement. The various types of inventory includes:

- Raw material and production inventory: Stock of material required at various stages of production
- Finished goods inventories: Stock of product ready for sale.

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Inventory: It refers to the stock of goods and materials that is held for doing business.

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- In-process inventories: Theses are stock of partially finished, or work -in- progress parts.
- MRO (Maintenance, Repairs and Operating supplies) Inventories: Theses are stocks that are usually consumed during the manufacturing but are not a part of the product. Tools, fixtures, oil, chemicals, plants spare, machinery, etc. are MRO inventories.

The following are the reasons why inventory is kept:

- **Support in Operational Requirement:** Inventory helps in keeping the plant operational. Stocks like spare parts of production machinery, equipment, tools, welding rods, lubrication oil and chemicals, etc. help in maintenance and repair and keeping the plant functional.
- Meeting the production requirements: Stock of raw materials, semi-finished goods or work-in-process (WIP) stock, components and parts required in the manufacturing process are needed for meeting the production requirement and hence are required to be stored. The uncertainty like non-availability of material, delay in receiving the stock due to order placing or order processing or supply chain management can lead to hindrances in the production and hence inventories are stocked.
- Uncertain demand: The future demand, however, is uncertain. So whatever predictions you do, there will still be scope of change in demand. Inventories provide a cushion against that uncertain demand and help in maintaining businesses.
- **Customer Service:** Stock of spare parts and WIP inventories also help in providing customer support in case of product defect or damage and hence helps in improving customer satisfaction.

Because of all these above-mentioned reasons, it is important to manage inventory, though it has its own cost. These includes the money involved in maintaning the goods or materials and the expenses on warehouse. Hence, in order to control the cost of inventory, it is important to develop an effective inventory control system. There are two ways to control inventory. These are called push strategy and pull strategy.

- **Push System:** The push strategy of inventory management involves forecasting inventory that needs to meet customer demand. It is based on the principle of manufacturing as per the forecasted demand. In this strategy, the company forecast the demand based on past data, market trends and competitor analysis, then the forecasted quantity is produced. Then the produced product is available in the market for sale or they push the product into the market.
- **Pull Strategy:** The pull system of inventory management involves working as per the customer's order. As per this strategy, companies only make enough products to fulfil customer's order. Hence, based on the customer/ orders pulled towards the company, the manufacturing happens.



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Fig. 1.17 Push Vs Pull

The major disadvantage of the push strategy are that many a times, the wrong forecast leads to huge inventory and the cost per product increases. This disadvantage is overcome by the pull strategy, where the manufacturing happens only as per the required demand and there is hardly any inventory to be stocked. This reduces the overall cost of the product. The only advantage of this strategy is that the company is assured that it will have enough products at any point of time to meet the demand and will be able to prevent the inability to meet the customer's demand. Whereas, in case of pull strategy, the company at any point of time could run into the challenge of meeting demand; For example, if suppliers are not able to meet the demand on time. In order to keep per unit cost under control, it is important to control the level of inventory. Concepts like lean manufacturing and Just-In-Time (JIT) are the ways by which the companies are trying to lower their inventory level in the supply chain management to keep the production optimized.

1.6.1 Just-In-Time (JIT)

Just-In-Time (JIT) is a manufacturing philosophy based on manufacturing as per the order received by the customer. It is a philosophy of reducing and eliminating wastes. Here waste is any non-value adding activity. The seven types of waste of

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the manufacturing process are waste from overproduction, processing waste, waste of waiting time, waste of motion, transportation waste, waste from product defects and inventory waste.



Fig. 1.18 Inventory Cycle for Traditional and JIT for One Product

Logistics and JIT

Since JIT requires negligible inventory, the logistics has to be extra proactive. As the reduced inventory increases pressure on logistics, the system needs to work with maximum efficiency. The communication between various vendors, suppliers and other channel partners had to be very open, and at the same time, these vendors and suppliers should be flexible with the delivery of the product.

Logistics has to be very careful in vendor selection, order preparation, supply chain management, warehousing and inventory management. The size of the safety stock should be determined carefully. Logistics should ensure that sufficient warehouse capacity is available to the place where the goods are required to be stopped or have to be stored or are temporary waiting for the transportation or waiting for distribution.

As JIT is based on the principle of waste elimination, the logistics should also try to eliminate those activities considered to be waste. Activities like excessive time in the order processing can be eliminated by speeding up the process of picking up orders and processing them, else these can be automated to make it faster. This may also help in reducing the error. The other waste elimination could be in the transportation route and time. Logistics should consider the fastest and the most economical route for the goods transport and the reverse logistics should also be speeded up.

Tracking the container and keeping a check on the timeline is another task that logistics has to perform more religiously in the JIT then in the push strategy. They have to ensure that the materials are available the moment they are required and the waiting time in the warehouse is less and so there is more inventory in circulation. The freight forward has to be proactive and must respect the delivery deadlines.

1.6.2 Kanban (A scheduling system for lean inventory)

Kanban is a visual system for managing work as it moves through a process. It is a visual signal that is used to trigger an action. It is a Japanese word and it means 'card you can see'. It visualizes both the process (the workflow) and the actual work passing through that process.



Kanban:

It is a Japanese manufacturing system in which the supply of components is regulated through the use of an instruction card sent along the production line.

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The purpose of creating Kanban was to manage the work and control the inventory at every stage of the production. It aims to identify the potential bottlenecks in the process and fix them.

At its simplest, Kanban is a card with an inventory number that's attached to a part. These cards could be in the form of signboards, instructional cards or visible cards. These cards display the status of inventory and production. Any bottleneck in the process is clearly visible and hence can be resolved quickly.



Fig. 1.19 Kanban System

These visual cards indicate the level of inventory or the product in the process. When the stock reached to the re-order point, the employees take the card to the manager who places the order and the stocks are replenished. It is a pull-based system and depends upon the demand.

There are six generally accepted rules for Kanban. These are as follows:

- Upstream processes may only send items downstream in the precise amounts and sequences specified by the Kanban.
- Downstream processes may only withdraw items in the precise amounts specified on the Kanban.
- No items are made or moved without a Kanban.
- Do not send defective products to the subsequent process.
- A Kanban must accompany each item at all times.
- The number of Kanbans should be monitored carefully to reveal problems and opportunities for improvement.

Logistics and Kanban

Kanban cannot be maintained in any organization without strong logistics support. Logistics needs to be integrated with Kanban. Logistics needs to work as per the Kanban signals and all the upstream and the downstream logistics is to be managed accordingly. In the Kanban system, demand is predictable and lead time is short. Materials, products and components can be ordered in precise quantity (as per demand) but the process should be completed faster. Logistics as a Support/ Interface/Enabler of Production Function

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1.6.3 Vendor Managed Inventory (VMI)

Vendor Managed Inventory or VMI is an inventory management technique in which the manufacturer is responsible for optimizing the inventory level of the distributor. The manufacture has the access to the distributor's data and is responsible for producing purchase orders. In this case, the supplier or the manufacture assumes the role of inventory planning for their customer. But this requires extensive information sharing between the two parties. It can be made operational only when the supplier or the manufacturer maintains a high degree of visibility of its goods at the customer's location.

In a VMI system, the customer does not have to place the order. It is the responsibility of the supplier to replenish the stock when it reaches an appropriate level. The various ways to manage VMI are as follows:

- **Replenish upon visit:** Vendor may show up at the customer's place and physically review the inventory level. After the review, inventory is replenished with the inventory bought by the vendor. It is a form of physical stocking of the goods at the shelves.
- Visit and place replenishment order: The other way to manage VMI could be that the vendor may show up at the customer's place and physically review the inventory level. After the review, he/ she place an order for the replenishment of the inventory; the order is delivered later. Depending upon the methods of delivery, the vendor may do the restocking himself/ herself or put it down for the customer to do it.



Fig. 1.20 Ways to Manage VMI

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- **Interval Update:** The third way to manage the inventory level is that the customer provides the daily/weekly update to the vendor about the inventory level. The vendor reviews the level and accordingly plans replenishment. The replenishment orders are shipped and once it is delivered, the customer replenishes it on his own.
- Access to Inventory System: In the era of technology, where most of the factions are supported by technology, the customer can connect its inventory system with software solutions like Enterprise Resource Planning and give direct access to it to the vendor. Doing this enables the vendor to get real time information on inventory and can make the replenishment based on the data and ship the orders to the customers. This saves time as no representative is required to visit for the status of the inventory and no information is to be sent.
- **Onsite Support:** In many cases where the companies do not want to give access to the data, the vendor provides full time employee to the customer, who keeps a track of the inventory and plans the replenishment.
- Lease Warehouse Space: In few cases, the vendor may lease space within the customer's facility and run their own warehouse from it. This can help them in planning the replenishment for the customer in a faster pace.

Both vendor and firm play a great role in making VMI successful. It requires lots of cooperation and understanding between both the parties. The VMI for Vendors and Manufacturer is discussed in detail below:

Vendor Managed Inventory (VMI) for Vendors

The benefits of VMI for vendors are as follows:

- Since the supplier manages the replenishment of the inventory, the vendor does not have to worry about re-order of the stock.
- The vendor will not run out of the stock, as stocks are replenished regularly.
- As there is less number of stocks, the cost of keeping the inventory will be less for the vendor.
- Vendor is saved form the last minute planning of ordering the goods.

Vendor Managed Inventory (VMI) for the firm

The benefits of VMI for suppliers are as follows:

- Since the supplier has an idea about the vendor's inventory, it can predict the demand and accordingly, plan its manufacturing.
- Since the manufacturer keeps a track on the demand, the inventory to be kept reduces and so is the cost of carrying it.
- In the light of the demand, the manufacturer/ firm can plan its production and operations more efficiently.
- Better customer satisfaction will lead to better vendor firm relationship and will reduce the switching cost.
- Knowledge of inventory required by the vendor will help the firm manage the raw material and downstream supply better.

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How to make VMI work

In order to make VMI successful, the following points should be considered:

- Method of sharing information: VMI will be successful only when both the vendor and the firm agree to share necessary information for the restocking of the goods. Though confidential information can be retained with the vendor, the basic information necessary to calculate the inventory should be shared.
- Clear expectations: Both the party should have clear information about the benefit of the sharing information. They should be aware well in advance what will be shared and what will not be. If there is any conflict, it can be worked upon and both the parties should be assured that things will look better in long run.
- Mode of Sharing: To make VMI successful, it is very important that both the party agree upon the mode of information sharing. They should agree upon what will be shared, how frequently it will be shared. The customer should agree to provide production schedule or sales schedule so that the supplier can forecast the demand of good and material.
- Communication: There should be open communication between both the parties involved. They should understand their need and goal and discus the way to realize it. They should also learn from the past mistakes and try to avoid the repeated problems in future. It is the failure to communicate which is the most prominent reason for the failure of VMI.

1.7 SUMMARY

Some of the important concepts discussed in this unit are:

- Logistics is understood as planning, execution, and control of the procurement, movement, and stationing of materials, personnel, and other resources to achieve the objectives of the organization.
- It is now an industry and the global logistic sector is growing and expected to be over USD 15.5 trillion by 2023.
- The scope of logistics management is spread across the inbound and the outbound logistics. The proper management of inbound logistics requires a continuous and constant interface with the suppliers whereas the management of outbound logistics requires a continuous and constant interface with the transport operators and channels of distributions.
- The key activities of logistics include customer service standards, transportation, information flow and order processing and inventory management.
- · Logistics support activities can be defined as those activities that are not related to the process of logistics but add value to the logistics management and allow the operations of the process more efficiently and effectively.
- The system of logistics management can be viewed as a mean by which the needs of the customers are satisfied through the co-ordination of the materials and information flows that extend from the marketplace, through the firm and its operations and beyond that to suppliers.

Check Your Progress

- 6. Define demand forecasting.
- 7. What are the different modes available for the movement of goods?
- What does the pull system of inventory management entail?
- List one disadvantage of the push strategy.
- 10. What is VMI?

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- Logistics management helps in providing timely delivery of materials and parts from the suppliers to plant. It also ensures delivery of the manufactured goods to the immediate customer. Activities like order processing, inbound transport, purchase, inventory management, warehouse management, distribution and delivery transport, feedback and response management etc., are part of the logistics management.
- Logistics acts as enabler, support and interface in the production and operations of an organization. What started as a support function for keeping the army in the field, fighting a war is now being used for keeping the companies lean and cost efficient.
- Procurement cannot happen in isolation, an entire chain of logistics and supply chain is involved in to it. It requires a dedicated logistics team to manage purchasing, shipping, organizing and storing the various materials at the procurement warehouse.
- Transportation modes like sea freight, air freight, surface transport like rail, truck, etc. are available for the movement of goods. The logistics has to identify the most appropriate mode of transportation for materials.
- The entire logistics operations, involves set of standardized documentation from seller and buyer. Also as per the accounting practices followed in the organization, detail documents of purchase are required as per the bookkeeping practices and norms.
- Logistics management plays a very crucial role in optimizing this production function. Logistics can help the production function in optimization by managing the inventory and providing the required material to the suppliers and customers as per demand.

1.8 ANSWERS TO 'CHECK YOUR PROGRESS'

- 1. Logistics can be defined as the planning, execution, and control of the procurement, movement, and stationing of materials, personnel, and other resources to achieve the objectives of the organization.
- 2. The purpose of inventory management is to keep a check on the cost of holding inventory and, at the same time, not to compromise with the service level.
- 3. Logistics management as a process includes five stakeholders: suppliers, procurement, operations, distributions and customers.
- 4. The logistics support functions can be categorized into three main categories:
 - Support function of procurement
 - Support function for vendor facilitation
 - Support function for production
- 5. Vendors can be defined as businesses or individual that sells products to another business or individual.
- 6. Demand forecasting can be defined as the process of predicting the future demand for the product of the company.
- 7. Transportation modes like sea freight, air freight, surface transport like rail, truck, etc. are available for the movement of goods.

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- 8. The pull system of inventory management involves working as per the customer's order.
- 9. The major disadvantage of the push strategy are that many a times, the wrong forecast leads to huge inventory and the cost per product increases.
- 10. Vendor Managed Inventory or VMI is an inventory management technique in which the manufacturer is responsible for optimizing the inventory level of the distributor.

1.9 QUESTIONS AND EXERCISES

Short-Answer Questions

- 1. What are the major responsibilities of the vendor?
- 2. What is the scope of logistics management?
- 3. What role does logistics play in a manufacturing organization?
- 4. What activities do the procurement process include?
- 5. List the role of documentation in the logistics operations.

Long-Answer Questions

- 1. Describe the major logistics activities.
- 2. Explain in detail about main objectives of logistics management.
- 3. Explain the evolution of logistics management.
- 4. Discuss the various steps that are needed to be taken in tracking inward shipments.
- 5. Analyze the benefits of the VMI system for suppliers and vendors.

UNIT 2 LOGISTICS AS A SUPPORT/ INTERFACE/ENABLER OF MARKETING FUNCTION

Structure

- 2.0 Introduction
- 2.1 Unit Objectives
- 2.2 Marketing Logistics: An Introduction
 - 2.2.1 Significance of Marketing Logistics
 - 2.2.2 Objectives of Marketing Logistics
- 2.3 Function of Marketing Logistics
 - 2.3.1 Logistics as a Support Function
 - 2.3.2 Order Fulfilment Function
 - 2.3.3 Strategies Toward Perfect Order Fulfilment
- 2.4 Assembling and Labeling From Multi-Storage Points
 - 2.4.1 Assembling
 - 2.4.2 Labelling
- 2.5 Consignment Convergence/Divergence and Delivery
- 2.6 Logistics as an Interface of Market Forecasting
- 2.7 Stock Level Management
 - 2.7.1 Types of Stock
 - 2.7.2 Stock Level
- 2.8 Invoice or Sales Documentation
- 2.9 Picking Materials
- 2.10 Consolidation and its Significance
- 2.11 Packing: Types and Functions
- 2.12 Marking: Types and Significance
- 2.13 Preparing Outbound
- 2.14 Documentation and Shipping
- 2.15 Customer Facilitation
- 2.16 Tracking Outbound Shipments
- 2.17 Summary
- 2.18 Answers to 'Check Your Progress'
- 2.19 Questions and Exercises

2.0 INTRODUCTION

Logistics is not only a planning process of efficient and effective storage of raw materials, material inventory, inventory of finished goods and services, but also the implementation of all the planned activities. It also refers to the flow and transportation of product from the warehouse to the consumer. Marketing logistics or physical distribution has been described as planning, implementing and controlling the process of physical flow of materials and final products from the point of the origin to the point of the use in order to meet a customer's needs, as well as earn a profit. In this unit, we will study about various aspects of marketing logistics.

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Marketing **Logistics:** It refers to the process of managing the flow of raw materials and finished goods from the source of supply to the end-users.

UNIT OBJECTIVES 2.1

After going through this unit, you will be able to:

- Define marketing logistics, its components and process
- Understand the support, enabler and interface function of marketing logistic
- · Know about market forecasting, stock-level management, invoice or sales documentation
- Elabourate picking materials, consolidation, packing, marking and preparing outbound documentation and shipping
- Explain customer facilitation
- List the ways to track out-bound shipments
- 2.2 MARKETING LOGISTICS: AN **INTRODUCTION**

Marketing logistics is the art of managing the flow of raw materials and finished goods from the source of supply to the end-users. It primarily involves management of movement of goods from the point of manufacturing to the consumer or movement of raw material from the source of supply to the opening of production line. Various activities involved in marketing logistics are transportation, inventory control, warehousing, order processing and information monitoring.

Earlier, marketing and logistics were considered two different functional areas. The reason for it was that logistics was more related to transportation and warehousing. The route of the goods transported, information management of the goods in transit, and so on, were not related to the product, price, and promotion strategy of the marketing. With growth in competition, companies started looking out for the ways to reduce the cost of the product and, at the same time, provide right product to the right customer in the shortest possible time at the best cost. This led to the establishment of more connecting link between marketing and logistics and the emergence of marketing logistics.



Fig 2.1 Evolution of Marketing of Logistics

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2.2.1 Significance of Marketing Logistics

Marketing logistics forms a crucial part of the marketing task. In the past, the role of logistics was to provide low cost solutions for the movements of goods, but nowadays, the focus is on satisfying consumer demand. The products are made at a different place and consumed at a different place. There are very few products that are completely consumed at the point of manufacturing and do not require any logistics activity. Hence most of the products are required to be carried to the place of consumption, require storage and warehousing facility, are to be distributed to the place of consumption. Thus, marketing logistics become more important. It is marketing logistics that confers place-utility and time-utility to a product by making it available at the right place and at the right time for the consumer and thus maximizing its chances of buying by the consumers.

Whenever production locations and markets are distanced, logistics marketing is more crucial. Factors like proximity to market and raw materials, labour cost or technological factors lead to the establishment of point of production far from the point of consumption. In all such cases, logistics marketing becomes more important.

There are many products that can be produced round the year but has seasonal demand. Then there are products for which the demand is round the year but they are available in a particular season only. For all such kind of products, marketing logistics is more important. It is marketing logistics that determines customer service level to a great extinct, hence it acts as a tool for developing clientele for the product.

2.2.2 Objectives of Marketing Logistics

The objective of marketing logistics is to ensure the steady flow of material between the buyer and the seller in a manner that consists of the following essentials for the consumer. These are:

- · The right products
- At right places
- In right quantities and assortments
- At the right time
- In the right condition
- At right cost/price

2.3 FUNCTION OF MARKETING LOGISTICS

The major functions of marketing logistics encompasses product delivery, price decisions, promotion decisions and supply of goods to the place of consumption.

1. **Product delivery**: One of the function of logistics is to find out who your customers are and how to ensure the delivery of the products to these customer. Based on the needs of the customer, logistics providers have to individualize the services. The goal of the product delivery should be to ensure timely delivery to precise locations as per the invoicing and all these to be achieved without any damage.

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Check Your Progress

- 1. Define marketing logistics.
- 2. What is the focus of logistics?

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- **2. Price**: The price function of marketing logistics includes logistics planning based on pricing drivers. Factors like profile of customer, type of products, and type of order are considered while planning logistics. Factors like shipping-costs based on the size, weight and distance to be travelled, labour cost, type of material, manufacturing cost, etc. also affect the overall pricing.
- 3. **Promotion**: Another important aspect of marketing logistics is promotion. When a company is planning to bring a product to the market, it must coordinate with the logistics of various promotional materials.
- 4. **Place**: The place function of marketing logistics ensures that the products are delivered to the customer at a place of his choice while keeping customer away from the complexities of the logistics.

The entire functions of marketing logistics can be divided into following three categories:

- 1. Support function
- 2. Interface function
- 3. Enabler of marketing function



Fig 2.2 Functions of Marketing Logistics

2.3.1 Logistics as a Support Function

Logistics is viewed as a tool that links an organization with its consumers and suppliers. It helps in gathering information from and about customers in the form of orders, sales activity and forecasted demand and translates this information into manufacturing and purchasing plan. The job is not over at this stage, further value addition happens during manufacturing in the form of inventory flow and supply of finished products to the customer. Hence, the whole process can be viewed as two interconnected activities—inventory flow and information flow. The inventory flow consists of procurement, manufacturing support and physical distribution, whereas the information flow integrates the three operating areas by planning and coordinating flow of information.



Fig 2.3 Logistics as a Support Function

2.3.2 Order Fulfilment Function

Order fulfilment is a key process in logistics and supply chain management. Filling customer order efficiently and effectively is a crucial step in providing customer service. Various steps involved in order fulfilment are: generating orders, filling orders, delivering orders and serving customer order. Every industry designs a network and a fulfilment process that take care of the customer requirements and company requirements. Irrespective of the kind of industry or its order fulfilment process, there is one thing which is common and that is: every customer wants a faster logistics service.



Fig 2.4 Order Fulfilment Process

- Generating Orders: The first stage of the order fulfilment is the generation of the order. The customer places the order to the company. The company after receiving the same, confirms it. Once the confirmation is being done, the payment of the order is being made (Or the payment conditions are agreed upon by both the parties) and the order is processed for the next stage.
- **Filling Orders**: The next stage after the generating the order is filling the order. The item to be delivered is taken out form the stock or from the suppliers and the same is then packed for delivery to the customer.
- **Delivering Orders**: The packed order is sent to the supply chain solutionprovider for delivering it to the customer. If the order is a pre-paid order (the order for which the payment is already made), it is delivered to the customer; if it is cash on delivery kind of order, and it is delivered after taking the payments.
- Serving Customer Order: The delivery of the order to the customer is not the end of the order fulfilment process. The logistics service provider also

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manages return and refunds of the orders. If the product is covered under warranty, the return and replacement of the order are also managed by logistics department.

The various challenges which are required to be overcome to streamline the order fulfilment process are:

- Maintaining customer satisfaction: Customer expectations are rising day by day; they want the best product to be delivered to them in the shortest possible time. Not only this, the features of the products should be in line with the information available. The company should ensure that complete information is available to the consumer and if required additional information could be provided.
- Order management complexity: Managing the order fulfilment process is not child's play. It requires coordination and sharing of information at each and every stage. Small information missed at any point could prove fatal for the company.
- **Inaccurate order processing date**: The availability of the stock and processing of the information together should be able to show or indicate the correct order processing date. If due to any reason, this date is not accurate, the customer dissatisfaction can arise.
- Escalating supply chain and IT: Due to tough competitions and customer expectations, companies are forced to arrange supply chain arrangements in the shortest possible time. This leads to increase in the cost of supply chain. Also a huge investment is required for Information Technology (IT) solutions for safety, security and tracking of the goods.
- **Demand Forecasting**: Another challenge of managing order fulfilment is managing inventory. Based on the demand forecasted, the inventories are managed. If the inventory is not decided appropriately, either pending orders with no stock or accumulation of goods without any order will happen and neither is good for the company. Hence it is important to forecast demand appropriately.

2.3.3 Strategies toward Perfect Order Fulfilment

While there are lots of challenges in order fulfilment, a few of the strategies that can help in better management of order fulfilment are as follows:

- (a) Accurate Demand Sensing and Shaping: Better demand management is the first step towards order fulfilment. Demand shaping and demand sensing are the two capabilities that organizations can use for better demand management. It is done by analyzing the past demand data and clubbing it along with seasonal factors, kind of customer, purchasing capability, service level required and level of the demand.
- (b) Global Order Promising (GOP): In order to meet the customer and consumer expectations, organizations across the world are required to improve the reliability and accuracy of their promises to customers and manage their commitment. But it is very difficult to identify which part of the system is causing the delay. Global Order Promising addresses this issue by helping companies make reliable quick delivery promises. This technology, by

combining real-time data-driven processes and logistics constraints, helps companies plan reliable and profitable promising processes which, in turn, improve customer service levels. All customer-related issues can be addressed on the basis of 'available to promise' to 'capable to promise' to 'profitable to promise.'

(c) Global Distributed Order Orchestration and Fulfilment: The complexity of receiving and managing the order is the biggest challenge for logistics companies. There are number of factors that contribute to this; one of this is poor integration among various units. With the help of global distributed order orchestration and fulfilment, companies are able to apply enterprise-wide rules and processes, and identify and rectify problems before they become an issue for customers.

All these strategies help in managing order fulfilment.

2.4 ASSEMBLING AND LABELING FROM MULTI-STORAGE POINTS

Let us now understand assembling.

2.4.1 Assembling

Most of the marketing logistics activities are centred on establishing a supply chain and distribution network that optimize the pace of making the product available to the consumer or customer. For this they need to work from the starting point of physical distribution, i.e., receiving a customer's orders. As discussed earlier, this order should be processed in the shortest possible time but this itself is not sufficient, logistics should ensure that not only the right product but a product in the best possible physical state reaches the customer. Here comes the role of assembling and labelling services. The customer may not look for a single product or the company might be selling a bundle of products. In such a scenario, the logistics provider is required to assemble the bundled product or customize the product as per the order at the warehouse and then ship it to the customer. Bulk items are stored in the warehouse and based on the order placed, the logistics provider assembles the order. There are instances where the manufacturer offers joint products (either of its own or along with some other partner) either for promotion or for cost optimization. In this case as well the logistics partners have to assemble and prepare a kit containing ordered products before it is shipped.

Benefit of Assembling Services

The benefits of assembling services are as follows:

- Assembly services provided at the warehouse helps the manufacturer keep their manufacturing cost low, and at the same time, give marketing scope to promote and sell the product in a different configuration.
- It also helps companies to keep lower inventory of finished goods and hence lower inventory cost.
- Another benefit of delaying the assembly till the final order arrives is that companies do not have to stock the product which is not in demand. This helps in profit maximization.

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Check Your Progress

- List the major functions of marketing logistics.
- 4. Why is order fulfilment a key process in logistics and supply chain management?
- 5. What do you mean by Global Order Promising (GOP)?

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Shelf life: It refers to the length of time for which an item remains usable, fit for consumption, or saleable.

2.4.2 Labelling

A label can be defined as a piece of paper, cloth, plastic, metal or other material affix on a container or packet and contains written or printed information about product. Various information available on labels includes:

- **Manufacturer/ Brand Name**: The label contains information about the manufacturer or the brand. The role of logistics in labelling becomes more important in case the same product is to be shipped under different labels, mostly in case of mass manufacturing where the manufacturer is providing services to more than one company or brand. Examples: Clothes or apparels, car accessories, machine parts, etc.
- **Shelf Life**: The label should also display the shelf life of the product. In case the product is assembled at the warehouse, the role of logistics provider is to indicate the shelf life as per the prescribed guideline of the manufacturer.
- Nature of material (Breakable/ Poisons/ flammable, etc.): The nature of material, like hazardous, breakable/ flammable or poisonous, etc., has to be displayed on the packet shipped by the logistics.
- Environmental advice (How to or not to destroy the product): Environmental advice related to loading, unloading, handling, discarding the external package, recycling, etc., should be displayed on the packet.
- **Point of origin**: Information about the point of origin or the manufacturing site should also be there on the label provided on the packet. The role of logistics becomes more important in case the manufacturer is mass customizer and deals with many companies for their product solutions.
- **Installation information**: The installation information is also to be provided on the label of the packet. If the logistics involves shipping the product to customers of different countries, then country-specific installation information should be provided.
- Use of product information: Another information which is available is the product usage information. In case the logistics provider is assembling the product, it has to insure that this information forms a part of the package or label.
- **Product code, batch number**: Another very important labelling information is the product code and information about the batch number. This helps in tracking the product on its way to customer and final delivery. Also, in case the product requires return, this information helps in financial settlement.
- Advertising information like recipe: Labelling also acts as a means of advertising.
- Mailing labels like address of the receiver, address for return, contact person information help in shipping the product to the right customer and managing refund or return.

Benefit of Labelling

The benefits of labelling are as follows:

- It acts as a tool of marketing and can help in attracting potential buyers.
- It helps in identifying brand.

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- It helps in tracking the product.
- It helps in managing shipping of the product to the right customer.
- Reduces breakage and damage by providing appropriate information for transport.
- Reduces return frequency by providing guidance for installation and usage.
- Increases customer satisfaction as the labelling information on customer care helps the customer to contact customer care centre in case of need.
- The return instructions also help in increasing the customer satisfaction, as the customer becomes aware about how to return the product in case of dissatisfaction.
- Labelling may also include security printing that helps in identifying whether the package and contents are counterfeit or not.

The services of assembling and labelling are provided by the logistics companies to optimize the cost and build customer satisfaction. It is a very important aspect of marketing logistics as along with building customer satisfaction, it helps in marketing communication and brand building.

2.5 CONSIGNMENT CONVERGENCE/ DIVERGENCE AND DELIVERY

Logistics providers are expected to offer a quick and reasonably priced delivery service to the customer. The increase in the customer expectations and the strict timelines of delivery have made the situation more challenging for the logistics. The delivery planning process consists of six steps:

- **1. Plan Process Input**: It involves arrangements of product/products to be delivered along with their packaging and labelling for transportation.
- **2. Resource Availability**: Once the packaging and the labelling are done, the carriage is arranged for shipping the product to the customer.
- **3. Route Planning**: Based on the available transport resources, the optimal one is selected based on the route to be followed by the vehicle. Many a time, the reverse is done, i.e., based on the consignment to be delivered or picked, the route of the vehicle is determined. The aim is to minimize the cost of transportation and avoid damage or breakage of the product during shipping.



Fig 2.5 Delivery Planning

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Check Your Progress

- How does assembling provide a crucial role for the logistics provider?
- List some benefits of assembling services.
- 8. What do you mean by labelling?
- Make a list of information available on labels.

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- **4. Assignment**: After the route decisions are taken, the product is assigned to the selected vehicle for delivery or pickup.
- **5. Dispatch and Follow-up**: The goods are dispatched as per the plan and a follow up is maintained by the company to track the status of consignment.
- **6. Management Reporting**: Once the delivery or pickup is complete, the same is communicated to the organization.

Marketing logistics supports the marketing functions by the following ways:

- 1. Providing the products in the shortest possible time
- 2. Keeping the customer informed about the status of delivery by providing product tracking facility and update on the delivery routes
- 3. By adhering to the timeline promised by the marketer, it helps in realizing the marketing function of the organization
- 4. Delivery flexibility should be like:
 - Preferred time delivery
 - Sunday delivery
 - Evening delivery
 - Deliver as per the time selected by the customer

These are the facilities that help building customer satisfaction and achieving marketing objectives.

- 5. Logistics also supports marketing by providing product related information like status of order, way to return, transit information, etc., to the customer.
- 6. Another area where it helps in convergence and delivery is: Generating return request, managing return and reverse logistics.

All these facilities help in consignment convergence/divergence and delivery.

2.6 LOGISTICS AS AN INTERFACE OF MARKET FORECASTING

Based on the demand of the product in the market, logistics arranges for order processing, dispatch and delivery of the goods. In case where the products are 'Make to Order' kind, the marketing logistics also arrange for the assembly and packaging and labelling facilities. Depending upon the demand, the container and pallets are arranged by the logistics provider.

Logistics with the help of customer relationship management, customer service management, order fulfilment, manufacturing flow management, supplier relations hip management, product development and commercialization and return management helps in forecasting demand and understanding the market. It provides valuable customer information so that marketing and sales activities can be planned. The following details on customer are needed:

- How much have they ordered in the past?
- What had been supplied to them?
- How had it been made available to them?
- Which products are preferred in bundles and which are separately ordered?

- How many customer have asked for the return services?
- What are the products frequently returned or replaced?



Source: Adapted from Keely L. Croxton, Sebastián J. García-Dastugue, Douglas M. Lambert, and Dale S. Rogers, "The Supply Chain Management Processes," *The International Journal of Logistics Management*, Vol. 12, No. 2 (2001), p. 19.

Fig 2.6 Demand Management

The demand management process has both strategic and operational elements. In case of strategic sub-processes, the team establishes a structure for managing the process and in case of operational sub-processes; the measures are taken to actualize the demand management. The strategic sub- processes are comprised of six sub-processes that are aimed at designing an efficient operational system for matching supply and demand. The information provided by logistics on customer demand and pattern helps in determining the demand and executing the same at the operational level.

2.7 STOCK LEVEL MANAGEMENT

Nowadays, companies are becoming more and more concerned about maintaining an optimal level of goods and parts to take care of demand. One of the way to do it is to define 'stock management' strategies. **Stock management** can be defined as the process of understanding the stock mix of a company and their demand.

2.7.1 Types of Stock

There are mainly four types of stocks. They are as follows:

- 1. Raw materials and components (used in production)
- 2. Work in progress (unfinished goods in production)



Stock management: It refers to the process of understanding the stock mix of a company and their demand.

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- 3. Finished goods (ready for sale)
- 4. Consumables (fuel, stationery, etc.)

How much quantity of these should be kept depends upon the size and the nature of the business. Both excess and stock out of the product are harmful for the organization.

The advantages and disadvantages of keeping a huge stock are as follows:

Advantages

- Economy of Scale: If the goods are bought or manufactured in large quantity, the cost per unit is low as compared to the cost when the quantity is low. Hence storing huge quantity helps in achieving economy of scale.
- Low management costs: When stocked or produced in bulk, the management cost is low.
- Never run out: Managing huge stock ensures that company is never out of goods.

Disadvantages

- **Higher storage and insurance costs**: The cost of storage and insurance is very high.
- Not good for perishable goods: Keeping a huge stock of perishable goods is not advisable for perishable goods as they may not be required in that quantity and would lead to the wastage of money.
- Stock may be come out of date before it is used: If the stocks are not sold in time, they may become outdated.

At the same time, if the companies keep a low stock, it has its own set of advantages and disadvantages.

The advantages and disadvantages of keeping low stock are as follows:

Advantages

- Lower storage costs as there are fewer products to be stored. Hence, they require less space and insurance cost will also be less.
- Up-to-date products can be kept and made available to the customer.

Disadvantages

- There is always a risk of running out of stock.
- There are frequent reorders and hence the cost of meeting stock level becomes expensive and complicated.
- It increases the dependency of the company on the suppliers.

Thus, stock management is necessary to streamline the functioning of the organization.

2.7.2 Stock Level

In order to manage stocks, companies define their minimum stock level, maximum stock level and re-order point.

- **Minimum Stock Level:** The minimum quantity of material that should be maintained and made available at any point of time is called minimum stock level. This level is maintained to avoid shortage of goods.
- **Maximum stock level:** The maximum quantity of the product that should be made available at any point of time is called maximum stock level. This level is fixed to avoid overstocking of the product.
- **Re-order point:** The level of material at which the new order should be placed is called re-order point. Based on the past demand and supply trend and lead time of the product, the re-order point is decided. It is somewhere between the minimum and the maximum stock level. The moment the quantity of stock goes at or below the reorder point, new orders are placed.

The information like past ordering trend by the customer or consumers, the demand pattern and the forecasted demand value are used for determining the stock level. Companies also keep safety stock to take care of unpredicted demand.

Information provided by logistics is in the form of:

- 1. Delivery and supplier notes for incoming goods
- 2. Requisitions and issue notes for outgoing goods
- 3. Purchase orders received
- 4. Receipts and credit notes and
- 5. Return notes

These help organization to determine their stock level and manage stocks.

2.8 INVOICE OR SALES DOCUMENTATION

The entire logistics operations involves a set of standardized documentation from seller and buyer. In addition, as per the accounting practices followed in the organization, detail documents of purchase are required as per the book-keeping practices and norms.

Sales documents are business documents related to the sales of goods or services. It includes contract notes, invoices, bills, notes, receipt issued by seller and settlement notes. The following information are contained on a sales note:

- Date of documentation
- Serial number or order number of the document
- Name of seller and its organization number
- Name of buyer and address of his/her organization
- Organization number of buyer and seller (If any)
- A clear description of the goods or service
- Time and place of delivery of the goods/service
- Nature and scope of the goods/service provided
- Remuneration and due date for payment
- Detail of taxes

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- 10. Define stock management.
- 11. List a few advantages and disadvantages
 - of keeping low stock.

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Purpose of a Sales Invoice

It is written documentation for the transaction of goods and services and protects the right of buyer and seller. The major purpose of a sales invoice are as follows:

- **1. Record Keeping:** Its basic function is to keep record of all transactions. It provides a way to track the date on which the order was placed, the amount paid, number of units sold, price of each unit, outstanding debt if any. It also provides information about the person who made the sales and the customer to whom the sales was made.
- **2.** Tax Purposes: For tax purpose, it is important to have a record of all sales transaction. The sales document helps in keeping that record. It helps the company in filing taxes and avoiding audits.
- **3. Marketing:** The information like date of sales, quantity of product being sold, and price of product help the organizations to identify the demand trend of the product and accordingly plan their marketing strategies.



Fig 2.7 Purpose of a Sales Invoice

4. Legal: It also protects business owners from fraudulent or petty civil lawsuits. The sales documents indicate that a particular good or service was provided on certain terms and conditions at a point of time. The signature of the customer on the sales documents indicates that there was an agreement between the buyer and the seller for the mentioned product and sales was made. It acts as evidence in the court of law and protects the right of buyer and seller.

Since all the details pertaining to the sales of the product like order processing, order management, shipment, distribution of goods to the customer, receipt of the order by the customer, details of return and refund are laying with the logistics, the same helps in providing these documents to the purchase department which maintains the record of all such documents for future purpose. These documents also help in identifying the demand, as the details about the quantity of goods sold can form a firm base for forecasting future demand. It also helps marketing to get information related to the price at which the products were sold and helps in fixing future pricing strategies. The details of the returns and replacements help in identifying the possible causes of return and replacement and help in product development.

2.9 PICKING MATERIALS

Physical selection of product in a specified quantity which forms a location after receiving the customer's order is called order picking. The different methods of order picking are as follows:

- **Piece picking:** In this method the order picker moves to collect the products necessary for one order.
- **Zone picking**: Each order picker is assigned a specific zone and will only realise order picking within this zone.
- **Batch picking**: An order picker is assigned and picks multiple orders simultaneously, minimizing trips to each location.
- Wave picking: A variation of zone and batch picking. Rather than orders moving from one zone to the next for picking, all zones are picked at the same time and the items are later sorted and consolidated into individual orders/ shipments.
- **Pick to box method:** The operator fills the box with the items on a customer and the warehouse management system directs the operator to pick the units from the stock keeping units into a storage bin or transportation box. The box moves to the picking zones until the customer order is complete and it is then ready for shipment to the customer.

All strategies are not equally good for all the organizations, hence it is important to identify the strategy that is good for one's organization. The following points can help in identifying the kind of picking strategy that suits the organization:

- Characteristics of product being handled
- Type of organization
- Total number of transactions and orders
- Quantity of pick
- Picks per order
- Picks per SKU
- Total number of SKUs
- Whether you are handling piece pick, case pick, or full-pallet loads

Sometimes, a combination of picking methods is required to handle diverse product and order characteristics. Defining the picking processes has become an important part of the supply chain process. As the order picking process involves significant cost and can affect customer satisfaction levels, there have been increasing numbers of process improvements proposed to help companies with this supply chain issue. Strategies like minimum touch during the picking process and error-proof picking system help in increasing customer satisfaction.

2.10 CONSOLIDATION AND ITS SIGNIFICANCE

The way production and manufacturing achieve economies of scale by producing in bulk, the economies of scale in logistics is achieved by **consolidation**. The process of combining multiple orders into one tracking number is called consolidation. Though

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Consolidation: It refers to the process of combining multiple orders into one tracking number.

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all the items are delivered in their original packaging, they are shipped under one tracking number and are delivered together.



Fig 2.8 Consolidation

In consolidation, smaller packages are grouped together and are shipped as a single order. These packages are separated at the destination and are handed over to the individual consignment for delivery.

Companies are discouraged to send smaller packages or smaller quantities by price penalties and delivery schedule. Logistics companies pick up materials from various companies to the transit point and at the trans-shipment point these packages are resorted and consolidated for in-bound delivery.

Problem with Working Alone

There is not only the cost of transportation that is involved when goods are shipped, there are other factors that also add up to the final cost of the product. Questions like the ones given below are needed:

- Where is the shipment going?
- What kind of vehicle will be used?
- What is the background of the driver?
- How much space will the product occupy?
- What are the other available options of transportation?
- What will the fuel cost?
- What will be the cost of insurance?
- When will the shipment be leaving for the customer?
- In which city it is supposed to go?

All these question are required to be given due consideration while deciding to ship the product all alone.

Consolidation provides benefit over alone shipping in the following manner:

- It helps in reducing the cost of shipping the goods.
- It also helps in reducing time constraints on each shipment.
- It also helps in reducing emission and thus reducing the carbon footprint of the company. Many government regulation favours reduced footprint.
- It helps in reducing insurance premium as risk is lowered due to involvement of more than one part.
- It provides better control over shipment as the sender is not forced to change the quantity or the size or the shipment due to available options. It is up to the seller to identify a vehicle as per his need.
- Because consolidator uses latest technologies, the tracking of the product is easy and shipment delivery dates can be forecasted with more accuracy.

Benefits of consolidation for Marketing are as follows:

- Consolidation gives flexibility to the customer to ship goods in any quantity.
- If the company wants to send specialized packages to a customer, consolidation makes it possible.
- Also deliveries like express delivery and prime deliveries can be arranged with the help of consolidation. Hence it makes goods distribution faster.
- It builds customer satisfaction, as they are able to get their products faster.
- The tracking facility helps the customer know the status of the placed order and build confidence in the working of the company.

2.11 PACKING: TYPES AND FUNCTIONS

Packaging can be defined as the coordinated system of preparing goods for safe, secure, effective handling and transportation, storage, distribution, retailing, use, disposal, and so on, with the aim to maximize consumer value and bring in organizational profit.



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12. What do you

mean by consolidation?13. List some benefits of consolidation.

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On the basis of its use and purpose, the packaging is classified into following eight categories:

- **1. Primary packaging**: This is also called sale packaging or consumer packaging. It is this packaging that consumers usually take home and are in contact with the product.
- **2. Secondary packaging:** The packaging which is meant to contain several primary packaging is called secondary packaging.
- **3. Tertiary packaging**: Tertiary packaging is the packaging that contains secondary or primary packaging for assembling them on pallet or container.
- **4. Group packaging**: The packaging carried out to protect the breakage and damage of the primary package while handling or transportation is called group packaging.
- **5. Transport packaging**: The packaging that is designed keeping in mind the transportation and handling of the product at the warehouse or transit is called primary packaging. This helps in preventing physical damage during transportation and handling.
- 6. Display packaging: Here the focus is on the display and design of the packet.
- **7. Retail packaging**: It is similar to display packaging. Here the focus is on the designing the product to fit the retail need.
- 8. Used packaging: The packaging or packaging material left after the product is removed is called used packaging. It can be used for packaging again or is recycled or is destroyed in a manner to protect the environment.

Functions of Packaging

The various functions of packaging include:



1. Marketing functions: The marketing function of packaging includes packet designing and format to attract the customer towards the products. Legal considerations like maximum retail price, weight, certifying agency,

ingredients or raw material use, environmental safety, warnings, etc. are also mentioned on the packets. The packets also contain information which the consumers may find useful. Information like installation instructions, recopies, terms of usage, handling instructions are also mentioned on the product for the benefit of the customers. There are many companies which design their packaging on the basis of the comfort to handle the product. All these are done to attract the consumer towards the product.

- **2. Logistics functions**: Packaging also helps in distributing the product without any defect or damage. The information about the product handling and the shipping and billing address is also available on packet to make delivery manageable.
- **3.** Environmental functions: There are many packaging materials that are environment friendly and recyclable. Also the information like re-usable material on the packet helps in saving environment. There are many packets that contain materials that are not good for environment; the information mentioned on the product helps in saving the environment.

All these various types of packaging help in transporting the goods to their destination in a manner that products are protected and customer are happy. The sales packaging helps in attracting the customer and hence increasing the chances of availing the product.

2.12 MARKING: TYPES AND SIGNIFICANCE

Marking is the act of labelling the container with prescribed destination and order information. Each transport mode has its own requirement related to the information to be available on the label. The various types of marking are:

- 1. Shipping Marks: Those marks that contain the information required to transport the right box to the right place and to the right customer are called shipping marks. The shipping marks are same as the information given on the transport documents.
- **2. Information Marks:** Those marks that provide additional information like quantity of product, buyer's code, dimension and information for storage of the box are called information marks. These marks are not given on transport documents.
- **3. Handling Marks:** The instruction given on the boxes for the handling of the product at different stages of transportation is called handling marks.

Significance of Marking in Marketing

The significance of marking in marketing is as follows:

- It ensures safe transportation of the product.
- It ensures delivery of the product to the right customer.
- It helps in identifying the product and its rightful owner.
- It helps in handling the product in appropriate manner.
- It ensures the upkeep of the product during transit.

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Marking: It is the act of labelling the container with prescribed destination and order information.

Due to the above benefits, marking ensures that right product reaches to the right place at right time in right condition and thus helps in satisfying the need of the customer.

NOTES | 2.13 PREPARING OUTBOUND

The outbound process consists of activities that one must perform to issue goods from warehouse and prepare it for shipment. In order to prepare outbound, the following details are needed:

- Review demand data in order to manage distribution
- · For small consignment, review consolidation options
- For large consignments, facilitate dedicated vehicle to minimize handling
- Validate delivery queries and manage any incidence where non-conformance occurs
- Manage tracking of the consignment
- Apply relevant security measures like vehicle tracking, bar coding, RFID, etc. to share information between different transportation nodes
- Arrange to share information between different transport nodes

Steps of Outbound Procedure

The outbound procedure includes following steps:

Step 1. Generate outbound advice: The first step of the outbound procedure is to generate outbound advice for the goods that are required to be issued from the warehouse. The outbound advice includes the list of locations and the quantity of goods to be issued for each warehouse. In case of single warehouse, the outbound advice only consists of information about the quantity of goods to be issued.



Fig 2.11 Steps of Outbound Procedure

Self-Instructional 54 Material **Step 2. Release outbound advice:** Once the outbound advice is generated, it is released so that picking list can be generated. The issue of outbound orders also activates the related order lines for released, staged and inspected status. The released status of order line indicates that picking lists are included in the outbound warehousing procedure. The stage's status indicates picking lists are not included in the outbound warehousing procedure and goods have been moved to the loading area for shipping. In case outbound inspections are included in the outbound warehousing procedure, 'to be inspected' note is issued for the inspection of goods.

Step 3. Generate picking list: A picking list consists of information about the quantity of goods to be issued for the warehouse and the location of the warehouse from where it will be issued. It is prepared after the release of the outbound advice.

Step 4. Adjust picking list: The picking list can be reviewed before the final picking happens for any modification in quantity or type of goods or for any change in the warehouse location.

Step 5. Confirm picking list: After the adjustment of the picking list, the final picking list is confirmed and the goods order lines are operated and goods in the picking lists are moved to the loading area of the warehouse.

Step 6. Inspect outbound goods: If any outbound inspection is to be performed, it is done before the loading of the goods. The goods can be accepted or rejected. Once the goods are accepted, the order line obtains the staged status. The staged status indicates that goods are ready to be loaded and are placed in the loading area of the warehouse. If during inspection, any rejection of the goods happens, the rejected goods are removed from the inventory and are sent to quarantine warehouse and the outbound order lines are updated in accordance with the latest status.

2.14 DOCUMENTATION AND SHIPPING

The goods that are issued from the warehouse via outbound process are prepared for shipping to their destination. The shipment procedure involves two main steps: confirm shipment and print shipping orders.

Confirm shipment: If the shipment is confirmed, the goods are loaded into the container.

Shipping Modes

The shipment can be planned with the help of any of the available mode of shipping. The common mode includes rail, road, sea or air. Each of these mode have their own advantages and disadvantages. Though rail and water are comparatively cost effective modes of shipping goods, they have their limitations with respect to infrastructure requirement, flexibility of material handling, shipping frequency, etc. Rail cars can be used for the places that are well connected with the rail network. Similarly water transport can be used only for the places connected with port facility. However, road and air transport give the flexibility to plan the shipment more frequently and are faster than the other two.

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 Table 2.1
 Comparison of Different Modes of Shipment

Criterion	Rail	Road	Air	Water
Relative Speed	Moderate	Moderate	Very High	Slow
Cost per ton/Km	Low/ Medium	Medium	High	Very Low
Flexibility	Low	High	Medium	Low
Dependability in meeting schedule	Medium	High	High	Medium
Frequency of shipment	Low	High	Medium	Very Low
Availability of Services	Limited and fixed infrastructure	Extensive network	Limited Network	Restricted Network
Other Consideration	Large consignment from port of discharge to inland operations site	Short and medium distance, internal transport	Emergency, Expensive goods, Fragile or perishable goods, Small shipment	Large quantity, less urgent, long distance with no time constrain
Advantages	Economical, large Loading Capacity, Range and Speed	Relatively fast, No transhipment, Direct delivery, Flexible	Fast, Reliable, Limited losses, Direct, easy Tracking	Economical, No restriction on weight, Large loading capacity
Disadvantages	Difficulty finding cars, Delay, Transhipment, Inflexible, Tracking challenges	Relatively costly, danger or blocked road, vehicle permit	Expensive, Restricted between airports, Restricted loading, size of shipment, weight etc.	Slow, Not flexible, Higher theft rate

Air is the fastest modes of transport but is very costly among all the available options and hence it is suitable only limited products. It is good for perishable goods, luxury or costly items or for the goods having a very short lifecycle.

When it comes to meeting schedule, road and air transport are more reliable and are able to transport goods faster as compared to rail and water. Also the rate of loss due to theft and breakage is comparatively more in water transport than to road or air. Thus water and rail are suitable for the cases where the goods are to be transported in huge volume and there is no restriction with the time taken or ample time is available with the seller and the buyer.

Where air transport comes with the restriction on the weight of the goods, size of the packages, etc., there is no such restriction in case of water transport.

The road transport gives high flexibility to plan the shipment schedule, which is not available in any of the other mode of transport. Though air shipment gives some level of flexibility but it is very less as compared to road. The shipment via water and rail has to be made in accordance with the schedule of the service provider and there is no flexibility as such.

Theses modes can be evaluated for their suitability for shipping the goods by the company.

Document Requirement

The following documents are required once the shipping is confirmed:

- 1. Bill of Lading/Air-way Bill: A 'bill of lading' is a contract between buyer and the seller. There are two types of bill of lading: straight bill of lading and shipper's order bill of lading. Straight bill of lading is non-negotiable, whereas a shipper's order bill of lading is negotiable and can be bought, sold, or traded while the goods are in transit.
- **2. Packing Slips:** It includes a list of the products included in the shipment. It gives description about the quantity, weight and content of the shipment.
- **3. Packing List:** This document is considerably more detailed and informative than a standard packing list. It contains information about list of seller, buyer, shipper, date of shipment, invoice number, carrier, mode of transport, and itemized quantity. Description about the type of package, the quantity of packages, total net and gross weight (in kilograms), dimension of package, etc. are available in the packing list. Many times, a packing list acts as conforming document but it is not a substitute for a commercial invoice.
- **4. Delivery Notes:** A delivery note is a document that orders the release of the goods to the buyer or its representative against bill of lading. It is not regarded as a document of title at common law with the result that the transfer of the delivery order did not affect transfer of constructive possession of the goods.
- **5. Shipping Manifests**: Also called "cargo document" is a document that lists the cargo details for the use of customs and other officials. The purpose of the list is to ensure that the cargo listed as having been placed on board at the beginning of its passage continues to be on board when it arrives at its destination.

2.15 CUSTOMER FACILITATION

Businesses across the globe is driven by consumer demand and consumers have lots of choices when it comes to avail products or services. The same is true for logistics as well. Logistics helps marketing by providing sound advice to customers at each and every stage. A few of the services provided by logistics in distribution are: predicting market demand, providing customer insight, route and container size determination, etc.

Predicting market demand is crucial for business requirement; logistics provides valuable customer insight and demand information to the company and helps it in planning its capacity. Not only this, it also provides guidance to the company in determining the route, container size, documentation, packaging and repair and maintenance services. The services provided by the logistics in distribution are discussed below:

They help the company in planning inventory level and service level. The transaction data helps in identifying the demand of the product and also helps in maintaining the service level. They also educate the customer about the legal requirement pertaining to product or service.

Logistics provides customized packaging services to meet the requirement of the product e.g. special packaging for fragile, perishable, different shape, Logistics as a Support/ Interface/Enabler of Marketing Function

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Bill of Lading: It is a detailed list of a ship's cargo in the form of a receipt given by the master of the ship to the person consigning the goods.

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product requiring water proofing, etc. Also the customized packaging is provided with the packaging material. There are certain countries that have special packaging requirement. Logistics takes care of that need and also educates the customer about the need of the country.

Table 2.2 Services Provided by the Logistics in Distribution

Stock point Facilitator & Planner for maximum inventory turnover \checkmark Problem solver \checkmark Customer educator Packaging \checkmark Customized packaging Grouping related products \checkmark Order Booking Work towards: Dispatch and Payment collection \checkmark Channel visibility √ Value addition \checkmark Channel \checkmark Sales Negotiate with customer Provide sales force \checkmark \checkmark Market intelligence \checkmark Maintenance and repair of products Maintenance \checkmark Service facility

For order booking, dispatch and payment collection, they work toward channel visibility and add value to the supply chain by providing information on channel demand.

On many occasions, the logistics provider facilitates the sales services by providing sales force, sharing information on the current market trend and helping it gather information on their offerings so as to facilitate negotiation.

All logistics are dealing with many companies simultaneously; they provide valuable market information related to trend, new market, demand, and so on, to their client and help them in understanding their market better. At times, they also provide repair and maintenance services from the client side.

2.16 TRACKING OUTBOUND SHIPMENTS

Once the goods leave the warehouse, it is very important for the companies to know where they are. Till the companies do not receive the conformation of the receipt of the goods, the tracking services provide information on the status of goods movement by sharing the location information and giving the company facility to monitor the same.

Logistics Tracking Technologies

Some of the popular logistics tracking technologies are RFID, AIDC and IoT. Let us study them in detail.



Fig 2.12 RFID Technology

- **RFID:** Radio-frequency identification (RFID) is an automatic identification methods based on the use of electromagnetic fields to automatically identify and track the data stored on devices called RFID tags attached to goods transported. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves.
- AIDC: Automatic Identification and Data Capture (AIDC) is a method of automatically identifying objects, collecting their data and then entering these data directly into a computer systems. It does not involve any human intervention and provides updates to a shipment status as the shipment moves throughout the shipping process. Popular technologies considered as AIDC are bar codes, biometrics (like iris and facial recognition system), Radio Frequency Identification (RFID), magnetic stripes, smart cards, Optical character recognition (OCR), and voice recognition. They provide real-time insight into a shipment location, explanation of delayed delivery, estimated time of delivery, and many other factors.
- **IoT-Based Technologies:** The latest development in the field of tracking technology is the emergence of Internet based technologies (IoT). IoT refers to the connection of all objects, whether static or mobile, big and small to the Internet and all the services available there. The IoT has been used to a lot of communication between different technologies and machines to improve the production and efficiency of shipping processes in the logistics industry. This has helped to reduce downtime and enhance the workflow of a given shipment and providers' processes.

The benefits of providing tracking services are as follows:

- They help in providing real time information about the status of the shipment and hence can help the companies plan their marketing and sales promotion activities.
- The availability of the tracking facility also helps the companies in managing their purchase operations.

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- It helps in tracking the package location and thus reducing theft and loss of the goods.
- It helps in keeping a stock of goods delivered, goods in stock, goods likely to be delivered, etc. and thus helps the company in planning and distribution strategy.

2.17 SUMMARY

Some of the important concepts discussed in this unit are:

- Marketing logistics has been described as planning, implementing and controlling the process of physical flows of materials and final products from the point of the origin to the point of the use.
- The various activities involved in marketing logistics are transportation, inventory control, warehousing, order processing and information monitoring.
- The objective of marketing logistics is to ensure the steady flow of material between the buyer and the seller. The major function of marketing logistics includes product delivery, price decisions, promotion decisions and supply of goods to the place of consumption.
- Order fulfilment is a key process in logistics and supply chain management. Filling customer order efficiently and effectively is a crucial step in providing customer service.
- Most of the marketing logistics activities are centred on establishing a supply chain and distribution network that optimize the pace of making the product available to the consumer or customer.
- The services of assembling and labelling are provided by the logistics companies to optimize the cost and build customer satisfaction. It is a very important aspect of marketing logistics as along with building customer satisfaction, it helps in marketing communication and brand building.
- Nowadays, companies are becoming more and more concerned about maintaining an optimal level of goods and parts to take care of demand. One of the way to do it is to define stock management strategies.
- The entire logistics operations involves a set of standardized documentation from seller and buyer. Moreover, as per the accounting practices followed in the organization, detail documents of purchase are required as per the bookkeeping practices and norms.
- The way production and manufacturing achieve economy of scale by producing in bulk, the economy of scale in logistics is achieved by consolidation.
- The goods that were issued from the warehouse via outbound process are prepared for shipping to their destination. The shipment procedure involves two main steps: confirm shipment and print shipping orders.
- Logistics helps the marketing by providing sound advice to customer at each and every stage. Few of the services provided by logistics in distribution are: predicting market demand, providing customer insight, route and container size determination, etc.

- **Check Your Progress** 14. Define marking
- 4. Define marking and list the various types of markings.
- 15. What are the available modes of shipping?
- 16. List documents required when shipping is confirmed.
- 17. List the technologies that help in tracking goods.

Self-Instructional **60** *Material* • The tracking services provide information on the status of goods movement by sharing the location information and giving the company facility to monitor the same.

2.18 ANSWERS TO 'CHECK YOUR PROGRESS'

- 1. Marketing logistics is the art of managing the flow of raw materials and finished goods from the source of supply to the end- users.
- 2. In the past, the role of logistics was to provide low cost solutions for the movements of goods, but nowadays, the focus is on satisfying consumer demand.
- 3. The major function of marketing logistics includes product delivery, price decisions, promotion decisions and supply of goods to the place of consumption.
- 4. Order fulfilment is a key process in logistics and supply chain management because filling customer order efficiently and effectively is a crucial step in providing customer service.
- 5. It is very difficult to identify which part of the system is causing the delay. GOP addresses this issue by helping companies make reliable quick delivery promises.
- 6. The logistics provider is required to assemble the bundled product or customize the product as per the order at the warehouse and then ship it to the customer.
- 7. Some of the benefits of assembling services are: (i) They help the manufacturer keep their manufacturing cost low; (ii) They keep lower inventory of finished goods; and (iii) They help in profit maximization.
- 8. A label can be defined as a piece of paper, cloth, plastic, metal or other material affix on a container or packet and contains written or printed information about product.
- 9. The label contains information about the manufacturer or the brand. It displays the shelf life of the product. It carries the nature of material and environmental advice, the product usage information, product code and information about the batch number, etc.
- 10. Stock management is can be defined as the process of understanding the stock mix of a company and their demand.
- 11. The advantages and disadvantages of keeping low stock are as follows:

Advantages:

- (i) Lower-storage costs as there are fewer products. They require less space and insurance cost will also be less.
- (ii) Up-to-date products can be kept and made available to the customer.

Disadvantages:

- (i) There is always a risk of running out of stock.
- (ii) There are frequent reorders and hence the cost of meeting stock level becomes expensive and complicated.
- (iii) It increases the dependency of the company on the suppliers.

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- 12. The process of combining multiple orders into one tracking number is called consolidation.
- 13. There are numerous benefits of consolidation. These are: (i) Reduction in the cost of shipping the goods; (ii) It helps in reducing time constraints on each shipment; (iii) It also helps in reducing emission; (iv) It helps in reducing insurance premium as risk is lowered.
- 14. Marking is the act of labelling the container with prescribed destination and order information. The various types of marking are: Shipping Marks, Information Marks and Handling Marks.
- 15. The common modes of shipping logistics includes rail, road, sea or air. Each of these modes have their own advantages and disadvantages.
- 16. The following documents are required once the shipping is confirmed:(i) Bill of Lading; (ii) Packing Slips; (iii) Packing List; (iv) Delivery Notes; and (v) Shipping Manifests.
- 17. Some of the technologies that help in logistics tracking are RFID, AIDC and IoT.

2.19 QUESTIONS AND EXERCISES

Short-Answer Questions

- 1. Define marketing logistics and discus its significance.
- 2. Write short notes on the following:
 - (a) Support function
 - (b) Interface function
 - (c) Enabler of Marketing function
 - (d) Packing
 - (e) Picking
- 3. What do you understand by labelling? Discus its benefits.
- 4. What do you understand by consolidation? What are its benefit?
- 5. Define AIDC technology.

Long-Answer Questions

- 1. Discus the various functions of marketing logistics.
- 2. Define order fulfilment functions of logistics. Elaborate the strategies practiced toward perfect order fulfilment.
- 3. Discus the various challenges which are needed to be overcome to streamline the order fulfilment process.
- 4. How does technology help in tracking goods? Discus two such technologies.
- 5. Discus the pros and cons of each method of shipment based on relative speed, flexibility, reliability and availability of services.

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UNIT 3 EXPORT AND IMPORT (EXIM) LOGISTICS

Structure

- 3.0 Introduction
- 3.1 Unit Objectives
- 3.2 Export Logistics: An Introduction
- 3.3 Special Aspects of Logistics
 - 3.3.1 Picking
 - 3.3.2 Packing
- 3.4 Vessel Booking and Types of Loading
 - 3.4.1 Booking Less-Than Container Load (LCL)
 - 3.4.2 Booking Full Container Load (FCL)
- 3.5 Customs: Objectives and Role
- 3.6 Documentation: Types and Function
- 3.7 Shipment and its Procedure
- 3.8 Delivery to Distributors and Retailers
- 3.9 Import Logistics
- 3.10 Documents Collection
- 3.11 Valuing
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- 3.13 Warehousing: Function and Types
- 3.14 Customs Formalities and Clearing 3.14.1 Distribution to Units
- 3.15 Security and Insurance 3.15.1 Insurance
- 3.16 Multimodal Transport3.16.1 The UN Convention on International Multimodal Transport of Goods
- 3.17 Terminal Networks: Types and Roles
- 3.18 Summary
- 3.19 Answers to 'Check Your Progress'
- 3.20 Questions and Exercises

3.0 INTRODUCTION

Whatever the nature of business may be, the difference between the countries in which a firm operates does affect the decision related to its various management functions. The same is true for logistics management as well. In this era of globalization, mass customization and reduced distances, agility is the factor on which companies compete. Time is the most valuable and irreplaceable commodity to be traded with and hence there is no apparent reason to waste it. In order to manage time and cost in the most optimal way, companies need to formulate their EXIM (Export and Import) policies accordingly. In this unit, we will discuss in detail issues related to EXIM logistics.

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3.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Understand the meaning of EXIM logistics
- Explain the characteristics of EXIM logistics
- Define terms like picking, packing, and vessel booking
- Describe custom documentation and clearance procedures for export and import
- Examine logistics issues in export and import logistics
- Discuss the UN Convention on International Multimodal Transport (MT) of Goods
- Describe terminal networks and their types

3.2 EXPORT LOGISTICS: AN INTRODUCTION

Companies think about exporting their products because selling their goods to say the United States can generate more revenue than selling it in India. But in order to move the product out of the country an appropriate process needs to be followed. These processes include picking, packaging, vessel booking, custom documentation, shipment and delivery to distribution and retail centres. International logistics involves movements that cross borders and theses movements are considered more complex than the domestic movement. The entire process of movement of goods through ports in international logistics is time consuming; the difference in time zone and communication makes it further complex. The international logistics unit is responsible for the management, planning, coordinating and controlling of the logistics activities.

An overview of the export process is as follows:

- **1. Purchase:** The first stage of the export process is that foreign buyers identify your product or service and order for the purchase of the goods. They negotiate contract and set terms and conditions for the purchase.
- **2. Buyer Issues:** Once the purchase decision is being made, the next stage is to issue purchase order.
- **3. Prepare Your International Order:** After receiving the order, the next stage is to prepare packing list, commercial invoice and consider marking requirements.
- **4. Prepare Export Document:** Once the exporter is ready with the order, the next stage is to prepare the documents. Documents like Export Declaration B13a, commercial invoice, certificate of origin, permits (if required) are prepared.




Fig 3.1 Overview of Export Process

- **5.** Carrier: Carrier management involves planning for the transportation and preparation of the way bill. Once everything is arranged, the goods are shipped as per the arranged transport.
- **6.** Notify Importing Country: The custom departments of the country to which the goods are sent are notified for the sent goods.
- 7. Foreign Custom: For the country to which the goods are sent, the documents like commercial invoice, carrier waybill, certificate of origin, export permits, other foreign customs are made available once the goods reached their shore.
- **8.** Custom Clearance: Custom clearance is obtained by final accounting and payment of duties and taxes.
- **9. Goods Received and Proof of Delivery:** Once the custom clearance is obtained, the client takes charge of the goods and issues a payment receipt. This receipt acts as a proof of delivery of the goods.

Advantages of Exporting Goods

Any company, before committing its resources to venture in the export business, must carefully assess the benefit and challenges of exporting into a new market. A few of the advantages of exporting goods are as follows:

- **1. Increased Sales and Profits:** Without entering into an international market the company would have never seen any increase in the sales of products and the revenue. This provides a larger market to the company.
- **2. Gain Global Market Shares:** By going international, the companies get an opportunity to be a part of the global market.
- **3.** Enhance Domestic Competitiveness: Many companies become competitive in the domestic market before they enter into the international market. In order to be internationally accepted, they improve their quality of products and services in the domestic market and hence become competitive in the domestics market as well.

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4. Compensate for Seasonal Demands: Companies that are in the business of selling seasonal products are saved from the decrease in demand when operating globally. They get an alternative market to sell their product and hence become less affected by seasonal demand.

5. Diversification: Selling to multiple markets allows the companies to diversify their risk as they are no more associated with one country or client.

6. Sell Excess Production Capacity: Exporting goods provides companies a market to sell their excess production. The companies are saved from selling them at the discounted price.

7. Gain New Knowledge and Experience: Many a time, companies have to modify their product in line with the demand of the international partner. This gives them the opportunity to gain new knowledge and experience in the field of new technologies, methods or marketing strategies.

Challenges of Exporting Goods

No business is free from risk and so is the case with export. A few of the challenges of exporting goods are:

- **1. Product Modification:** Many a time, the companies have to modify their product to meet the requirements of the international customer. In all such cases, they have to identify and adopt modifications to satisfy the requirements. This involves time and cost.
- 2. Extra Costs: There is a cost involved not only in the product modification as companies also have to invest on manpower and other resources to develop a new market. Hence there is a risk of spending more than what you can get out of the new market.
- **3.** Export Licenses and Documentation: Before a company enters into the export business, it must understand license and documentation requirement. The licenses and documentation also vary upon the location, the purpose of shipping and the kind of client. Hence many a time, it becomes challenging to understand the actual number of documents required. So, a thorough research is required.
- **4. Market Information:** Another challenge of exporting goods is finding information on foreign market. It is more difficult and time consuming as compared to the domestic market.

Due to the above-mentioned challenges, the export operation is a challenging task and should be executed carefully. The various stages of the export process should be carefully investigated and the required process and documentations should be arranged carefully. The most important operational activity to be managed in export is the logistics operations. The major activities involved in the export logistics are picking, packing, vessel booking, custom documentation, shipping and delivery.

Check Your Progress

- Why do companies need to formulate their EXIM policy?
- 2. What are the activities that the international logistics unit is responsible for?
- List some advantages of exporting goods.

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3.3 SPECIAL ASPECTS OF LOGISTICS

The special aspects of export logistics are shown in Figure 3.2. Each of these aspects is discussed below.



Fig 3.2 Special Aspects of Export Logistics

3.3.1 Picking

Order picking can be defined as the process of receiving goods in a specified quantity from a storage or warehouse and shipping them to the customer. It is a part of the supply chain process and is very labour intensive. Picking activities cannot be done in a hurry as mistakes are difficult to catch and costly to be rectified.

- (a) Levels of order picking: There are five levels of order picking, these are as follows:
 - Pallet Picking Retrieval of full pallets
 - Layer Picking Retrieval of layers of cases
 - Case Picking Retrieval of inner packs from cases
 - Split Case Picking Retrieval of inner packs from cases
 - Broken Case Picking Retrieval of individual, discrete items

(b) Characteristics of Picking System

- Flexible
- Cost effective
- High quality



Order picking: It refers to the process of receiving goods in a specified quantity from a storage or a warehouse and shipping them to the customer.

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(c) Types of Order Picking

- **1. Discrete Order Picking:** It is the most common type of order picking method. In this method, one order in one liner is picked at a time. Also there is one order scheduling at a time. The benefit of this method is that it is easy to incorporate. However, it is the least efficient method of order picking.
- **2. Zone Picking:** In this method, the pickers are allocated a specific zone. It is the responsibility of the picker to pick all the Stock Keeping Units (SKU) forms for the allocated zone. In this method there is only one scheduling per shift and hence there is a cut-off period for each day and any queued order is picked up the next day.
- **3. Batch Picking:** When a picker picks up a group or a batch of order at the same time, it is called batch picking. This is very useful when there are multiple orders within the same SKU as it saves time.
- **4. Cluster Picking:** When multiple order containers are picked up at the same time, it is called cluster shipping. The containers can be picked up in any of the above-mentioned method. It is beneficial for the picking to cart operations and for the operations utilizing independent zone shipping.
- **5. Wave Picking:** It is similar to discrete picking; the only difference between the wave picking and the discrete picking is that here the pickup schedule is fixed.

(d) Method to Improve Picking

The various activities that can help in improving the productivity of the picking include:

- 1. Stock assignment by activity: In order to make pickup faster, similar goods or frequently picked together goods are kept together. This helps in saving time during the pickup process. Items that are infrequently asked for are placed at a distant corner.
- **2. Sequenced picking:** This involves sequencing the picking based on the location. All the pickup from a given area is picked at one time. This reduces the cost or repeat travel. Sequencing can also be done on the basis of the type of pickup. All the pickups that require a particular vehicle can also be planned.
- **3. Consolidated picking:** Many a time, a given destination has placed multiple orders and hence receives multiple packages. This results in wastage of time and resources. Consolidated packaging helps in multiple orders in single or fewer packages and hence minimizes cost.
- **4. Golden zone picking:** This method involves storing popular items in a location that is easily accessible to the picker. It is the least stressful and most comfortable location for repetitive motion working.
- **5.** Computer zone picking: Information technology is constantly used to manage inventory and relate picking. It helps in faster processing of picking.

3.3.2 Packing

The rigour of long distance transportation of goods requires protection from possible breakage, pilferage or moisture and hence the goods should be sent in such a way that it not only allows the customer to take custody of the material but should also ensure that it had reached safely and in a sound condition. This makes packaging a very important aspect of export logistics activity. Insufficient or improper packaging may lead to the damage of the product; it also entitles the customer to reject the goods or claim damage. Also the product must be packed to comply with the legal requirement of the country. For example, in Australia and New Zealand, straw or rice husk cannot be used as a packing material. In Germany, 70 per cent of the packaging material must be recyclable.

The packaging should be such that the container is able to withstand multiple loading and unloading impact, should be adequately sealed and the weight should be appropriately distributed. The material used for the packaging should be leak proof, moisture resistance and should meet the environmental guidelines.

(a) Functions of Packaging

Packaging plays a vital role in logistics. From making transportation possible to protecting goods during transit, it propels and moves the system forward. The major functions of packaging are as follows:

- **Protect Function:** Packaging protects the product on its way to the consumer. It protects the product during transportation to warehouse, distribution centre, retail outlet and shipment. It also protects product from tempering.
- Storage Support: Packaging helps in arranging the product in the warehouse, shipping, etc. and supports storage.
- **Transport Support:** Packaging makes handling the goods easy and safe. The loading and unloading can also be done more effectively for a well-packed product.
- **Cost Reduction:** Since packed products are less likely to get damaged and easy to transport, an appropriately packed product also helps in cost reduction.
- Facilitation of Handling: Packaging facilitates mechanical handling and recycling of used material.
- (b) Few of the important points for packing products are
 - **Prior to Packing**: Dusting, cleaning, removing of fingerprints and drying of items
 - Measures to Consider in Packing: Corrosion, tarnishing, staining, breakage, decay and moisture.
 - **Preventing Damage:** Appropriate cushioning, rack positions and handling instructions
 - Small Items: Bulk packaging with separator to prevent individual items.
 - Heavy Items: Separate packaging

(c) Factors Affecting Type of Packing

In order to meet the continuously changing market, the packaging techniques need to be changed. The following factors affect the type of packaging:

- 1. Risk of damage or pilferage: The amount of risk due to breakage, damage or pilferage affects the kind of packaging. Such product requires more sophisticated packaging to reduce risk. Improved standard of packaging helps in reducing insurance premium and building goodwill with importer.
- **2. Space utilization:** Packaging design that helps in saving cargo space and fits appropriately helps in reducing transportation cost. As appropriately designed packet can be stacked without any space in between, it reduces fall and breakage and also helps in utilizing full capacity of the container.
- **3. Value of goods:** High value goods attract more extensive packaging. The nature of packaging also depends upon the declared valuation of the cargo, and the risk involved in the route.
- **4. Packaging dimensions:** The packaging dimensions and configurations should be such that it facilitates economical method of handling. This is more important for those products that have very awkward design. The dimensions should help in reducing labour cost and speed up the process of loading and unloading.



Fig 3.3 Factors Affecting Types of Packing

5. Packaging cost: Packaging cost is another factor that affects the type of packaging. There are different types of packaging solutions like corrugated boxes, boxboard or paperboard cartons. Paper bags and sacks are also available to the exporter. The most optimal one should be used. The selected solution should be able to meet the special requirement (if any) for the importing country.

- 6. Nature of cargo: Cargo shipped in bulk requires less packaging as compared to the general merchandize. For example, ores, minerals, cars are shipped in bulk and require negligible packaging, whereas fruits like apple, which is consigned in cases, are required to be appropriately packed to reduce damage
- **7. Nature of Transit:** The type of transport used such as road, sea, air, and rail, as well as the distance travelled affect the type of packaging. The more handling a product requires, the stouter should be the packaging. Transport like air and ISO containerization usually requires less expensive packaging as compared to other modes.
- **8.** Compliance with Statutory Requirement: Those cargo that need special statutory requirement should be packed according to it. For example, frozen food items should be packed and transported in a manner that the temperature requirements are met. They are also supposed to meet the food safety and hygiene standards.
- **9.** Agreement of Sale: If there are certain clauses in the international consignment delivery terms, then it should be considered while deciding upon packaging options.
- **10.** Facilities Available at the Terminal: The availability of facilities like lifting equipment, custom clearance, and so on, at the airport, sea port, feeder port, warehouse, free trade zones, container freight station, dry port, freight village also affect the type of packaging. The size, design and the strength of packaging vary as per the available facility.
- **11. Insurance Acceptance Condition:** Another important factor that affects the type of packaging is the insurance requirement. Those cargo which had a history of damage should be packed more carefully else the insurance will be rejected or its cost would be too high. Normally, the inadequacy of packaging is a clause in the cargo insurance and the insurance provider can refuse the claim if the packaging is not sufficient.

(d) Advantages of Packaging

- It makes transportation possible. An appropriately packed product helps the companies to supply it to the world.
- It protects the products from damage. A damaged material can upset the customer and force companies to arrange the replacement at additional cost. This will increase the cost of the product. Had the product been arrived in good condition, this cost could have been saved. Hence packaging is important.
- The packet also contains lots of information like the batch number, price, approving agencies and standards follows, content, weight, etc. It also contains the way to operate, handle and store product. This provides an important source of information for the user as well as the logistics partner.
- Transport packaging makes the storage of goods easy. Packages of all shapes and size can be stored and shipped.
- Another important advantage of packaging for the sellers is that it enables them to display the product, attract customer and sell it.

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(e) Types of Packaging

There are mainly three types of packaging: primary packaging, secondary packaging and tertiary or transit packaging.

- **1. Primary Packaging**: Primary packaging is also called sales packaging. It forms the sale unit of the end-user. It can be a single layer of pack as in biscuits or a few layer of packing material as in case of televisions. It is the primary packaging that contains the maximum information about the product.
 - **2. Secondary Packaging:** It is a packaging that is used to collect the group of primary packaging. Typical examples of secondary packaging are card boxes or tray that contains number of primary packaging. The purpose of secondary packaging is to protect the primary packaging and keep them in their original form when in transit. The dimensions of primary packaging are kept in such a way that they protect the primary packaging and also fulfil space utilization. They also help in keeping the material at the required temperature and condition.
 - **3. Tertiary Packaging:** Also known as transit packaging. The purpose of tertiary packaging is to hold together secondary packaging and handle transportations. They are done in such a way that they prevent physical damage to the primary and secondary packaging and also aid in material handling.

(f) Packaging Testing

Various techniques used to test the suitability of the packaging for the transportation are as follows:

- **1. Vibration:** Before the packaging material is finalized, a vibration test is done to test the suitability of the material and scope of product damaged due vibration or some movement.
- **2. Horizontal Impact:** The product is subjected to impact from several horizontal direction to check the suitability of the packaging.
- **3. Dropping:** The packages are dropped from some height to test the fragility of the packages.
- **4. Compression:** Many times, the measures are taken to reduce the space occupied by the package. This is achieved by using shrink wraps.
- **5. Rough Handling:** Many times, the products are handled very roughly by the labourers and hence the packages are also tested for their ability to withstand rough handling.
- **6. Over-exposure to Extreme Temperature or Moisture:** For those products that require protection from temperature and moisture, the packaging is also tested for the ability to withstand it.



Fig 3.4 Types of Packaging Testing

3.3.3 Logistics and Packaging

For logistics, packaging should be done in such a way that:

- It does not hamper the constituent of the packaged material.
- It makes the movement of goods between the warehouse and shipyard flexible and manageable.
- It should ensure that the product is in right condition, at right place, in right sequence and right position.
- Information about the fragility of the product, severity of the distribution environment and the characteristics of the cushion material should be known by the logistics providers.
- For a smooth and uniform logistics, the packaging should contain information about batch number, weight, compliance labelling, instructions for use and smart labels

(a) Packaging Symbols

A few of the common packaging symbols are:



Fig 3.5 Packaging Symbols

(b) Packaging Material

The commonly used packaging materials are as follows:

- Shrink Film or Shrink Wrap
- Cling Film or Food Wrap
- Packaging Tape
- Brown Papers

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- Carton Sealing Tapes
- Printed Tapes
- Thermocol Sheets
- Thermocol Blocks
- Foam Sheets
- Brown Packing Papers
- Corrugated Sheet
- Thermocol Boxes
- Carton Boxes
- Yellow Strap
- Strapping Belt and Tools
- Bubble Roll, Bubble Bag, Bubble Pouch
- Plastic Rope
- Plastic Covering Sheet, Packing Films
- Tarpaulin Sheets



Fig 3.6 Packing Materials

(c) Checklist for Export Packaging

In order to ensure effective packaging in export, the following checklists should be ensured:

- **1. Product Requirement:** The packaging should be checked for the suitability of the product requirement.
- 2. Customer/ Consumer's Requirement: It should be checked for the suitability of the customer/ consumer's requirement. If any country has any specific requirement, it should be met.

- **3. Distribution Requirements:** Packaging should also be checked for the suitability of the distribution requirement. It should be able to material handling requirement.
- **4. Transportation and Storage Requirements:** The suitability of the packaging for the transportation and storage should also be ensured before finalizing it.

3.4 VESSEL BOOKING AND TYPES OF LOADING

Once the picking and the packing of the goods are complete, the next stage is to arrange vessels for their transportation to the country where the goods are to be sent. The company that ships the product to the buyer is called the Shipper and the consignee is the receiver of the product. The following steps are taken for the booking of the vehicle.

- 1. **Rate request**: The shipper requests a rate for the destination where the goods are to be sent.
- 2. Receiving Rates: The shipping line provides that rate to the shipper.



Fig. 3.7 Steps for Booking a Vessel

- 3. **Rate Evaluation, Acceptance and Booking:** After receiving the rates, the shipper evaluates the rate and takes the decision. Once the decision to accept the rate is taken, the request for the booking of the vessel is made with the shipping line.
- 4. Booking Details by Shipping Line: The shipping line provides booking details like booking reference number. This reference number is used for the release of the empty container for the packing.
- 5. **Pick up of Empty Container**: Based on the date agreed upon by the shipper and the shipping line, the shipper arranges transporter who picks up the empty container.

Check Your Progress

- Define order picking and list some of its types.
- 5. What are the
- major functions of packaging?
- What is tertiary packaging? What purpose does it serve?

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- 6. Cargo Packing: The empty container is then taken to the shipper's warehouse for the packing. Once done, the cargo is packed and is taken to the port or terminal.
- **7. Transportation to Port/ Terminal**: If for any reason the container is not able to reach the port within the designated time period, at the discretion of the shipping line or port terminal, a late arrival request may be processed.
- 8. Loading: The containers then wait at the terminal or port to be loaded on the designated ship.
- 9. Freight Invoice: Once loaded on the board, the freight invoice is sent to the client/ shipper to fetch his bill of lending.

The shipper can book the entire container or partial container. When a shipper has enough goods to accommodate one full container, he books a full container load (FCL) else less than container load (LCL) is booked.

3.4.1 Booking Less-than Container Load (LCL)

In case the shipper does not have enough goods to accommodate in one full container, he books cargo with a consolidator to console his goods along with goods of other shippers. This kind of booking is called less than container load. The consolidator arranges a fully loaded container and consoles the shipments of other shippers. At the final destination, each shipment is separated and delivered to its destination.

(a) Advantages of LCL

The major advantages of LCL are as follows:

- It decreases the cost of shipping as the shipper pays only for the portion of the space he is using.
- Sharing the container does not have any impact on the transit time.
- They also provide the facility to pick and drop the cargo at the warehouse or destination. Hence the additional hassle to arrange transport is solved.
- As there is no need to return container after delivery, this hassle is solved. Since the container is shared with other company, the shipping line arranges the return.
- The fluctuation in the demand can be managed with ease, as the company does not have to bother about the container but only space. This provides flexibility to the shipper.

(b) Disadvantages of LCL

The major disadvantages of LCL load are as follows:

- There is always a possibility of delay in shipment
- The per cubic cost is higher in LCL than in case of FCL.
- Insurance per product or per square meter is more expensive for LCL as compared to FCL
- The damage is more in case of LCL as compared to FCL.

3.4.2 Booking Full Container Load (FCL)

In case the shipper has enough goods to accommodate in one full container, he books a full container load (FCL) to ship his cargo. The whole goods in the container is owned by a single shipper only. The container may or may not be fully loaded but once it is booked by one single shipper, it is called full container load (FCL) shipment.

(a) Advantages of FCL

The following are the advantages of FCL:

- FCL gets delivered more quickly than LCL. When a FCL arrives at the port, it is unloaded and delivered to the buyer whereas in case of LCL, it is sorted and separated and then the delivery arrangements are made.
- Many a time, the shipment is inspected by custom and in case of LCL, all the shipments are examined which also causes delay. This does not happen in case of FCL.
- Since the product is meant to be delivered at a single destination, the breakage in the transit is less.

3.5 CUSTOMS: OBJECTIVES AND ROLE

Customs is an authority or agency in a country responsible for collecting tariffs and for controlling the flow of goods, including animals, transports, personal effects, and hazardous items, into and out of a country. Every country has its own rules and regulations related to the export and import of goods, outside the country or within the country. These rules are enforced by customs officials. There are certain products that are not allowed to move in or out of the country. Customs officials enforce these rules. They work in close connection with border security force and intelligence. The primary role of customs is the inspection of the goods and individuals at the border. The role of customs is not limited to the regulation of movement of goods inside or out of the country; they have a legal measure to control theses movements also. These measures are called customs control measures. These measures are meant to check the compliance of import and export with the laws and regulations.

Objectives of Customs Control

The following are the objectives of customs control:

- To access and realize the export duty/ charges according to custom tariff act/ cess or any other legislation.
- To ensure that nothing moves out of the country without the compliance of the legal structure.
- To ensure the authenticity of value of cargo according to the customs valuation and to also check under and over invoicing.
- To provide export data.
- To check all the regulatory provision of export like export quality, export act, etc. It has to ensure that foreign exchange regulation, etc. are complied.

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Customs: It refers to the official department that administers and collects the duties levied by a government on imported goods.

Check Your Progress

7. When does a shipper book a FCL?

 List some advantages of LCL.

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Indian Customs Electronic Data Interchange System (ICES)

It is a computerized processing of shipping bills. It came under effect since 15th Sept 2004. It is known as ICES. It has initiated a new era of paperless trade. Now it is possible to exchange the export documents electronically with custom and other government agencies. It helps in faster processing and efficient custom clearance. The system of sharing export document with the customs for clearance is called Electronic Data Interchange System (EDI System).

Objectives of EDI System

The main objectives of the Indian Customs EDI System are as follows:

- To expedite the process of custom clearance without compromising legal compliances.
- To simplify regulations, guidelines, procedure and administrative guidelines for customers.
- To respond quickly to the needs of the trade.
- To help in mentoring of import, export, warehouse goods, ex-bond clearance, export promotion schemes.
- To provide MIS (Management Information system) for policy making.
- To provide quick and correct information of export and import.
- To provide retrieval of information from other custom locations to have uniformity in assessment and valuation.

Procedure for Computerized Customs Clearance - Shipment by Sea

In export of goods, custom clearance is handled by agents. They are specialized in the line of activity and are familiar with requirements and changes if anything happens in the process.

The below mentioned procedure is followed for custom clearance:

- **Registration for Business Identification Number:** The first stage is to get register for the business identification number. Prior to filling for custom clearance, exporter are required to obtain PAN based Business Identification Number (BIN) from the Directorate General of Foreign Trade (DGFT). The purpose of this BIN is to bring a common identification number to all persons dealing with various regulatory agencies. The registration process also includes, obtaining foreign exchange dealer code and opening a current account in the designated bank.
- Electronic Filing of Shipping Bill: Once these codes are received, the exporters are required to register their codes, Customs House Agent License Nos., and the Bank A/c No. in the Customs Computer Systems, before an EDI Shipping Bill is filed.

The following documents are required to be submitted:

- 1. A declaration in the specified format (Applicable annexure A or B)
- 2. Filled statutory declaration form (SDF)
- 3. Quota/Inspection certificate and
- 4. Drawback/DEEC/DFRC/DEPB Declarations, etc. as applicable

All these documents should be filled completely in all respects and signed by the exporter or his authorized representative.



Fig 3.8 Procedure for Custom Clearance

• Shipping Bill: In order to get the shipping bill generated, the exporter or the customs house agent (CHA) fills application in two forms, Annexure A and B. Annexure A is filled when the export is duty free and if the export is under claim of duty drawback, Annexure B is filled. Once filled, the applicable annexure is submitted at the Service Centre- Data entry Centre of Custom station. A check list is generated once the data is uploaded. The exporter or the CHA is required to verify this and after verification, the bill is processed and service centre generates shipping bill. This bill is used as a basic document for issue of 'Let Export Order'. Once the exporter or the CHA receives the 'Let Export Order', the printed copy of the shipping bill is generated.

The following categories of Shipping Bill are accessed by the custom for export:

- 1. Shipping Bills where the FOB value is more than ₹ 10 Lakhs.
- 2. Drawback Shipping Bills where drawback amount is more than ₹ 1 Lakh.
- 3. Shipping Bills relating to free trade samples whose value is more than ₹ 20,000.
- Checking of Documents at Customs House: Checking of documents at the custom house involve the following activities:
 - Shipping bills are verified to ascertain whether the value and quantity of goods are as per the letter of credit or export order or not. Custom official also verify the compliance to the formalities related

Check Your Progress

- 9. What is the primary role of customs?
- 10. What do you mean by EDI System?
- 11. List some procedure which are followed for custom clearance.

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to licensing, Exchange control, Pre-Shipment inspection and other statutory requirement.

- 2. Those cases where shipping bill involves foreign exchange are sent to appraisement section. In this section drawback and dutiable bills are allotted to appraisers for examination and scrutiny.
- 3. The checking also involves the examination or appraiser of the value of goods. This valuation is used in all future transaction. It is also used for the settlement of the claims.

Once the verification is over, the custom officials signs "Examination Order" form. This form contains information about the extent of examination of the goods to be carried at the Dock. This status of the form is available online and can be viewed by exporter or the CHA. They can also view objection if any raised in the documentation.

- Physical Examination of Export Cargo by Dock Appraiser: As per the examination order received, the appraiser conducts the physical examination of the goods at the dock. During the physical examination, two samples are drawn and the same is examined and a report is generated in three copies. One copy is sent along with the sample to the test agency, the second copy is the custom copy and the third copy is handed over to the exporter. Once the examinations are over, the examiner or appraiser also signs and stamps the original and duplicate copies of statutory declaration form (SDF) and returns the same to the exporter. In case of any discrepancy found during the examination, the same is communicated to Assistant Commissioner/Deputy Commissioner of Customs and the exporter is expected to meet them for the settlement of the dispute. Once all the formalities are over, the final clearance for the export of goods is given and shipping bill is processed.
- Loading of Goods under Supervision of Preventive Officer: The shipping bill is submitted to the Preventive Officer of Customs who makes and endorsement "Let Ship Order" on the exporter's copy. This endorsement is an authorization from customs for the shipping company to accept cargo on the vessel for loading. After receiving "Let ship Orders", the goods are loaded. The loading is supervised by the Preventive Officer and later, on completion of the loading, "Shipment on Board" endorsement is given on the exporter copy of shipping bill.
- Mate' Receipt: Mate Receipt is a document signed by an officer of a vessel evidencing receipt of a "Shipment on Board". Shipping Company hands over this receipt to port and after paying the port dues, the same is collected by the exporter of the CHA.
- **Post-Loading Certification:** Once loading is complete and Mate's receipt is received, the same is submitted to the Preventive Officer who makes entries about the fact of the shipment on the shipping bill.
- Collection of Bill of Lading: After submitting the mate's receipt to the shipping company, exporter or the CHA requests the company to issue "Bill of Lading". Both negotiable and non-negotiable copies are issued.

Customs Clearance of Export Shipment

For custom clearance, the following documents are required to be submitted by the exporter or the CHA:

- Shipping Bill
- Exchange Control Form
- Commercial Invoice (2 copies)
- Copy of Letter of Credit/Copy of Export Order/ Export contract, duly attested by bank
- Certificate of Origin or GSP certificate of Origin
- Packing List
- · Shipper's declaration form for export of goods
- · Original copy of Certificate of Insurance, wherever necessary
- ARE-1, duly approved by the Central Excise office (ARE-1 has replaced AR-4)
- Marine Insurance Policy
- Export License, wherever required and
- Any other documents.

3.6 DOCUMENTATION: TYPES AND FUNCTION

There are number of documents that are required to be prepared by the exporter in order to arrange export of his goods. These documents help in smooth flow of goods and payments thereof. All these documents can be categorized into two major categories: commercial documents and regulatory documents. Commercial documents are of two types: principal documents and auxiliary Documents.



Fig 3.9 Types of Export Documents

Commercial Document

The following are some of the types of commercial documents:

• **The Commercial Invoice:** A **commercial invoice** is a bill from the seller to the buyer. As discussed earlier, it is used by the custom department to appraise the value of the goods while assessing the custom duty. It is a well-defined document w.r.t. content, number of copies, language, etc. It is used by the government to control movement of goods.

Commercial invoice: It refers to a legal document between the supplier and the customer that clearly describes' the sold goods, and the amount

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due on the

customer.

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COMPANY LETTER HEADED PAPER Sender's Name Sender's Address Sender's Telephone Number

> IMPORTER'S DETAILS Importer's Name Importer's Address Importer's Telephone / Fax Number

COMMERCIAL INVOICE

Invoice I	Number:			Invoice Date	2:		
Quantity	Description of Goods	Net Weight	Harmonised Tariff Code	Country of Manufacture	Currency	Unit Value	Subtota
Total We Reason f	ight: for Export:		Kgs	Total Value Currency:	:		
For Con Terms of Terms of Contract	mercial Inv Delivery: Payment: Number: Date:	voices or be	nly: This inf identic	ormati Cal with	on m 1 cont	ust vac	t.
			2	Original Co Sender's O	ompany St riginal Sig	amp nature	

Fig 3.10 The Commercial Invoice

• **Packing List:** This document is considerably more detailed and informative than a standard domestic packing list. It contains information about the list of seller, buyer, shipper, date of shipment, invoice number, carrier, mode of transport, and itemizes quantity. Description about the type of package, the quantity of packages, total net and gross weight (in kilograms), dimension of package, etc. are available in the packing list. Many times, a packing list acts as conforming document but it is not a substitute for a commercial invoice.

PACKING LIST (Prepared by commercial dept.)

EXPOTER/SHIPPER NAME:		INVOICE NO .: .			DATE: 20	-06-2011
LTD.		EXP NO.:			DATE: 20	-06-2011
		L/C NO.:			DATE: 02	-02-2011
BANGLADESH.		CAT :				
,		H.T.S. CODE N	0.:			
Applicant:		B/L NO :			DATE	
E S SUTTON INC		CAPPIER			DATE.	
		E B C NO . BA	70179			
1400 BROADWAT, 201H FLOOR		E.R.C. NO.: RA	-/91/0			
NEW FORK, NY 10018, USA.						
NOTITY			LETTERU	F CREDIT A	SIGHT.	
		LIC ISSUIN DA				
115 KENNEDY DDIVE SAVDEVILL	=	2 HANSON DLA	SA, N.A.			
NI 09972 CANADA	⊑,	NEW VORK 11	217 1154	KL TN,		
INJ 06672, CANADA.		ADVISING PAN	217, USA.			
		EIDET SECURI	IN:			
		PANANI PRAN		PANKLID.	+ D	
		KEMAL ATATU		E DUAKA 12	12	
		FINAL ATATU		E, DRANA-12	CANADA	
PORT OF LOADING : DHAKA	AIRPORT,	CHURDED DESTINA	ATION : VA	ANCOUVER,	CANADA.	
PORT OF DISCHARGE : VANCO	UVER, CANADA.	SHIPPED PER	IA :		DOO	TOTAL
SHIPPING MARKS	DESCRIPTIO	N OF GOODS		CIN	PCS	TOTAL
			NO	QIT	CIN	P03
SHID TO WAL MART CANADA						
SHIP TO: WAL-MART CANADA	DUSTER					
	DUSTER	SWEATER				
BRAND NAME: GEORGE	OTVI E NO	DO NO				
TIEMDESCRIPTION: FOR TRIMMED	STTLE NO	PO NO	1 445	AAE Cto	0 Dee	2 560 Dee
MEASURMENTS: 17 X 17 X 12 INCH	GRF 120307G	04233 111	1-445	445 Cui	OFUS	3,300 FCS
MEASURMENTS. 17 X 17 X 12 INCH						
MADE IN BANGLADESH						
SIDE MARK						
DEDT: 22						
BRAND NAME: GEORGE						
ITEM: ELID TRIMMED DUSTED SWEATED						
STVLE: CRE120207C						
PO: 84233\/M 84234\/M 84267\/M						
COLOR: TRUE BLACK						
SIZE: S(7/8)_M(10/12)_I (14)_(2-3,2)						
OLIANTITY SPCS CARTON OF						
GW-1274LBS PRICE TICKET VEG						
	TOTAL		L	445 Ctn		3,560 Pcs
GRAND TOTAL CARTON	445 CTN					
GRAND TOTAL PCS	3,560 PCS			For,	Lte	d.
GRAND TOTAL NET WEIGHT	2,051.00 KGS					
GRAND TOTAL GROSS WEIGHT	2,571.00 KGS					
GRAND TOTAL MEASURMENT	17" X 17" X 12"					
CARTON MEASURMENT	24 00 CBM					
	BANGI ADEEL			Authorized	Signatu	-
COUNTRY OF ORIGIN	DANGLADESH			Authorized	Signatu	le

NOTES

Fig 3.11 Packing List

• **Bill of Lading**/ **Air Waybill:** A bill of lading is a contract between exporter and the carrier. There are two types of bill of lading: straight bill of lading and shipper's order bill of lading. Straight bill of lading is non-negotiable whereas shipper's order bill of lading is negotiable and can be bought, sold, or traded while the goods are in transit. These documents are required to be possessed in original by the customer to take possession of goods. Air waybill is a document that is required when air freight is used. These are shipper specific.

BILL OF LADING – SHORT FORM – NOT NEGOTIABLE

Page 1 of 1

NOTES

Date

			SHIP	FROM				Bill of L	.ading	Numb	er:		
[Name [Stree [City, SID No	e] t Address] ST ZIP Co p.:	de]								8/	AR CODE SPA	ĈĒ	
			SHI	Р ТО				Carrier	Name				
[Name [Stree [City, CID Ne	e] t Address] ST ZIP Co p.:] de]						Trailer n Serial ni	umber umber	(s):			
	THIR	D PART	Y FREIG	НТ СНА	RGES BIL	L TO		SPAC:					
[Name [Stree [City,	e] t Address] ST ZIP Co] de]						Pro Num	iber:	B/	ar code spa	CE	
Speci	al Instru	ctions:						Freight otherwise	Char):	ge Tern	1S (Freight charges are p	repaid unless	marked
								Prepaid	🗆 Co	llect 🗆	3rd Party 🗆		
								🗆 Maste	er bill o	of lading	with attached underly	ying bills of	lading.
					cı	ISTOME	RORD	ER INFO	RMAT	ION			
Custo	mer Ord	er No.				# Packa	of ages	Weigh t	Palle (circl	et/Slip e one)	Additional Shipper	r Informati	on
									Υ	N			
									Υ	N			
									Y	N			
									Υ	N			
Grane	d Total												
						CAR	RIER IN	FORMAT	ION				
Han	ndling Jnit	Pad	ckage									LTL	Only
Qty	Туре	Qty	Туре	Weigh t	HM (X)	Commo Commoditie stowing mu ordinary ca	dity De es requirin ist be so m re. See Se	escriptio og special or harked and p ction 2(e) of	n addition ackaged NMFC it	al care or a l as to ens em 360	attention in handling or ure safe transportation with	NMFC No.	Class
Where t agreed property	he rate is dep or declared va / is specificall	endent or alue of the ly stated b	n value, ship e property as by the shippe	pers are req follows: "Ti r to be not o	uired to state he agreed or exceeding	e specificall declared va	y in writin alue of the per	^{g the} CC Fe aC	DD An e term ceptat	s: Colle	t 🗆 Prepaid 🗆 Ci	ustomer che	eck
Note	e: Liabilit	y limit	ation for	loss or	damage	in this :	shipme	nt may l	oe apj	olicable	. See 49 USC § 1470	06(c)(1)(A)	and (B).
Receive been ag otherwis by the c applicat	d, subject to reed upon in se to the rate arrier and an ole state and	individuall writing be s, classific available federal re	ly determine etween the ca ations, and r to the shipp gulations.	d rates or co arrier and sh ules that ha ber, on requ	ontracts that tipper, if appl we been esta est, and to al	have licable, blished	The ca charge Shippe	rrier shal s and all er Signa	l not m other ture	iake del awful fe	ivery of this shipment es.	without pay	ment of
Shipp	er Signa	ture/D	ate		Trailer		Freigh	t Count	ed:		Carrier Signatu	re/Pickup [Date
This is t properly and are accordir	o certify that classified, p in proper cor ig to the appi	the above ackaged, i dition for licable reg	e named mat marked, and transportatio julations of th	erials are labeled, on ne DOT,	■ By shi	pper ver	⊔ By s □ By d contair □ By d	nipper Iriver/pall 1 Iriver/piec	ets sai :es	d to	Carrier acknowledges n required placards. Carri response information w carrier has the DOT em or equivalent document described above is rece noted.	eceipt of packag ler certifies eme vas made availal ergency respon tation in the vel elved in good on	pes and rgency ble and/or se guidebook hicle. Property der, except as

Fig 3.12 The Bill of Lading

- Certification of Inspection/ Quality Control: The certificate is issued by customs after the inspection of goods for their conformance to standards and the filled information. It is a necessary document for export. This document describes the condition of the goods and also confirms that the goods have been inspected. The buyer usually designates the inspecting organization.
- **Bill of Exchange:** It is an instrument for payment realization. It is legally binding written document that orders payment of specific amount of money on a predetermined future date or payment on demand. It is signed by the importer and given to the exporter. The exporter is the drawer and he draws (prepares and signs) this unconditional order in writing upon the importer (drawee) asking him to pay a certain sum of money either to himself or his nominee (endorsee).

Export and Import	
(Exim) Logistics	

Drawn under Korean Commercial Bank	Due	FORWARDING BANK'S NUMBER
L/C 6702 / 6789	1	
Royal Bank of Canada International	January 21 19.	
TRade Centre L/C 1234567		6702 / 6789
	The second second	No. 14
AT SIGHT FOR VALUE RECEIVED PAY TO THE ORDE	R OF THE	
RUYAL BANK UF CANADA THE SUM OF		
Tilty Thousand U.S.	DOLLARS \$ 50.000.00 u.s.	
D I D I I D I	Corners Automation construction gal.	RECEIVING
10 Koyal Bank of Canada		BANK'S NUMBER
International Trade Contre	BCD Execute Ltd	
Any City Any Provinc	1 Brown Echort Manager	
and any and any potential any for the contraction of the	Arrange and an and a statistic set a statistic set of the statistic set of the set of th	

Fig 3.13 Bill of Exchange

• **Shipment Advice**: This document is sent by the exporter to the buyer as soon as the shipment is made. It contains all the shipment details.

Office Fujishiro Tokyo, Japan

SHIPPING ADVICE

DATE:

Messrs.ABC TRADING CO. New York, U.S.A.

Dear Sirs,

We are pleased to advise you that your valuable orders have been shipped as follows:

INVOICE NO	ABC-1000
DESCRIPTION	TAPE
SHIPPED PER	AIR FREIGHT
FROM	TOKYO, JAPAN
то	NEW YORK, U.S.A.
ORDER NO.	F-1000
PAYMENT:	T/T 90DAYS AFTER AWB

We are sure that the goods will reach you in good and safety condition. Your kind attention and arrangement for the payment will be highly appreciated.

Yours faithfully,

Office Fujishiro

Fig 3.14 Shipping Advice

• **Insurance Certificate**: Since the stakes are very high, insurance becomes more important in export. The goods in the export are cover for the duration of transit period via some insurance cover. Once covered, insurance certificate is issued by the insurance agency.

- Certificate of Origin: This document acts as a proof of the country of origin of goods for the importer in his country. This is required to be provided at the time of custom clearance. This is an important document used by the agencies in the importing country for the calculation of liabilities and import duty. There are three types of certificate of origin:
 - (i) Certificate required by all countries for clearance of goods.
 - (ii) Certificate required for availing concessions under Commonwealth Preferences.
 - (iii) Certificate required for availing concessions under GSP extended to imports from India by certain countries like Germany, Italy, Japan, USA and New Zealand.

Certificate of Origin Template

Ce	rtifica	at	te of	Ori	gin		
Exporter Name and Address			Blanket Peri	od: (DD/MM/Y	(YY)		
			FROM:				
Tax Identification Number			то:				
Producer Name and Address			Importer Na	ime and Addre	55:		
Tax Identification Number:			Tax Identific	ation Number			
Description of Good	ł(s)	CLAS	TARRIF SSIFICATION NUMBER	PREFERENCE CREITERION	PRODUCER	COST	COUNTRY OF ORIGIN
			iniana, contain				
				1			
	20						
I CERTIFY THAT:							
 Information provided in this representations. I understand document. 	certificate is based I that I am liable for	on f r any	acts and is act false statemer	curate and I assu it or material om	ime the respon ission made on	sibility for or in cond	proving such ern with this:
 I agree to maintain and preswriting, al persons to whom certificate. 	sent upon request on this certificate was	docu s give	mentation neo en of any chan	cessary to suppor ges that would a	rt this certificate ffect accuracy c	e and to in or validi <mark>t</mark> y	form, in of this
This certificate consists of		_pag	ges including al	l attachments			
Authorized Signature:			СОМРА	NY:			
Name: (Print or Type)			TITLE:				
Date: DD/MM/YYYY Ph	: XXXXXXXXXXXXXXXXXXXXXX		Fax: xxx	XXXXXXXXXXXXXXXXXXX	Customs Fo	rm:	

Fig 3.15 Certificate of Origin

Auxiliary Documents

Auxiliary documents are the documents required for the preparation of the principal documents. Some of the types of auxiliary documents include:

1. **Performa Invoice:** it is also called estimate and is s preliminary bill of sale. It outlines a seller's intention to deliver products or services to the buyer at a specified price. It is not a true invoice as the price is not yet agreed upon. These invoices are helpful for the preparation of commercial invoices and at time used for the internal purchasing process.

ASME	Mechanical Engineer	y of 's	P F	hone: 1 ax: 973	-800-843-2763 -882-4924 0.: 13-1623899
SETTING THE STANDARD	22 Law Drive/PO Box 2900, Attention: Conformity Asses	Fairfield NJ 07007-2900 sment Finance	U.S.A.	551 NO.	: 126148048
	1.000000000000000000000000000000000000		Date:		09/20/2012
			Company ID:		10000
Proforma In	voice		Proforma Invo	oice #	CRM12345
	VOICE		Application #		1111111
			Page -		1 of 1
Billing Address:		Plant Address:			
CA Training Institute		CA Training Institute			
Plant Addr 1		Plant Addr 1			
Plant Addr 2 Plant Addr 3		Plant Addr 2 Plant Addr 3			
Plant City, NY 10013		Plant City, NY 10013			
United States		United States			
Quantity Description 1 Deposit to be applied to	the cost of the review/survey		Unit Pr 9.000	rice 0.00	Ext Price 9,000.00
Quantity Description 1 Deposito be applied to Subtotal faceicable. Certificate(c)/Stamp(c) = iii be	the cost of the review/survey		Unit Pr 9,000	rice 0.00	Ext Price 9,000.00 \$9,000.00 \$9,000.00
Quantity Description 1 Deposito be applied to Subtotal Tappicable, Cenificate(s)/Stamp(s) will be	the cost of the review/survey e mailed d ⊯äh		Unit Pr 9,000 Subtotal Advanced Paym	nice 0.00	Ext Price 9,000.00 \$9,000.00 \$9,000.00 \$9,000.00 \$0.00
Quantity Description 1 Deposition be applied to Subtotal If applicable, Certificate(s)Stamp(s) will be upon receipt of payment of this invoice and he approval of ASME.	the cost of the review/survey e mailed d wth		Unit Pr 9.000 Subtotal Advanced Paym Total Due	nice 0.00	Ext Price 9,000.00 \$9,000.00 \$9,000.00 \$0,000 \$0,000
Quantity Description 1 Deposit to be applied to Subtotal fasplicable. Cenificate(s)Stamp(s) will be pon receipt of payment of this invoice and he approval of ASME. A final invoice will be rendered at the comp	the cost of the review/survey e mailed d ⊯th pletion of		Unit Pr 9.000 Subtotal Advanced Paym Total Due	nice 0.00	Ext Price 9,000.00 \$9,000.00 \$9,000.00 \$0,000 \$9,000.00
Quantity Description 1 Deposito be applied to Subtotal Tapplicable, Certificate(s)/Stamp(s) will be upon receipt of payment of this invoice and he approval of ASME. Anal invoice will be rendered at the comp he Review assessing under or overpayme	the cost of the review/survey e mailed d wth pletion of ent as		Unit Pr 9.000 Subtotal Advanced Paym Total Due	nice 0.00 nent	Ext Price 9,000.00 \$9,000.00 \$9,000.00 \$0.00 \$9,000.00
Quantity Description 1 Deposito be applied to Subtotal fapplicable, Cenificate(s)/Stamp(s) will be popon receipt of payment of this invoice and he approval of ASME. A final invoice will be rendered at the comp he Review assessing under or overpayme pppropriate.	the cost of the review/survey e mailed d w≵h pletion of ent as		Unit P. 9.000 Subtotal Advanced Paym Total Due	nice 0.00 nent	Ext Price 9,000.00 \$9,000.00 \$9,000.00 \$9,000.00
Quantity Description 1 Deposito be applied to Subtotal Tappicable, Cerificate(3)Stamp(3) will be upon receipt of payment of this invoice and he approval of ASME. A final invoice will be rendered at the comp he Review assessing under or overpayme appropriate. Remit payments in USD to: IS Manage Charlos Renk H 0	the cost of the review/survey e mailed d with pletion of ent as		Unit Pr 9.000 Subtotal Advanced Paym Total Due	nice 0.00 nent	Ext Price 9,000.00 \$9,000.00 \$0,000.00 \$0,000.00
Quantity Description 1 Deposito be applied to Subtotal tappicable. Certificate(s)/Stamp(s) will be pon receipt of payment of this invoice and he approval of ASME. A final invoice will be rendered at the comp he Review assessing under or overpayme proportiat. Remit payments in USD to: IPM Sergan Chase Bank, N.A.	the cost of the review/survey e mailed d with pletion of ent as		Unit Pr 9.000 Subtotal Advanced Paym Total Due	nice 0.00 nent	Ext Price 9,000.00 \$9,000.00 \$9,000.00 \$9,000.00
Quantity Description 1 Deposito be applied to Subtotal tappicable, Centificate(s)/Stamp(s) will be pon receipt of payment of this invoice and he approval of ASME. A final invoice will be rendered at the comp he Review assessing under or overpayme proportiat. Remit payments in USD to: IP Morgan Chase Bank, N.A. CHIP S Participant Number 0002 or SWIFT IPM CA 8A-021-000-021	the cost of the review/survey e mailed d with pletion of ent as T: C HASUS33		Unit P 9.000 Subtotal Advanced Paym Total Due	nent	Ext Price 9,000.00 \$9,000.00 \$9,000.00 \$9,000.00
Quantity Description 1 Deposito be applied to Subtotal fappicable, Cerificate(s)Stamp(s) will be pon neceipt of payment of this invoice and he approval of ASME. A fanil invice will be rendered at the comp he Review assessing under or overpayme ppropriate. Remit payments in USD to: PM Morgan Chase Bank, N.A. CHIP S Participant Number 0002 or S WIFT PM CAB A: 021-000-021 OR FURTHER CREDIT:	the cost of the review/survey e-mailed d with pletion of ent as T: CHASUS33		Unit P 9.000 Subtotal Advanced Paym Total Due	nent	Ext Price 9.000.00 \$9.000.00 \$9.000.00 \$9.000.00
Quantity Description 1 Depositio be applied to Subtotal Tappicable, Certificate(s)/Stamp(s) will be promoved of dayment of this invoice and he approval of ASME. a final invoice will be rendered at the comp he Review assessing under or overpayme uppropriate. Note: Stamp (s) will be rendered at the comp he Review assessing under or overpayme uppropriate. Remit payments in USD to: IP Morgan Chase Bank, N.A. PUIP S Participant Number 0002 or SWIFT IPM CAB A:021:000:021 IOR FUIRTHER CREDIT: Ymerican Society of Mechanical Engineer. ME ACCOUNT #6101631700 State Account and the state of the state	the cost of the review/survey e mailed d with pletion of ent as T: CHASUS33 rs (ASME)		Unit P 9.000 Subtotal Advanced Paym Total Due	nice 0.00 nent	Ext Price 9,000.00 \$9,000.00 \$9,000.00 \$9,000.00

Fig 3.16 Performa Invoice

- **2. Intimation of Inspection**: It is a document submitted by the exporter to the inspecting agency along with the inspection fee, purchase order and invoice and contractual information (if any), so that the agency can carry the inspection.
- **3.** Shipping Instructions: This form gives details of the consignment such as its weight, size and volume, date of shipment, number of packages, name of the vessel, port of entry, name of the liner, date of arrival, etc.
- **4. Application of Certificate of Origin:** The document use by the applicant to make application to the Chamber of Commerce or Trade Association for giving the certification as stipulated in the Letter of Credit.
- **5. Insurance Declaration:** This form is also called Insurance Certificate. It assures the consignee for the coverage of loss (if any) to be covered by the insurance.

6. Mate's Receipt: Once the ship is loaded, the commanding officer issued a receipt. This is called Mate's receipt. It contains information like quantity of goods, condition of packing and number of packages.

7. Letter to Bank for Collection/Negotiation of Documents: It is a letter written to the bank requesting it for release of the stipulated funds as provided by the Letter of Credit.

Regulatory Documents

The documents required for the compliance of regulations of either the importer's country or the exporter's country are called regulatory documents. The different types of regulatory documents include:

- **1. ARE Form:** Application for Removal of Excisable (ARE) form is used by the exporter to avail export benefit under excise and custom. ARE-1 is submitted by the exporter in sixtuplicate (six copies) to the Superintendent or Inspector of Central Excise having jurisdiction over the factory or warehouse of the exporter and request for inspection. The goods are examined and if eligible an AR-4 is issued. Issue of AR-4 indicates the acceptance of considering the rebate in duty or cancellation of the bond.
- **2. Shipping Bill/Bill of Export**: This document is required by the Customs Authority for allowing shipment. It is issued by shipping agency and provides the permission for the movement of goods by sea. In case the movement happens by rail or road, "Bill of Export" is issued.

There are four types of Shipping Bill/Bill of Export. These are:

- (i) **Dutiable Shipping Bill/Bill of Export:** It is for those goods that attract duty or cess.
- (ii) Free Shipping Bill/Bill of Export: It is for those goods where export goods attract neither export duty/cess nor are covered under Duty Drawback scheme. Samples, gift parcels, free-trade, warranty replacements, etc. are covered under this category.
- (iii) **Drawback Shipping Bill/Bill of Export**: Under this scheme the export duty is paid first but is refunded.
- (iv) Ex-bond Shipping Bill/Bill of Export: This document is required when goods are shipped from the customs bonded warehouse.
- **3. GR Form (Exchange Control Declaration):** Guaranteed Remittance (GR) form is a declaration to be submitted by the exporter in the format prescribed by RBI to customs. It contains information about consignee, sender, description of goods, and full export value of goods in foreign currency, etc. The RBI checks whether all payment have been come to exporter account or not. In case all payment are not received then FERA is applied on exporter.
- **4. Vehicle Ticket:** Once the payment of duties and charges at the port happens, the port authorities issue a discharge note. This is called vehicle ticket.
- **5. Insurance Premium Payment Certificate:** It is a certification issued by the insurance agency stating that the premium for the mentioned cargo has been made and the same is insured as per the terms and conditions stated in the policy.

Check Your Progress

- Name two major categories of documents required by the exporter.
- 13. What are the two types of bill of lading?
- 14. List various regulatory documents that the exporter needs.

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3.7 SHIPMENT AND ITS PROCEDURE

An amount of a particular type of goods sent to another country using rail, road air or water transport or any other mean is called shipment. The general procedure of shipment of export cargo is as follows:

Procedure for Shipment of Export Cargo

- Shipping Order: Shipping order is the primary step involved in the shipment process. Even before the goods are ready for ship, the exporter starts looking for shipper who can provide the required space on due date. There is a possibility that the same might not be available if they start looking for the space at the last moment. Hence advance planning is necessary to meet the delivery schedule. Shipment involves many more steps before the goods are finally dispatched.
- Clearing and Forwarding Agents: CFAs or clearing and forwarding agents are people who have knowledge of export documentation and procedure. They are specialized in the area and have experience of handling product for the country where it is to be exported. Depending upon the kind of service/services the exporter is looking forward to, they select the CFAs. While all CFAs provides basic or mandatory services, very few provide optional services. They guide exporter about the modes of transport, alternative route, cost of transport and also help in selecting the best suited one. They also provide assistance in the procedural formalities of the customs and port authorities.
- Shipping Documents: The moment the goods reaches the warehouse, the exporter arranges for a set of documents called shipping documents to be passed on to the forwarding agent. The set comprise of the following documents:
 - 1. Commercial Invoice (in duplicate)
 - 2. ARE-1 in original, duplicate and sixtuplicate
 - 3. Letter of Credit along with export contract or export order
 - 4. GR form (in duplicate) / SDF form (in duplicate) where shipping bills are electronically processed in Customs House
 - 5. Packing list or Packing Note
 - 6. Certificate of Origin
 - 7. Marine Insurance Policy
 - 8. Certificate of inspection, wherever necessary
- Verification of Documents at Customs House: No cargo that is meant for export is allowed for loading without getting the custom clearance and so verification of documents at the custom house is to be carried out. For this, all the documents mentioned above and five copies of shipping bill are submitted to the custom house for appraisal. The Customs House examines compliance of formalities relating to Pre-Shipment inspection, Quality Control, Exchange Control, and compliance of requisite Licensing by the exporter. Once the verification is complete, all documents except the original copy of Shipping Bill, original copy of GR, and one copy of Commercial Invoice are returned

to the exporter. The successful completion of verification leads to issue of "Shipping Bill Number" and completion of GR1 and its dispatch to RBI.



- **Obtaining 'Carting Order' from the Port Authorities:** A carting order is issued for the movement of goods in the port premises. The cargo is moved for the warehouse to the port and is kept in the warehouse moved to the port, the permission from the gate inspector is taken and goods are unloaded and kept in assigned sheds.
- **Customs Examination of Cargo at Docks:** The physical examination of goods are arranged either at the warehouse or the factory premises to ascertain the compliance with respect to the ordered goods. The main purpose of the inspection is to see whether the goods are same as the one mentioned on the shipping bill or not. The goods are then sealed in presence of the custom officials and "Let Export Order" is issued to permit export.
- Obtaining 'Let Ship Order' from the Customs: As discussed earlier, after the inspection of the goods, if the custom officials are satisfied with the inspection, a 'Let export Order' is issued. This certificate allows the loading of the cargo on the board the vessel nominated for the export.
- Mate's Receipt: Once the goods are loaded on board the vessel, a document called "Mate's Receipt" is issued by the Captain or Master of the ship. This

document certifies the loading of the cargo on board the vessel. Details like the number of packages, brief description of the cargo, the shipping marks, the name of the vessel and the date of issue, etc. are mentioned in this document.

- Port Trust Dues and Collection of Bill of Lading: The Mate's Receipt discussed above is handed over to the port authorities, Exporter collects the same by paying port dues. The exporter then submits the "Mate Receipt" to the shipping company and get "Bill of Lading" in negotiable and non-negotiable copies.
- **Documents with Exporter:** At the end of the shipping process, the exporter has the following documents:
 - 1. An export promotion copy of Shipping Bill.
 - 2. A copy of the invoice duly attested by customs authorities.
 - 3. Full sets of clean bill of lading along with the requisite non-negotiable copies of bill of lading.
 - 4. ARE-1 form in original (for claiming excise refund) and sixtuplicate (for claiming export incentives).
 - 5. The original Letter of Credit and export contract/export order

3.8 DELIVERY TO DISTRIBUTORS AND RETAILERS

Delivery through distribution or cross docking is method where goods are shipped the same day or overnight without being stored. In this case, loading dock is used as a staging area where incoming shipments are quickly transferred to the outgoing shipment. This eliminates the need to put the goods in storage or warehouse and thus the need for inventory storage is no more there. It also helps in reducing the overall logistics cost as the cost of warehouse is saved.

The different types of cross docking are as follows:

- 1. Manufacturing Cross Docking: In this kind of cross docking, the logistics partner receives the purchased and inbound products which is required in the manufacturing process. This product is then shipped to the manufacturer.
- **2. Distributor Cross Docking:** When the logistics providers consolidate products received from various exporter into a mixed product pallet and deliver it to the importer when the final item is received, this is called distributor cross docking.
- **3. Transportation Cross Docking:** When the logistics providers consolidate shipments from a number of different carriers in the less-than-truckload (LTL) and small package and then transport them together, this is called transport cross docking.
- **4. Retail Cross Docking**: When the logistics provider receives the goods from a number of exporter and then sort out the outbound trucks for a number of retail stores, this is called retail cross docking.
- **5. Opportunistic Cross Docking**: This kind of cross docking can be used by any export house. It involves transferring a product directly from the goods receiving dock to the outbound shipping dock to meet a known demand or a customer sales order.

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3.9 IMPORT LOGISTICS

There are many individuals who want to start an export business. If an importer proceeds with right strategy, it is also profitable. However, in the long-term, success of it depends upon the importers' knowledge of the business and understanding about the international market. Today millions of products are sold, brought, distributed, represented daily worldwide. Imports can be defined as a goods bought into jurisdiction especially across a national border. The goods may be bought by citizens, businesses and government. The person who bought the goods is called importer. An import for the receiving country is export for the sending country.

Risk of Import

No business is free from risk and the same is the case with imports. The various risks involved in the import business are as follows:

- **1. Currency Risk:** Since the currency fluctuates on a daily basis, the amount payable at the time of final settlement may be higher than the once estimated at the time of entering into contract.
- **2. Transportation Risk**: When goods are in transit, they might be stolen or damaged or lost. These risk are called transportation risk.
- **3. Non-Delivery or Non-Performance:** There is always a risk that the supplier may not deliver the goods as per the agreed quality or at the agreed time. This is taken care by involving an external inspection agency to inspect the quality and standards of the goods.
- **4. Trader Risk:** Change in the government regulation may restrict of prevent the importer from making the payments or exchange foreign currency.
- **5.** Country risk: Change in the government may affect the import or the ability of the importer or exporter to receive or send the goods.
- **6.** Foreign Currency: Many countries regulate the transfer of money and conversion of foreign currency. Sudden change in these regulations may affect the import.

In spite of all these risk, import is still carried out. The various reasons for the import of goods are:

- Availability: The import of goods might be carried out as the individual or business house is not able to produce or grow the product in his home country.
- **Price:** Another reason for carrying out import is the price. There are certain products which are cheaper when imported from a foreign country. For example, Chinese toys.
- **Prestige or Cachet:** There are many products like champagne, electronics goods, certain fruits, fashion goods, and so on, that are imported as they carry more of a prestige issue for the user. Examples are: French Perfume, Belgian Chocolates, and so on.

Advantages of Import

The advantages of imports are as follows:

• The import of goods help countries and individuals to access best products and services, as theses from across the globe can be availed.

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- It also provides cheap resourcing of products and thus give a price edge to the importer
- Imports can improve the standard of living of people of that country by making product available at a cheaper price.

Disadvantages of Import

The disadvantages of imports are as follows:

- Many a time, foreign goods proved to be a killer for the domestic goods. Domestics businesses are not able to compete with the imported goods in terms of quality, price and hence loses the business.
- Import of goods leads to the loss of valuable foreign exchange.
- If import leads to decrease in demand for the local goods, it may lead to unemployment as many of the businesses may be closed.

Import Process

In spite of all the risk and the disadvantages, the import of goods is carried out. The import of goods follows a set of activities. These activities are as follows:

- **The Purchase:** The first stage of the import process is that the importer locates international suppliers for his product or service and negotiates transaction and payments terms. Before placing the order, the terms and conditions for the payment transaction are agreed upon.
- **Buyer Issues:** Once the purchase decision is being made, the next stage is to issue purchase order
- **Supplier Prepare Order**: After receiving the buyer, the supplier prepares order and issue packing list.
- **Supplier Create Commercial Invoice:** Once the supplier received the order, the next stage is to prepare export documents required by the importing country. Documents like commercial invoice, packing list, etc. are prepared.
- **Carrier:** Carrier management involves planning for the transportation and preparation of way bill. Once everything is arranged, the goods are shipped by the exporter as per the arranged transport.



Fig 3.18 Overview of the Import Process

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- Arrange Custom Clearance: The exporter arranges custom clearance of the goods to be shipped.
- **Documents Presented to Custom:** Once the exporter is ready with the order, the next stage is to prepare the documents. Documents like Export Declaration B13a, commercial invoice, certificate of origin, permits (if required) are prepared and are shared with the importer.
- **Custom Clearance:** The exporter obtains the custom clearance and ships the goods to the imported. The detail of the consignment is also sent o the importer.
- Goods Received and Receiving report: The importer receives the goods at the port by presenting the necessary documents to the custom of its country and receives the goods. The report of the same is sent to the exporter for the payment of dues and settlement of account.

Categories of Import

There are three categories of import. These are as follows:

- (i) Freely Importable Goods: These goods are free to import and are imported under Open General License.
- (ii) Restricted/Licensed Imports: These goods require license for import.
- (iii) **Prohibited Items:** These goods are not permitted to be imported from other countries.

3.10 DOCUMENTS COLLECTION

Document collection is a process, in which the seller (Exporter) instructs his bank to forward the documents related to the export of goods to the buyer's (Importer's) bank with a request to present these documents to the buyer (Importer) for payment. It requires the exporter to ship the product and create a negotiable document. These documents are then processed through the importer's bank or through importer's and exporter's bank. Once these documents arrive in the bank, the buyer is notified about its arrival and a request for payment is made. Once the payment is made, the documents are released to the buyer. These documents are used for obtaining the possession of goods and getting custom clearance.

The various steps involved in the documents collection are as follows:

- (i) The buyer and the seller agreed to trade and enter into a contract. The orders are placed.
- (ii) The seller ships the goods as per the contract conditions.
- (iii) Once goods are shipped, the seller receives the necessary document and prepares them as per the agreement.
- (iv) These documents are submitted to the exporter's bank.
- (v) Exporter's bank forwards these documents to the importer's bank.
- (vi) After receiving the documents, the importer's bank reimburses to the exporter's bank.
- (vii) The exporter's bank then makes the payments to the exporter.
- (viii) Once the payments are made, the documents are released to the importer.

Check Your Progress

15. What is a loading dock? Name different types of cross docking.

16. List the various risks involved in the import business.

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- (ix) The importer then use these documents to receive goods and get custom clearance.
- Export and Import (Exim) Logistics
- (x) Once the clearance is revived, the goods are handed over to the importer.



The buyer presents the documents to and claims the goods from the carrier.

goods are handed over to the buyer.

10. Upon clearance, the

Fig 3.19 Document Collection Process

The various advantages of document collection to the importer (buyer) and exporter (seller) are as follows:

Advantages of a Documentary Collection for Importers

- This method ensures that importer will pay the exporter after shipment of goods.
- This is a less complicated method as compared to other options like letter of credit.
- It is less expensive as compared to other alternatives like letter of credit.
- It enables the importer to view the shipment documents before payment.

Advantages of a Documentary Collection for Exporters

• It ensures that the exporter recieves the payments. Banks play a limited role in the transaction. Their role is not to surrender the documents to the importer unless the payments are made.

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- This is a less complicated method as compared to other options like letter of credit.
- Exporter retains the title of goods.
- It is less expensive as compared to other alternatives like letter of credit.

CHARACTERISTICS OF A DOCUMENTARY COLLECTION

Applicability

Recommended for use in established trade relationships and in stable export markets.

Risk

Exporter is exposed to more risk as D/C terms are more convenient and cheaper than an LC to the importer.

Pros

- Bank assistance in obtaining payment
- The process is simple, fast, and less costly than LCs

Cons

- Banks' role is limited and they do not guarantee payment
- Banks do not verify the accuracy of the documents

Fig 3.20 Documentary Collection



Valuation:

3.11 VALUING

Every time goods are imported, the valuations of the goods are required to be presented. There are many methods. **Valuation** can be defined as the determination of correct value of goods. The valuation of goods serves the following purpose:

- It helps in determining the custom duty. Custom duty is often charged as a percentage of the value of the imported goods.
- It also helps in determining the import, VAT and other taxes, as these are also calculated as a percentage of the value of the imported goods.

It refers to the process of determining the correct value of goods.

Self-Instructional 96 Material The value of goods also helps in determining the trade statistics.

Methods of Valuing

There are six methods of custom valuation. The primary method is called transaction value. Transaction value is calculated by taking into account the price paid for the goods as per the invoice and adding the following amount (not included in the price). It comprises:

- 1. Cost of packing and packaging charges
- 2. Commissions and brokerage fees
- 3. Royalties and license fees paid by buyer
- 4. The value (apportioned as appropriate) of any goods and services supplied by the buyer free or at a reduced cost for the production and sale for export of the goods.
- 5. Transportation, loading, unloading, insurance and handling charges prior to export.
- 6. The value of any part of the proceeds of any resale, disposal, or use of the goods by the buyer that accrues or is to accrue (directly or indirectly) to the seller.
- 7. The value of any materials, parts, or other goods incorporated to repair or refurbish the goods before export and the price paid for the repair or refurbishment.

The following are deducted:

- 1. Any customs duties or other taxes payable in the country of import for the importation or sale of the goods, cost of transportation, loading, unloading, insurance and handling charges for the imported goods from the time the goods have left the country of export.
- 2. Any reasonable cost, charge, or expense incurred for the transportation or insurance of the imported goods.
- 3. Any reasonable cost, charge, or expenses for the construction, technical assistance, erection, assembly, or maintenance after the goods are imported.

Since the transaction value method is subject to number of requirements, there are certain cases when it cannot be used. These are:

- (i) There are no restrictions about the use of the goods by the buyer, other than those
 - (a) Limiting the geographical area of sales of goods
 - (b) Imposed by law
 - (c) That don't substantially affects the value of the goods.
- (ii) If the transaction value of goods is not acceptable.
- (iii) If the imported goods haven't been sold for export.
- (iv) If the price payable or paid is affected by the relationship between buyer and seller.

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Fig 3.21 Methods of Valuing

In all such cases, other methods are used. These encompass:

- Transaction Value of Identical Goods
- Transaction Value of Similar Goods
- Computed Method of Valuation
- Residual Method
- Deductive Method

Transaction Value of Identical Goods: When transaction value method cannot be used for valuing, established value for duty of identical goods is used. Identical goods are goods that are same in all respects as the goods being appraised. They might have minor difference in appearance but that do not differentiate the value. Also the identical goods are from the same country.

Transaction Value of Similar Goods: When transaction and identical goods value cannot be used, the established value for duty of similar goods is considered. The basic qualification/ characteristics that the goods must possess for similar goods are:

- 1. It should have ability to perform same function.
- 2. It should closely resemble the similar goods.
- 3. It should be commercially interchangeable.
- 4. It should be produced in the same country.

Residual Method: This valuing method does not specify any specific requirement for determining the value of goods. It is applied when the value of goods cannot be determined on the basis of any of the above-discussed method. In this method,

the value is based on the unit price at which, imported goods or identical or similar imported goods are sold in the greatest aggregate quantity to persons who are not related to the sellers.

3.12 BONDING

Bonding can be defined as the warehousing of goods in custom declared area or warehouse on execution of a bond without payment of duty for a stipulated or required time period. The custom declared area may be a public, private or personal area. The purpose of this facility is to give the importer enough time to pay the duty and taxes and receive clearance. A bond is required for all commercial import. The section of customs department that deals with bond is called Bond Section because the imported goods are bonded to customs till the payment of duty is made in full. The importer agrees to the following conditions. An importer will:

- Pay duties, taxes and all charges in a timely manner.
- Produce documents and evidence of shipment.
- Complete all the entries.
- Redeliver merchandise if requested.
- Rectify any non-compliance with provision for admission.
- Reimburse exoneration.
- Let the custom examine the merchandise.
- Comply with special requirements on duty free entries.

Procedure of Bonding

The procedure of bonding is as follows:

- Import documents are received and are verified.
- Bill of Entry is filled
- Bill of Entry, Double Duty Bond and Trans-shipment Bond are assessed and executed.
- Once the Double Duty Bond and Trans-shipment Bond is approved, the cargo moved to inland container depot or any custom authorized bonded warehouse.
- The goods moved to the bonded warehouse are given a "Bond Number" by the custom official. This number is used in all communication related to the bonded goods.

Different Types of Customs Bonds

The types of bond depend upon the quantity and kind of transaction involved. The most common types are: 'Single Entry Bond' and 'Continuous Bonds'.

- **1. Single Entry Bond**: It is a bond that can be used for a particular transaction. It can be used only once. They are required to be used at the port which is specified in the bond.
- **2. Continuous Bonds**: This is a bond that can be used over a period of time (usually annual period) and covers all transactions taking place during that time. These bonds can also be used at multiple ports and hence provide considerable saving.

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3.13 WAREHOUSING: FUNCTION AND TYPES

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Imported goods after landing at the country of import are permitted to be stored at a warehouse till the payment of duties are made. The law lays down the time period up to which such goods can be stored in the warehouse, without incurring any interest liability and with interest liability. The advantage of this facility is that imported goods can be cleared on payment of duty in instalments also.

The goods can be warehoused for a period of one year in bonded warehouse and up to a period of five years in case the goods are intended to be used in export oriented unit (EOU). This facility can be extended by the Commissioner of Customs for a period of six months and by the Chief Commissioner of Customs for such further period as is deemed fit by him. To avail the extension of warehousing period, the importers should file the applications for extension well before the expiry of the initial/extended period. But the extensions in warehousing is neither a matter of right nor a routine affair; it is granted only in such cases where the goods have to be stored in the warehouse under circumstances beyond the control of the importer. However the lack of funds to pay the duty is not considered as valid reason to approve extension but may be given for a short period. The warehousing period can also be decrease in case the Commissioner of Customs feels that the goods are perishable or likely to be perished.

Kind of Warehouse

The warehouse can be a public owned warehouse, like the one owned by the Central Warehousing Corporation, Port Trust of India or a private warehouse. If it is a private warehouse, it has to get a license for the same. The Asst. Commissioner of Customs after verifying the private warehouse can issue a license.

The following things are inspected during the verification procedure:

- 1. During verification, it is ensured that there is no risk to custom revenue.
- 2. The place is secure for storing non-duty paid imported goods.
- 3. There is no risk of theft, loss of deteriorations of the goods for any reason.
- 4. The capacity of the warehouse and the expected custom duty from it is also evaluated.

The license is issued for a period of one year and can be cancelled at any point of time by giving one month notice.

As per the rule, only the goods belonging to the licensee can be stored in the private warehouse. Only in those cases where the public warehouse is not available, the facility can be used by other importers. For using the facility of the private warehouse, the importer has to receive the consent from the private warehouse licensee.

3.14 CUSTOMS FORMALITIES AND CLEARING

The various custom formalities in the import of the goods are:

• Valuation: It includes assessment of custom duty on the imported goods. Based on the Bill of Entry, the valuation of the goods is made by the custom
department. The goods are appraised by the customs official by classification of goods in the appropriate category. Customs also appraises the goods on the basis of purpose of importing goods and based on all these, import duty on the goods is decided upon. They also check the goods for violation of law.

- **Examination of the Goods**: It includes physical examination and quantity checking of the goods. Random samples can be opened and examined at the 'Custom Examination Yard' for the conformance to the documents and import regulations. An examination report is prepared and sent to the clearance department.
- **Custom Clearance**: After the examination process, if the goods are found to adhere to all the standards and the custom duties are paid, the clearance is given to the importer to take possession of the goods and a 'Out of Custom Charge' certificate is issued.

Customs Clearing

Every country has its own laws for custom clearance. It helps in checking goods against illegal import and charges proper taxes against the incoming and outgoing of goods. The imported goods are required to obtain custom clearance before they are sent to the importer for sale or for the warehouse for storage. The importer fills a statutory document known as 'Bill of Entry' in the Import Department of the Customs House. The 'Bill of Entry' contains exhaustive details like information about the vessel carrying the goods, nationality of the vessel, number of packages, quantity, weight, number of units of each kind, description of goods, value of goods, rate of duty- auxiliary and additional duty, separately, value of the goods in foreign exchange, currency exchange rate, freight and insurance details, handling charges, value of goods in domestic market, etc. The importer also signs documents related to the conformance to the correctness of the data declared in the Bill of Entry, value in the invoice produced in commission received (if any) and special relationship (if any) with foreign suppliers.

The date of presentation of the Bill of Entry is important, as the duty rate of that day will be applicable on calculating all the duty and taxes irrespective of the date when the goods are assessed. The Bill of Entry is accompanied by various documents that are necessary for getting clearance. These documents includes Invoice, Bill of Lading, Packing List, Import Licence, Catalogue/Literature (wherever required), Copies of Indent, Acceptance, Letter of Credit, Bank Draft, etc.

The Bill of Entry along with the above-mentioned documents are presented to the appraising section where the goods are assessed for duty. The assessment involves three aspects. These are:

- 1. Valuation
- 2. Classification of the goods under the Customs Tariff and Import Control
- 3. Good Clearance

This Bill of Entry is subject to verification by the customs officials and can be re-assessed if declarations are found to be incorrect or if the customs official is not satisfied with the provided documents. In case no discrepancies are observed during the examination of the goods, 'Out of Charge' order is issued and thereafter the goods can be cleared. Export and Import (Exim) Logistics

The various documents required for import customs clearance are:

- 1. Bill of Entry
- 2. Bill of Lading / Air waybill
- 3. Import License
- 4. Insurance Certificate
- 5. Test Report (if any)
- 6. GATT/DGFT Declaration
- 7. Purchase Order/Letter of Credit
- 8. Technical Write up, Literature etc. for Specific Goods (if any)
- 9. Industrial License (if any)
- 10. RCMC. Registration-cum-Membership Certificate (if any)
- 11. DEEC/DEPB /ECGC or any other Documents for Duty Benefits

3.14.1 Distribution to Units

The final stage in the import process is to load the goods after the custom clearance and send them or distribute them to the importers distribution centre or warehouse. It might seem very simple process of transporting but the reality is very different; it is as complicated as the other processes till date. The logistics provider arranges for the shipping of goods form the custom warehouse to the distributor unit. Goods are uploaded to the carriage containers after verifying it against packaging list, palletize or shrink wrap. The customer is notified about the upload and movement of vehicle. At the distribution unit, the unloading and racking of goods happens and the receipt of delivery is acknowledged by the importer.

The challenge is to arrange the type of logistics after giving due consideration to quantity of items to be shipment, cost of transportations, type of products (perishable, non-perishable, dangerous), time needed to deliver goods to the client, etc. Logistics management takes care of need of the customer and arranges appropriate means of inbound logistics and manages the distribution in an optimal manner.

3.15 SECURITY AND INSURANCE

Security in general can be considered as freedom from danger or as an act of showing force. During transportation, the goods are required to be secured so that negative disruption in the movement of goods can be avoided. This is called logistics security. Logistics security requires a combination of preventive measure like integration of human and material resource, technological support, vehicle, system, infrastructure, and so on, to carry out this act. Technological development in anti-theft devices, RFID (Radio-frequency identification) tags, GPS, etc., are used to keep the product and cargo safe.

A few of the international security measures are:

Customs–Trade Partnership against Terrorism (C–TPAT): This is a voluntary system established by the United States Bureau of Customs and Border Protection (CBP). The purpose of it is to create an environment where close co-operation exist between US importers, international exporter and carriers. The parties are required to conduct a comprehensive assessment of security in the supply chain and submit

a predefined questionnaire to CBP, develop and implement a programme to improve security and communicate the guidelines to other partners in the supply chain.

Container Security Initiative (CSI): Under this system, customs officers from CBP are stationed around the world at the major departure ports and keep a check on the containers bound for the United States. It uses four main elements to keep a check:

- 1. Uses intelligence and automated information to identify containers that pose a risk of terrorism.
- 2. Conducts a pre-screening of suspected containers at the port of departure rather than on their arrival at United States.
- 3. Uses detection technology to pre-screen suspected containers.
- 4. Uses tamper-proof containers.

Secure Freight Initiative (SFI): It involves use of latest technology to scan containers.

Advanced Manifest Regulations (AMR): All the importer and exporter are required to send advance details about the cargo to be shipped to or from the USA. If the information is incomplete or get delayed because of any reason, it could result in issue of 'No Load' or additional checking of the cargo.

Tactical Security Measures

It includes security measures taken for vehicles, distribution centres and for employees handling the goods.

- (a) Vehicle Security: Vehicles may be attacked either during the transit or at the warehouse, hence a security measure to protect the same is needed. Various security measures used for vehicles include:
 - i. Alarms for Different Circumstances
 - ii. Air Brake Immobilizers
 - iii. Steering Locks
 - iv. Starter Motor Immobilization
 - v. Wheel Clamps
 - vi. Fuel Valve Immobilization
 - vii. Kingpin Locks
 - viii. Break-glass Detectors
 - ix. Satellite Tracking/in-transit Visibility
- (b) **Distribution Centre Location**: The security measures taken at the distribution centre includes appropriate fencing with the following:
 - i. Gates with Restricted entry
 - ii. Closed Circuit Television (CCTV)
 - iii. Intruder Alarms
 - iv. Appropriate Lighting
- (c) **Personnel**: Care should also be taken while recruiting staff. Many times, criminals intrude into the organization by applying for job. Appropriate verification and background check should be carried out while recruiting staff for critical jobs.

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Marine insurance: It covers the loss or damage of ships, cargo, terminals, and any transport or cargo by which property is transferred, acquired, or held between the points of origin and final destination.

3.15.1 Insurance

The insurance used in import export is called **marine insurance**. Section 3 of the Marine Insurance Act, 1963 defines a contract of marine insurance as an insurance cover for marine cargo, air cargo and post parcels. Thus, it covers transportation by:

- 1. Sea, air or land
- 2. Rail/road
- 3. Air
- 4. Port

Singly or jointly, it provides insurance or protection to goods in 'transit' and also extends to stored goods.

Features of Marine Insurance Policy

The basic features of marine policies are as follows:

- The duration of the marine insurance policy is based on the institute cargo clause yet it is provided to include the period of transit, the time of discharge of the goods and the time of arrival of the goods. Generally, the duration of the policy covers time up to 30 days after arrival of the goods in case of air shipments and 60 days after the arrival of shipments by sea to allow for the transportation.
- The marine cargo insurance policies are freely assignable as the consignee finally takes the goods pass through various hands before the consignee finally takes their delivery.
- Insurable interest of the claimant must exist at the time of loss of the cargo.
- The assignment is done by endorsement and delivery.
- The value of the insurance policy is the sum agreed between the insured and the insurer. Thus these policies are always on agreed value basis.
- The contract of marine insurance is a contract of commercial indemnity and not pure indemnity because this insurance provides for indemnity against the loss of profits as well.

The various types of marine insurance policies are as follows:

- 1. Open Cover
- 2. Specific Voyage Policy
- 3. Mixed Policy
- 4. Floating Policy
- 5. Time Policy
- 6. Unvalued Policy
- 7. Valued Policy
- 8. Fleet Policy
- 9. Specific Cover Policy

Procedure for Obtaining Marine Insurance Policy

The following is the procedure for obtaining marine insurance policy:

- a. Selecting the Insurance Company
- b. Deciding the Appropriate Type of Policy among the available ones.
- c. Application to the Insurance Company in the prescribed 'Declaration Form, giving details like:
 - Address of the exporter and importer
 - Description of goods
 - Marks, numbers and kind of packages
 - Value of packages
 - Transportation from the warehouse to its final destination
 - Risk to be-covered for insurance
 - Any other information as required

Once the forms are filled, the payment of the premium is made to the insurance company. When its insurance policy is issued, it contains details like:

- Name and address of the exporter.
- Type of policy and description of the risks covered.
- Description of the goods insured.
- Amount of sum assured and premium paid.
- Date of issue and the period of policy.
- Special conditions and warranties.
- Special instructions regarding the procedure to be followed in the event of loss.

The policy documents are submitted to the bank along with all the other documents.

Procedure for Filing Marine Insurance Claim

The following steps are followed in the event of a marine loss:

- a. The insurance provider is intimated about the loss.
- b. The claim is filed. It should be done within the stipulated time.
- c. A surveyor is appointed by the insurance company to determine the cause and extent of loss. Details like sufficiency of package, protraction of right of recovery, way to minimize the claim, extent of cover, etc. are verified.
- d. A landing remark from the port is also required to be received and submitted along with other documents.
- e. The claim document is submitted.
- f. Claim is finalized and final settlement is done.

Documents for Claims

The following documents are required for the claim settlement:

1. Original insurance policy or certificate of insurance duly endorsed by the insured.

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- 2. Copy of invoice with packing/weight list.
- 3. Full set of Bill of Lading in respect of total loss claims. Otherwise nonnegotiating copy of the Bill of Lading, Airway Bill, Railway, etc., as applicable.
- 4. Insurance Survey Report or other documentary evidence to substantiate cause and extent of loss.
- 5. Port Authority Landing Remarks Certificate.
- 6. Joint-ship Survey Discrepancy Certificate issued by the carriers.
- 7. Casualty report when a vessel is missing or lost.
- 8. In case of short landing claims, a Short Landing Certificate issued by the carrier or port authority.
- 9. Ship master's protest or an authenticated copy of extract from ship's log book in case vessel encountered heavy weather or other casualty during the voyage.
- 10. A landed but Missing Certificate from port authority in case where package has landed but is missing.
- 11. Triplicate copy of Bill of Entry (in case of India).
- 12. In the event of General Average claim for refund of GA Deposit, the GA Deposit Receipt and GA Counter-Guarantee.
- 13. Copies of correspondence exchanged with carriers to examine whether the claimant has taken necessary measures.
- 14. Copies of Letter lodging claims on the carriers, port authority, etc.
- 15. Letter of subrogation duly stamped and signed; and
- 16. Any other document as may be asked for by the insurers.

3.16 MULTIMODAL TRANSPORT

The transport in which more than one mode of transport is used for a single contract is called multimodal transport. It uses at least two different modes of transport. The carriage is often performed by sub-carriage which provides a particular type of transport. All means of transport are not necessarily possessed by a single carriage. The carrier responsible for the entire carriage is called a Multimodal Transport Operator (MTO).

Multimodal Transport came into force on 2nd April 1993. It provides for the regulation of Multimodal Transportation of Goods from any place in India to any place outside India involving two or more modes of Transport on the basis of a single Multimodal Transport Contract.

A person can register himself as a Multimodal Transport operator or carried out Multimodal Transportation by registering as MTO under MMTG Act, 1993. The registration is carried out by Director General of Shipping. Once registered, the registration is valid for period of 1 year and may be renewed for further period of one year from time to time.

Check Your Progress

- Define bonding. List different types of Customs Bond.
- List the various types of Marine Insurance Policy.

Self-Instructional 106 Material The key benefits of multimodal transport are:

- 1. It minimizes the time loss at trans-shipment points as the communication links are maintained and carriages are well coordinated. This helps in smooth movement and reduces the transit time.
- 2. Since time loss is less, it provides a faster mode of transportation.
- 3. As there is no need to issue multiple documents for different modes of transport, it reduces the burden of documentation and formalities.
- 4. A single agency deals with the entire transportation and so insurances and other costs are reduced.
- 5. It also reduces the risk of loss or damage as a single agency is coordinating the operation.

3.16.1 The UN Convention on International Multimodal Transport of Goods

This Convention in Geneva, on 24th May 1980, establishes liability rules for international transport of goods where more than one means of transport is used. It is called UN Convention on International Multimodal Transport (MT) of Goods. It establishes documentation requirements and dispute resolution procedures whenever multimodal transport is involved in the international transport. It consists of 8 parts and 40 articles.

The various parts are:

- Part I General Provisions
- Part II Documentation
- Part III Liability of the Multimodal Transport Operator
- Part IV Liability of the Consignor
- Part V Claims and Actions
- Part VI Supplementary Provisions
- Part VII Customs Matters
- Part VIII Final Clauses

The States Parties to this Convention,

Recognizing

- (a) That international multimodal transport is one means of facilitating the orderly expansion of world trade;
- (b) The need to stimulate the development of smooth, economic and efficient multimodal transport services adequate to the requirements of the trade concerned;
- (c) The desirability of ensuring the orderly development of international multimodal transport in the interest of all countries and the need to consider the special problems of transit countries;
- (d) The desirability of determining certain rules relating to the carriage of goods by international multimodal transport contracts, including equitable provisions concerning the liability of multimodal transport operators;

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- (e) The need that this Convention should not affect the application of any international convention or national law relating to the regulation and control of transport operations;
- (f) The right of each State to regulate and control at the national level multimodal transport operators and operations;
- (g) The need to have regard to the special interest and problems of developing countries, for example, as regards introduction of new technologies, participation in multimodal services of their national carriers and operators, cost efficiency thereof and maximum use of local labour and insurance;
- (h) The need to ensure a balance of interests between suppliers and users of multimodal transport services;
- (i) The need to facilitate customs procedures with due consideration to the problems of transit countries;

Agreeing to the following basic principles:

- (a) That a fair balance of interests between developed and developing countries should be established and an equitable distribution of activities between these groups of countries should be attained in international multimodal transport;
- (b) That consultation should take place on terms and conditions of service, both before and after the introduction of any new technology in the multimodal transport of goods, between the multimodal transport operator, shippers, shippers' organizations and appropriate national authorities;
- (c) The freedom for shippers to choose between multimodal and segmented transport services;
- (d) That the liability of the multimodal transport operator under this Convention should be based on the principle of presumed fault or neglect,

Have decided to conclude a Convention for this purpose and have thereto agreed as follows:

PART I: GENERAL PROVISIONS

Article 1: Definitions

For the purposes of this Convention:

- 1. 'International multimodal transport' means the carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country. The operations of pick-up and delivery of goods carried out in the performance of a unimodal transport contract, as defined in such contract, shall not be considered as international multimodal transport.
- 2. 'Multimodal transport operator' means any person who on his own behalf or through another person acting on his behalf concludes a multimodal transport contract and who acts as a principal, not as an agent or on behalf of the consignor or of the carriers participating in the multimodal transport operations, and who assumes responsibility for the performance of the contract.

- 3. 'Multimodal transport contract' means a contract whereby a multimodal transport operator undertakes, against payment of freight, to perform or to procure the performance of international multimodal transport.
- 4. 'Multimodal transport document' means a document which evidences a multimodal transport contract, the taking in charge of the goods by the multimodal transport operator, and an undertaking by him to deliver the goods in accordance with the terms of that contract.
- 5. 'Consignor' means any person by whom or in whose name or on whose behalf a multimodal transport contract has been concluded with the multimodal transport operator, or any person by whom or in whose name or on whose behalf the goods are actually delivered to the multimodal transport operator in relation to the multimodal transport contract.
- 6. 'Consignee' means the person entitled to take delivery of the goods.
- 7. 'Goods' includes any container, pallet or similar article of transport or packaging, if supplied by the consignor.
- 8. 'International convention' means an international agreement concluded among States in written form and governed by international law.
- 9. "Mandatory national law" means any statutory law concerning carriage of goods the provisions of which cannot be departed from by contractual stipulation to the detriment of the consignor.
- 10. 'Writing' means, inter alia, telegram or telex.

Article 2: Scope of application

The provisions of this Convention shall apply to all contracts of multimodal transport between places in two States, if:

- (a) The place for the taking in charge of the goods by the multimodal transport operator as provided for in the multimodal transport contract is located in a Contracting State, or
- (b) The place for delivery of the goods by the multimodal transport operator as provided for in the multimodal transport contract is located in a Contracting State.

Article 3: Mandatory application

- 1. When a multimodal transport contract has been concluded which according to article 2 shall be governed by this Convention, the provisions of this Convention shall be mandatorily applicable to such contract.
- 2. Nothing in this Convention shall affect the right of the consignor to choose between multimodal transport and segmented transport.

Article 4: Regulation and control of multimodal transport

- 1. This Convention shall not affect, or be incompatible with, the application of any international convention or national law relating to the regulation and control of transport operations.
- 2. This Convention shall not affect the right of each State to regulate and control at the national level multimodal transport operations and multimodal transport operators, including the right to take measures relating to consultations,

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especially before the introduction of new technologies and services, between multimodal transport operators, shippers, shippers' organizations and appropriate national authorities on terms and conditions of service; licensing of multimodal transport operators; participation in transport; and all other steps in the national economic and commercial interest.

3. The multimodal transport operator shall comply with the applicable law of the country in which he operates and with the provisions of this Convention.

PART II; DOCUMENTATION

Article 5: Issue of multimodal transport document

- 1. When the goods are taken in charge by the multimodal transport operator, he shall issue a multimodal transport document which, at the option of the consignor, shall be in either negotiable or non-negotiable form.
- 2. The multimodal transport document shall be signed by the multimodal transport operator or by a person authorized by the transport operator.
- 3. The signature on the multimodal transport document may be in handwriting, printed in facsimile, perforated, stamped, in symbols, or made by any other mechanical or electronic means, if not inconsistent with the law of the country where the multimodal transport document is issued.
- 4. If the consignor so agrees, a non-negotiable multimodal transport document may be issued by making use of any mechanical or other means preserving a record of the particulars stated in article 8 to be contained in the multimodal transport document. In such a case the multimodal transport operator, after having taken the goods in charge, shall deliver to the consignor a readable document containing all the particulars so recorded, and such document shall for the purposes of the provisions of this Convention be deemed to be a multimodal transport document.

Article 6: Negotiable multimodal transport document

- 1. Where a multimodal transport document is issued in negotiable form:
 - (a) It shall be made out to order or to bearer;
 - (b) If made out to order it shall be transferable by endorsement;
 - (c) If made out to bearer it shall be transferable without endorsement;
 - (d) If issued in a set of more than one original it shall indicate the number of originals in the set;
 - (e) If any copies are issued each copy shall be marked "non-negotiable copy".
- 2. Delivery of the goods may be demanded from the multimodal transport operator or a person acting on his behalf only against surrender of the negotiable multimodal transport document duly endorsed where necessary.
- 3. The multimodal transport operator shall be discharged from his obligation to deliver the goods if, where a negotiable multimodal transport document has been issued in a set of more than one original, he or a person acting on his behalf has in good faith delivered the goods against surrender of one of such originals.

Article 7: Non-negotiable multimodal transport document

- 1. Where a multimodal transport document is issued in non-negotiable form it shall indicate a named consignee.
- 2. The multimodal transport operator shall be discharged from his obligation to deliver the goods if he makes delivery thereof to the consignee named in such non-negotiable multimodal transport document or to such other person as he may be duly instructed, as a rule, in writing.

Article 8: Contents of the multimodal transport document

- 1. The multimodal transport document shall contain the following particulars:
 - (a) The general nature of the goods, the leading marks necessary for identification of the goods, an express statement, if applicable, as to the dangerous character of the goods, the number of packages or pieces, and the gross weight of the goods or their quantity otherwise expressed, all such particulars as furnished by the consignor;
 - (b) The apparent condition of the goods;
 - (c) The name and principal place of business of the multimodal transport operator;
 - (d) The name of the consignor;
 - (e) The consignee, if named by the consignor;
 - (f) The place and date of taking in charge of the goods by the multimodal transport operator;
 - (g) The place of delivery of the goods;
 - (h) The date or the period of delivery of the goods at the place of delivery, if expressly agreed upon between the parties;
 - (i) A statement indicating whether the multimodal transport document is negotiable or non-negotiable;
 - (j) The place and date of issue of the multimodal transport document;
 - (k) The signature of the multimodal transport operator or of a person having authority from him;
 - (1) The freight for each mode of transport, if expressly agreed between the parties, or the freight, including its currency, to the extent payable by the consignee or other indication that freight is payable by him.
 - (m) The intended journey route, modes of transport and places of transhipment, if known at the time of issuance of the multimodal transport document;
 - (n) The statement referred to in paragraph 3 of article 28;
 - (o) Any other particulars which the parties may agree to insert in the multimodal transport document, if not inconsistent with the law of the country where the multimodal transport document is issued.
- 2. The absence from the multimodal document of one or more of the particulars referred to in paragraph 1 of this article shall not affect the legal character of the document as a multimodal transport document provided that it nevertheless meets the requirements set out in paragraph 4 of article 1.

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Article 9: Reservations in the multimodal transport document

- 1. If the multimodal transport document contains particulars concerning the general nature, leading marks, number of packages or pieces, weight or quantity of the goods which the multimodal transport operator or a person acting on his behalf knows, or has reasonable grounds to suspect, do not accurately represent the goods actually taken in charge, or if he has no reasonable means of checking such particulars, the multimodal transport operator or a person acting on his behalf shall insert in the multimodal transport document a reservation specifying these inaccuracies, grounds of suspicion or the absence of reasonable means of checking.
- 2. If the multimodal transport operator or a person acting on his behalf fails to note on the multimodal transport document the apparent condition of the goods, he is deemed to have noted on the multimodal transport document that the goods were in apparent good condition.

Article 10: Evidentiary effect of the multimodal transport document

Except for particulars in respect of which and to the extent to which a reservation permitted under article 9 has been entered:

- (a) The multimodal transport document shall be prima facie evidence of the taking in charge by the multimodal transport operator of the goods as described therein; and
- (b) Proof to the contrary by the multimodal transport operator shall not be admissible if the multimodal transport document is issued in negotiable form and has been transferred to a third party, including a consignee, who has acted in good faith in reliance on the description of the goods therein.

Article 11: Liability for intentional misstatements or omissions

When the multimodal transport operator, with intent to defraud, gives in the multimodal transport document false information concerning the goods or omits any information required to be included under paragraph 1(a) or (b) of article 8 or under article 9, he shall be liable, without the benefit of the limitation of liability provided for in this Convention, for any loss, damage or expenses incurred by a third party, including a consignee, who acted in reliance on the description of the goods in the multimodal transport document issued.

Article 12: Guarantee by the consignor

- 1. The consignor shall be deemed to have guaranteed to the multimodal transport operator the accuracy, at the time the goods were taken in charge by the multimodal transport operator, or particulars relating to the general nature of the goods, their marks, number, weight and quantity and, if applicable, to the dangerous character of the goods, as furnished by him for insertion in the multimodal transport document.
- 2. The consignor shall indemnify the multimodal transport operator against loss resulting from inaccuracies in or inadequacies of the particulars referred to in paragraph 1 of this article. The consignor shall remain liable even if the multimodal transport document has been transferred by him. The right of the multimodal transport operator to such indemnity shall in no way limit his

liability under the multimodal transport contract to any person other than the consignor.

Article 13: Other documents

The issue of the multimodal transport document does not preclude the issue, if necessary, of other documents relating to transport or other services involved in international multimodal transport, in accordance with applicable international conventions or national law. However, the issue of such other documents shall not affect the legal character of the multimodal transport document.

PART III: LIABILITY OF THE MULTIMODAL TRANSPORT OPERATOR

Article 14: Period of responsibility

- 1. The responsibility of the multimodal transport operator for the goods under this Convention covers the period from the time he takes the goods in his charge to the time of their delivery.
- 2. For the purpose of this article, the multimodal transport operator is deemed to be in charge of the goods:
 - (a) From the time he has taken over the goods from:
 - (i) The consignor or a person acting on his behalf; or
 - (ii) An authority or other third party to whom, pursuant to law or regulations applicable at the place of taking in charge, the goods must be handed over for transport;
 - (b) Until the time he has delivered the goods:
 - (i) By handing over the goods to the consignee; or
 - (ii) In cases where the consignee does not receive the goods from the multimodal transport operator, by placing them at the disposal of the consignee in accordance with the multimodal transport contract or with the law or with the usage of the particular trade applicable at the place of delivery; or
 - (iii) By handing over the goods to an authority or other third party to whom, pursuant to law or regulations applicable at the place of delivery, the goods must be handed over.
- 3. In paragraphs 1 and 2 of this article, reference to the multimodal transport operator shall include his servants or agents or any other person of whose services he makes use for the performance of the multimodal transport contract, and reference to the consignor or consignee shall include their servants or agents.

Article 15: The liability of the multimodal transport operator for his servants, agents and other persons

Subject to article 21, the multimodal transport operator shall be liable for the acts and omissions of his servants or agents, when any such servant or agent is acting within the scope of his employment, or of any other person of whose services he makes use for the performance of the multimodal transport contract, when such

person is acting in the performance of the contract, as if such acts and omissions were his own.

Article 16: Basis of liability

- 1. The multimodal transport operator shall be liable for loss resulting from loss of or damage to the goods, as well as from delay in delivery, if the occurrence which caused the loss, damage or delay in delivery took place while the goods were in his charge as defined in article 14, unless the multimodal transport operator proves that he, his servants or agents or any other person referred to in article 15 took all measures that could reasonably be required to avoid the occurrence and its consequences.
- 2. Delay in delivery occurs when the goods have not been delivered within the time expressly agreed upon or, in the absence of such agreement, within the time which it would be reasonable to require of a diligent multimodal transport operator, having regard to the circumstances of the case.
- 3. If the goods have not been delivered within 90 consecutive days following the date of delivery determined according to paragraph 2 of this article, the claimant may treat the goods as lost.

Article 17: Concurrent causes

Where fault or neglect on the part of the multimodal transport operator, his servants or agents or any person referred to in article 15 combines with another cause to produce loss, damage or delay in delivery, the multimodal transport operator shall be liable only to the extent that the loss, damage or delay in delivery is attributable to such fault or neglect, provided that the multimodal transport operator proves the part of the loss, damage or delay in delivery not attributable thereto.

Article 18: Limitation of liability

- 1. When the multimodal transport operator is liable for loss resulting from loss of or damage to the goods according to article 16, his liability shall be limited to an amount not exceeding 920 units of account per package or other shipping unit or 2.75 units of account per kilogram of gross weight of the goods lost or damaged, whichever is the higher.
- 2. For the purpose of calculating which amount is the higher in accordance with paragraph 1 of this article, the following rules apply:
 - (a) Where a container, pallet or similar article of transport is used to consolidate goods, the packages or other shipping units enumerated in the multimodal transport document as packed in such article of transport are deemed packages or shipping units. Except as aforesaid the goods in such article of transport are deemed one shipping unit.
 - (b) In cases where the article of transport itself has been lost or damaged, that article of transport, if not owned or otherwise supplied by the multimodal transport operator, is considered one separate shipping unit.
- 3. Notwithstanding the provisions of paragraphs 1 and 2 of this article, if the international multimodal transport does not, according to the contract, include carriage of goods by sea or by inland waterways, the liability of the multimodal transport operator shall be limited to an amount not exceeding 8.33 units of account per kilogram of gross weight of the goods lost or damaged.

- 4. The liability of the multimodal transport operator for loss resulting from delay in delivery according to the provisions of article 16 shall be limited to an amount equivalent to two and a half times the freight payable for the goods delayed, but not exceeding the total freight payable under the multimodal transport contract.
- 5. The aggregate liability of the multimodal transport operator, under paragraphs 1 and 4 or paragraphs 3 and 4 of this article, shall not exceed the limit of liability for total loss of the goods as determined by paragraph 1 or 3 of this article.
- 6. By agreement between the multimodal transport operator and the consignor, limits of liability exceeding those provided for in paragraphs 1, 3 and 4 of this article may be fixed in the multimodal transport document.
- 7. "Unit of account" means the unit of account mentioned in article 31.

Article 19: Localized damage

When the loss of or damage to the goods occurred during one particular stage of the multimodal transport, in respect of which an applicable international convention or mandatory national law provides a higher limit of liability than the limit that would follow from application of paragraphs 1 to 3 of article 18, then the limit of the multimodal transport operator's liability for such loss or damage shall be determined by reference to the provisions of such convention or mandatory national law.

Article 20: Non-contractual liability

- 1. The defences and limits of liability provided for in this Convention shall apply in any action against the multimodal transport operator in respect of loss resulting from loss of or damage to the goods, as well as from delay in delivery, whether the action be founded in contract, in tort or otherwise.
- 2. If an action in respect of loss resulting from loss of or damage to the goods or from delay in delivery is brought against the servant or agent of the multimodal transport operator, if such servant or agent proves that he acted within the scope of his employment, or against any other person of whose services he makes use for the performance of the multimodal transport contract, if such other person proves that he acted within the performance of the contract, the servant or agent or such other person shall be entitled to avail himself of the defenses and limits of liability which the multimodal transport operator is entitled to invoke under this Convention.
- 3. Except as provided in article 21, the aggregate of the amounts recoverable from the multimodal transport operator and from a servant or agent or any other person of whose services he makes use for the performance of the multimodal transport contract shall not exceed the limits of liability provided for in this Convention.

Article 21: Loss of the right to limit liability

1. The multimodal transport operator is not entitled to the benefit of the limitation of liability provided for in this Convention if it is proved that the loss, damage or delay in delivery resulted from an act or omission of the multimodal transport operator done with the intent to cause such loss, damage or delay

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or recklessly and with knowledge that such loss, damage or delay would probably result.

2. Notwithstanding paragraph 2 of article 20, a servant or agent of the multimodal transport operator or other person of whose services he makes use for the performance of the multimodal transport contract is not entitled to the benefit of the limitation of liability provided for in this Convention if it is proved that the loss, damage or delay in delivery resulted from an act or omission of such servant, agent or other person, done with the intent to cause such loss, damage or delay or recklessly and with knowledge that such loss, damage or delay would probably result.

PART IV: LIABILITY OF THE CONSIGNOR

Article 22: General rule

The consignor shall be liable for loss sustained by the multimodal transport operator if such loss is caused by the fault or neglect of the consignor, or his servants or agents when such servants or agents are acting within the scope of their employment. Any servant or agent of the consignor shall be liable for such loss if the loss is caused by fault or neglect on his part.

Article 23: Special rules on dangerous goods

- 1. The consignor shall mark or label in a suitable manner dangerous goods as dangerous.
- 2. When the consignor hands over dangerous goods to the multimodal transport operator or any person acting on his behalf, the consignor shall inform him of the dangerous character of the goods and, if necessary, the precautions to be taken. If the consignor fails to do so and the multimodal transport operator does not otherwise have knowledge of their dangerous character:
 - (a) The consignor shall be liable to the multimodal transport operator for all loss resulting from the shipment of such goods; and
 - (b) The goods may at any time be unloaded, destroyed or rendered innocuous, as the circumstances may require, without payment of compensation.
- 3. The provisions of paragraph 2 of this article may not be invoked by any person if during the multimodal transport he has taken the goods in his charge with knowledge of their dangerous character.
- 4. If, in cases where the provisions of paragraph 2(b) of this article do not apply or may not be invoked, dangerous goods become an actual danger to life or property, they may be unloaded, destroyed or rendered innocuous, as the circumstances may require, without payment of compensation except where there is an obligation to contribute in general average or where the multimodal transport operator is liable in accordance with the provisions of article 16.

PART V: CLAIMS AND ACTIONS

Article 24: Notice of loss, damage or delay

1. Unless notice of loss or damage, specifying the general nature of such loss or damage, is given in writing by the consignee to the multimodal transport

operator not later than the working day after the day when the goods were handed over to the consignee, such handing over is prima facie evidence of the delivery by the multimodal transport operator of the goods as described in the multimodal transport document.

- 2. Where the loss or damage is not apparent, the provisions of paragraph 1 of this article apply correspondingly if notice in writing is not given within six consecutive days after the day when the goods were handed over to the consignee.
- 3. If the state of the goods at the time they were handed over to the consignee has been the subject of a joint survey or inspection by the parties or their authorized representatives at the place of delivery, notice in writing need not be given of loss or damage ascertained during such survey or inspection.
- 4. In the case of any actual or apprehended loss or damage the multimodal transport operator and the consignee shall give all reasonable facilities to each other for inspecting and tallying the goods.
- 5. No compensation shall be payable for loss resulting from delay in delivery unless notice has been given in writing to the multimodal transport operator within 60 consecutive days after the day when the goods were delivered by handing over to the consignee or when the consignee has been notified that the goods have been delivered in accordance with paragraph 2(b)(ii) or (iii) of article 14.
- 6. Unless notice of loss or damage, specifying the general nature of the loss or damage, is given in writing by the multimodal transport operator to the consignor not later than 90 consecutive days after the occurrence of such loss or damage or after the delivery of the goods in accordance with paragraph 2(b) of article 14, whichever is later, the failure to give such notice is prima facie evidence that the multimodal transport operator has sustained no loss or damage due to the fault or neglect of the consignor, his servants or agents.
- 7. If any of the notice periods provided for in paragraphs 2, 5 and 6 of this article terminates on a day which is not a working day at the place of delivery, such period shall be extended until the next working day.
- 8. For the purpose of this article, notice given to a person acting on the multimodal transport operator's behalf, including any person of whose services he makes use at the place of delivery, or to a person acting on the consignor's behalf, shall be deemed to have been given to the multimodal transport operator, or to the consignor, respectively.

Article 25: Limitation of actions

- Any action relating to international multimodal transport under this Convention shall be time-barred if judicial or arbitral proceedings have not been instituted within a period of two years. However, if notification in writing, stating the nature and main particulars of the claim, has not been given within six months after the day when the goods were delivered or, where the goods have not been delivered, after the day on which they should have been delivered, the action shall be time-barred at the expiry of this period.
- 2. The limitation period commences on the day after the day on which the multimodal transport operator has delivered the goods or part thereof or, where

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the goods have not been delivered, on the day after the last day on which the goods should have been delivered.

- 3. The person against whom a claim is made may at any time during the running of the limitation period extend that period by a declaration in writing to the claimant. This period may be further extended by another declaration or declarations.
- 4. Provided that the provisions of another applicable international convention are not to the contrary, a recourse action for indemnity by a person held liable under this Convention may be instituted even after the expiration of the limitation period provided for in the preceding paragraphs if instituted within the time allowed by the law of the State where proceedings are instituted; however, the time allowed shall not be less than 90 days commencing from the day when the person instituting such action for indemnity has settled the claim or has been served with process in the action against himself.

Article 26: Jurisdiction

- 1. In judicial proceedings relating to international multimodal transport under this Convention, the plaintiff, at his option, may institute an action in a court which, according to the law of the State where the court is situated, is competent and within the jurisdiction of which is situated one of the following places:
 - (a) The principal place of business or, in the absence thereof, the habitual residence of the defendant; or
 - (b) The place where the multimodal transport contract was made, provided that the defendant has there a place of business, branch or agency through which the contract was made; or
 - (c) The place of taking the goods in charge for international multimodal transport or the place of delivery; or
 - (d) Any other place designated for that purpose in the multimodal transport contract and evidenced in the multimodal transport document.
- 2. No judicial proceedings relating to international multimodal transport under this Convention may be instituted in a place not specified in paragraph 1 of this article. The provisions of this article do not constitute an obstacle to the jurisdiction of the Contracting States for provisional or protective measures.
- 3. Notwithstanding the preceding provisions of this article, an agreement made by the parties after a claim has arisen, which designates the place where the plaintiff may institute an action, shall be effective.
- 4. (a) Where an action has been instituted in accordance with the provisions of this article or where judgement in such an action has been delivered, no new action shall be instituted between the same parties on the same grounds unless the judgement in the first action is not enforceable in the country in which the new proceedings are instituted.
 - (b) For the purposes of this article neither the institution of measures to obtain enforcement of a judgement nor the removal of an action to a different court within the same country shall be considered as the starting of a new action.

Article 27: Arbitration

- 1. Subject to the provisions of this article, parties may provide by agreement evidenced in writing that any dispute that may arise relating to international multimodal transport under this Convention shall be referred to arbitration.
- 2. The arbitration proceedings shall, at the option of the claimant, be instituted at one of the following places;
 - (a) A place in a State within whose territory is situated:
 - (i) The principal place of business of the defendant or, in the absence thereof, the habitual residence of the defendant; or
 - (ii) The place where the multimodal transport contract was made, provided that the defendant has there a place of business, branch or agency through which the contract was made; or
 - (iii) The place of taking the goods in charge for international multimodal transport or the place of delivery; or
 - (b) Any other place designated for the purpose in the arbitration clause or agreement.
- 3. The arbitrator or arbitration tribunal shall apply the provisions of this Convention.
- 4. The provisions of paragraphs 2 and 3 of this article shall be deemed to be part of every arbitration clause or agreement and any term of such clause or agreement which is inconsistent therewith shall be null and void.
- 5. Nothing in this article shall affect the validity of an agreement on arbitration made by the parties after the claim relating to the international multimodal transport has arisen.

PART VI: SUPPLEMENTARY PROVISIONS

Article 28: Contractual Stipulations

- 1. Any stipulation in a multimodal transport contract or multimodal transport document shall be null and void to the extent that it derogates, directly or indirectly, from the provisions of this Convention. The nullity of such a stipulation shall not affect the validity of other provisions of the contract or document of which it forms a part. A clause assigning benefit of insurance of the goods in favour of the multimodal transport operator or any similar clause shall be null and void.
- 2. Notwithstanding the provisions of paragraph 1 of this article, the multimodal transport operator may, with the agreement of the consignor, increase his responsibilities and obligations under this Convention.
- 3. The multimodal transport document shall contain a statement that the international multimodal transport is subject to the provisions of this Convention which nullify any stipulation derogating therefrom to the detriment of the consignor or the consignee.
- 4. Where the claimant in respect of the goods has incurred loss as a result of a stipulation which is null and void by virtue of the present article, or as a result of the omission of the statement referred to in paragraph 3 of this article, the

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multimodal transport operator must pay compensation to the extent required in order to give the claimant compensation in accordance with the provisions of this Convention for any loss of or damage to the goods as well as for delay in delivery. The multimodal transport operator must, in addition, pay compensation for costs incurred by the claimant for the purpose of exercising his right, provided that costs incurred in the action where the foregoing provision is invoked are to be determined in accordance with the law of the State where proceedings are instituted.

Article 29: General Average

- 1. Nothing in this Convention shall prevent the application of provisions in the multimodal transport contract or national law regarding the adjustment of general average, if and to the extent applicable.
- 2. With the exception of Article 25, the provisions of this Convention relating to the liability of the multimodal transport operator for loss of or damage to the goods shall also determine whether the consignee may refuse contribution in general average and the liability of the multimodal transport operator to indemnify the consignee in respect of any such contribution made or any salvage paid.

Article 30: Other Conventions

- 1. This Convention does not modify the rights or duties provided for in the Brussels International Convention for the unification of certain rules relating to the limitation of owners of sea-going vessels of 25 August 1924; in the Brussels International Convention relating to the limitation of the liability of owners of sea-going ships of 10 October 1957; in the London Convention on limitation of liability for maritime claims of 19 November 1976; and in the Geneva Convention relating to the limitation of the liability of owners of inland navigation vessels (CLN) of 1 March 1973, including amendments to these Conventions, or national law relating to the limitation of liability of owners of sea-going ships and inland navigation vessels.
- 2. The provisions of Articles 26 and 27 of this Convention do not prevent the application of the mandatory provisions of any other international convention relating to matters dealt with in the said articles, provided that the dispute arises exclusively between parties having their principal place of business in States parties to such other convention. However, this paragraph does not affect the application of paragraph 3 of article 27 of this Convention.
- 3. No liability shall arise under the provisions of this Convention for damage caused by a nuclear incident if the operator of a nuclear installation is liable for such damage:
 - (a) Under either the Paris Convention of 29 July 1960 on Third Party Liability in the Field of Nuclear Energy as amended by the Additional Protocol of 28 January 1964 or the Vienna Convention of 21 May 1963 on Civil Liability for Nuclear Damage, or amendments thereto; or
 - (b) By virtue of national law governing the liability for such damage, provided that such law is in all respects as favourable to persons who may suffer damage as either the Paris or Vienna Conventions.

4. Carriage of goods such as carriage of goods in accordance with the Geneva Convention of 19 May 1956 on the Contract for the International Carriage of Goods by Road in article 2, or the Berne Convention of 7 February 1970 concerning the Carriage of Goods by Rail, article 2, shall not for the States Parties to Conventions governing such carriage be considered as international multimodal transport within the meaning of article 1, paragraph 1, of this Convention, in so far as such States are bound to apply the provisions of such Conventions to such carriage of goods.

Article 31: Unit of account or monetary unit and conversion

- 1. The unit of account referred to in article 18 of this Convention is the Special Drawing Right as defined by the International Monetary Fund. The amounts referred to in article 18 shall be converted into the national currency of a State according to the value of such currency on the date of the judgement or award or the date agreed upon by the parties. The value of a national currency, in terms of the Special Drawing Right, of a Contracting State which is a member of the International Monetary Fund, shall be calculated in accordance with the method of valuation applied by the International Monetary Fund, in effect on the date in question, for its operations and transactions. The value of a national currency in terms of the International Monetary Fund, shall be calculated in a member of a national currency in terms of the Special Drawing Right of a Contracting State which is not a member of the International Monetary Fund, shall be calculated in a manner determined by that State.
- 2. Nevertheless, a State which is not a member of the International Monetary Fund and whose law does not permit the application of the provisions of paragraph 1 of this article may, at the time of signature, ratification, acceptance, approval or accession or at any time thereafter, declare that the limits of liability provided for in this Convention to be applied in its territory shall be fixed as follows: with regard to the limits provided for in paragraph 1 of article 18 to 13,750 monetary units per package or other shipping unit or 41.25 monetary units per kilogram of gross weight of the goods, and with regard to the limit provided for in paragraph 3 of article 18 to 124 monetary units.
- 3. The monetary unit referred to in paragraph 2 of this article corresponds to sixty-five and a half milligrams of gold of millesimal fineness nine hundred. The conversion of the amount referred to in paragraph 2 of this article into national currency shall be made according to the law of the State concerned.
- 4. The calculation mentioned in the last sentence of paragraph 1 of this article and the conversion referred to in paragraph 3 of this article shall be made in such a manner as to express in the national currency of the Contracting State as far as possible the same real value for the amounts in article 18 as is expressed there in units of account.
- 5. Contracting States shall communicate to the depositary the manner of calculation pursuant to the last sentence of paragraph 1 of this article, or the result of the conversion pursuant to paragraph 3 of this article, as the case may be, at the time of signature or when depositing their instruments of ratification, acceptance, approval or accession, or when availing themselves of the option provided for in paragraph 2 of this article and whenever there is a change in the manner of such calculation or in the result of such conversion.

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PART VII: CUSTOMS MATTERS

Article 32: Customs transit

- 1. Contracting States shall authorize the use of the procedure of customs transit for international multimodal transport.
 - 2. Subject to provisions of national law or regulations and intergovernmental agreements, the customs transit of goods in international multimodal transport shall be in accordance with the rules and principles contained in articles I to VI of the Annex to this Convention.
- 3. When introducing laws or regulations in respect of customs transit procedures relating to multimodal transport of goods, Contracting States should take into consideration articles I to VI of the Annex to this Convention.

PART VIII: FINAL CLAUSES

Article 33: Depositary

The Secretary-General of the United Nations is hereby designated as the depositary of this Convention.

Article 34: Signature, ratification, acceptance, approval and accession

- 1. All States are entitled to become Parties to this Convention by:
 - (a) Signature not subject to ratification, acceptance or approval; or
 - (b) Signature subject to and followed by ratification, acceptance or approval; or
 - (c) Accession.
- 2. This Convention shall be open for signature as from 1 September 1980 until and including 31 August 1981 at the Headquarters of the United Nations in New York.
- 3. After 31 August 1981, this Convention shall be open for accession by all States which are not signatory States.
- 4. Instruments of ratification, acceptance, approval and accession are to be deposited with the depositary.
- 5. Organizations for regional economic integration, constituted by sovereign States members of UNCTAD, and which have competence to negotiate, conclude and apply international agreements in specific fields covered by this Convention shall be similarly entitled to become Parties to this Convention in accordance with the provisions of paragraphs 1 to 4 of this article, thereby assuming in relation to other Parties to this Convention the rights and duties under this Convention in the specific fields referred to above.

Article 35: Reservations

No reservation may be made to this Convention.

Article 36: Entry into force

1. This Convention shall enter into force 12 months after the Governments of 30 States have either signed it not subject to ratification, acceptance or approval

or have deposited instruments of ratification, acceptance, approval or accession with the depositary.

2. For each State which ratifies, accepts, approves or accedes to this Convention after the requirements for entry into force given in paragraph 1 of this article have been met, the Convention shall enter into force 12 months after the deposit by such State of the appropriate instrument.

Article 37: Date of application

Each Contracting State shall apply the provisions of this Convention to multimodal transport contracts concluded on or after the date of entry into force of this Convention in respect of that State.

Article 38: Rights and obligations under existing conventions

If, according to articles 26 or 27, judicial or arbitral proceedings are brought in a Contracting State in a case relating to international multimodal transport subject to this Convention which takes place between two States of which only one is a Contracting State, and if both these States are at the time of entry into force of this Convention equally bound by another international convention, the court or arbitral tribunal may, in accordance with the obligations under such convention, give effect to the provisions thereof.

Article 39: Revision and amendments

- 1. At the request of not less than one third of the Contracting States, the Secretary-General of the United Nations shall, after the entry into force of this Convention, convene a conference of the Contracting States for revising or amending it. The Secretary-General of the United Nations shall circulate to all Contracting States the texts of any proposals for amendments at least three months before the opening date of the conference.
- 2. Any decision by the revision conference, including amendments, shall be taken by a two thirds majority of the States present and voting. Amendments adopted by the conference shall be communicated by the depositary to all the Contracting States for acceptance and to all the States signatories of the Convention for information.
- 3. Subject to paragraph 4 below, any amendment adopted by the conference shall enter into force only for those Contracting States which have accepted it, on the first day of the month following one year after its acceptance by two thirds of the Contracting States. For any State accepting an amendment after it has been accepted by two thirds of the Contracting States, the amendment shall enter into force on the first day of the month following one year after its acceptance by two thirds accepted by two thirds of the Contracting States, the amendment shall enter into force on the first day of the month following one year after its acceptance by that State.
- 4. Any amendment adopted by the conference altering the amounts specified in article 18 and paragraph 2 of article 31 or substituting either or both the units defined in paragraphs 1 and 3 of article 31 by other units shall enter into force on the first day of the month following one year after its acceptance by two thirds of the Contracting States. Contracting States which have accepted the altered amounts or the substituted units shall apply them in their relationship with all Contracting States.

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- 5. Acceptance of amendments shall be effected by the deposit of a formal instrument to that effect with the depositary.
- 6. Any instrument of ratification, acceptance, approval or accession deposited after the entry into force of any amendment adopted by the conference shall be deemed to apply to the Convention as amended.

Article 40: Denunciation

- 1. Each Contracting State may denounce this Convention at any time after the expiration of a period of two years from the date on which this Convention has entered into force by means of a notification in writing addressed to the depositary.
- 2. Such denunciation shall take effect on the first day of the month following the expiration of one year after the notification is received by the depositary. Where a longer period is specified in the notification, the denunciation shall take effect upon the expiration of such longer period after the notification is received by the depositary.

In witness whereof the undersigned, being duly authorized thereto, have affixed their signatures hereunder on the dates indicated.

Done at Geneva on 24 May 1980 in one original in the Arabic, Chinese, English, French, Russian and Spanish languages, all texts being equally authentic.

3.17 TERMINAL NETWORKS: TYPES AND ROLES

Terminal can be defined as any location where freight and passengers originate, terminate, or are handled in the transportation process. These are central and intermediate locations in the movements of passengers and freight. They often require specific facilities and equipment to accommodate the traffic they handle. These may also be points of interchange of mode of transport and hence acts as a link between various modes.

The major objectives of transport terminals are:

- 1. To provide shortest or the best lead time to the customer through relevant warehousing and cross docking facilities.
- 2. To reduce the cost of transportation by adopting appropriate size of vehicle or vessel as per the pickup or delivery conditions.

Functions of Terminal Network

Three major functions of a terminal network are:

- 1. Location: The major function of terminal is to serve large number of customers or to support large amount of industrial activities. Different terminals have different location constrains like port or airport sites. Because of high land cost, many new terminals have been constructed outside the city.
- **2.** Accessibility: Another function of terminal is accessibility to other terminals at local or global level via different routes. For example, if a maritime terminal is well connected to port but is poorly connected to inland transport or to the market, it has very little reliance.

3. Infrastructure: The terminal should be well equipped to handle and transship freight and passengers and hence requires sufficient infrastructure for the same. The capacity of the terminal to a great extinct depends upon the amount of land they occupy, their labor, technological and managerial intensity. Infrastructure considerations should be based on existing and anticipated future requirements.



Fig 3.22 Functions of Terminal Network

Types of Terminals

There are two main types of terminal: Passenger Terminal and Freight Terminal

- **1. Passenger Terminal:** These terminals are responsible for the movement of people
- **2. Freight Terminal:** At these terminal goods are moved or trans-shipped. There are three types of freight terminals, rail, port and airport:
 - Rail
 - Port
 - Air Port Terminal

The major characteristics of freight terminal can be divided into two parts: core and ancillary characteristics.

- **1. The Core (Operations) Characteristics**: They include Infrastructure facilities like raid, dock, siding facility, unloading area etc. Another part of the core characteristics is equipment; like storing equipment, intermodal lifting equipment, etc. The availability of storage facility for empty or loaded container is also a part of core operation requirement. The administrative facilities, administration, maintenance, access point, information system are another components to the core operations
- 2. The Value added Functions: They include container services, trade facilitation, storage depot and distribution centre. The various container services include repair, washing and preparation of containers. A terminal also provides trade facilities like free trade zone, logistical facilities and distribution facilities like cross docking, trans-loading, temperature control facilities or cold storage facility.

Table 3.1 Major Characteristics of Freight Terminal

	Infrastructure	Modal access (dock, siding, road), unloading areas
	Storage	Yard for empty and loaded containers
	Equipment	Intermodal lifting equipment, storing equipment
Core		Administration, maintenance, access (gates),
(Operations)	Management	information systems
	Container services	Washing, preparation, repair
	Trade facilitation	Free trade zone, logistical services
	Storage depot	Container depot, bulk storage
Ancillary (Value		Trans-loading, cross-docking, warehousing,
Added)	Distribution centres	temperature controlled (cold chain)

3.18 SUMMARY

Some of the important concepts discussed in this unit are:

- In order to manage time and cost in the most optimal way, companies need to formulate their EXIM policy.
- The entire process of movement of goods through ports in international logistics is time consuming: the difference in time zone and communication makes it further complex. The international logistics unit is responsible for the management, planning, coordinating and controlling of the logistics activities.
- Any company, before committing its resources to venture in the export business, must carefully assess the benefit and challenges of exporting into a new market.
- The various stages of the export process should be carefully investigated and the required process and documentations should be arranged carefully. The most important operational activity to be managed in export is the logistics operations.
- Order picking can be defined as the process of receiving goods in a specified quantity from storage or warehouse and shipping them to the customer. It is a part of supply chain process and is very labour intensive.
- The packaging should be such that the container is able to withstand multiple loading and unloading impact, should be adequately sealed and the weight should be appropriately distributed.
- Once the picking and the packing of the goods are complete, the next stage is to arrange vessels for their transportation to the country where the goods are to be sent.
- Every country has its own rules and regulations related to the export and import of goods, outside the country or within the country. These rules are enforced by customs officials.
- There are number of documents that are required to be prepared by the exporter in order to arrange export of his goods. These documents help in smooth flow of goods and payments thereof.

Check Your Progress

 When was the UN Convention on International Multimodal Transport (MT) of Goods established?

20. What are the two main types of terminal?

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- No cargo meant for export is allowed for loading without getting the custom clearance and so verification of documents at the custom house is to be carried out.
- There are many individuals who want to start an export business. If an importer proceeds with right strategy, it is also profitable. However, in the long-term, success of it depends upon the importers' knowledge of the business and understanding about the international market.
- Imported goods after landing at the country of import are permitted to be stored at a warehouse till the payment of duties are made. The law lays down the time period up to which such goods can be stored in the warehouse, without incurring any interest liability and with interest liability.
- The imported goods are required to obtain custom clearance before they are sent to the importer for sale or for the warehouse for storage. The importer fills a statutory document known as 'Bill of Entry' in the Import Department of the Customs House.
- The final stage in the import process is to load the goods after the custom clearance and send them or distribute them to the importers distribution centre or warehouse.
- The insurance used in import export is called marine insurance. Under Section 3 of the Marine Insurance Act, 1963 defines a contract of marine insurance as an insurance cover for marine cargo, air cargo and post parcels.
- A Convention in Geneva, on 24th May 1980, establishes liability rules for international transport of goods where more than one means of transport is used. It is called UN Convention on International Multimodal Transport (MT) of Goods.
- The major function of terminal network is to serve large number of customers or to support large amount of industrial activities. The terminal should be well equipped to handle and tranship freight and passengers and hence requires sufficient infrastructure.

3.19 ANSWERS TO 'CHECK YOUR PROGRESS'

- 1. In order to manage time and cost in the most optimal way, companies need to formulate their EXIM (Export and Import) policy.
- 2. The international logistics unit is responsible for the management, planning, coordinating and controlling of the logistics activities.
- 3. There are several advantages of exporting goods. These include:
 - Increased sales and profits
 - Gaining global market share
 - Enhanced domestic competitiveness
 - Compensate for seasonal demands
 - Diversification
 - Sell excess production capacity
 - Gain new knowledge and experience

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4. Order picking can be defined as the process of receiving goods in a specified quantity from storage or warehouse and shipping them to the customer. It is a part of supply chain process and is very labour intensive. The types of order picking are: discrete order picking, zone picking, batch picking, cluster picking and wave picking.

- 5. Packaging plays a vital role in the logistics. From making the transportation possible to protecting the goods during transit, it propels and moves the system forward. The major functions of packaging are: Protect Function, Storage Support, Transport Support, Cost Reduction and Facilitation of Handling.
- 6. Tertiary packaging is also known as transit packaging. The purpose of tertiary packaging is to hold together secondary packaging and handle transportations.
- 7. When a shipper has enough goods to accommodate one full container, he books a full container load (FCL).
- 8. The major advantages of LCL are as follows:
 - (i) It decreases the cost of shipping as the shipper pays only for the portion of the space he is using.
 - (ii) Sharing the container does not have any impact on the transit time.
 - (iii) They also provide the facility to pick and drop the cargo at the warehouse or destination. So, the additional hassle to arrange transport is solved.
 - (iv) Since the container is shared with other company, the shipping line arranges the return.
 - (v) It provides flexibility to the shipper.
- 9. There are certain products that are not allowed to move in or out of the country. Customs officials enforce these rules. They work in close connection with border security force and intelligence.
- 10. The system of sharing export document with the customs for clearance is called Electronic Data Interchange System or the EDI System.
- 11. The first stage for custom clearance is to get register for the business identification number. Prior to filling for custom clearance, exporter are required to obtain PAN based Business Identification Number (BIN) from the (DGFT) Directorate General of Foreign Trade. The registration process also includes, obtaining foreign exchange dealer code and opening a current account in the designated bank. For electronic filing of shipping bill, the exporters are required to register their codes, Customs House Agent License Nos. and the Bank A/c No.
- 12. The two major categories of documents required by exporters are: commercial documents and regulatory documents. Commercial documents are of two types: Principal documents and Auxiliary Documents.
- 13. There are two types of 'bill of lading': straight bill of lading and shipper's order bill of lading. Straight bill of lading is non-negotiable whereas shipper's order bill of lading is negotiable and can be bought, sold, or traded while the goods are in transit.
- 14. Various regulatory documents that an exporter needs are ARE Form, Shipping Bill /Bill of Export, Guaranteed Remittance (GR) form, Insurance Premium Payment Certificate, and so on.

- 15. The loading dock is used as a staging area where incoming shipments are quickly transferred to the outgoing shipment. Different types of cross docking are: Manufacturing Cross Docking, Distributor Cross Docking, Transportation Cross Docking, Retail Cross Docking and Opportunistic Cross Docking.
- 16. The various risks involved in the import business are: currency risk, transportation risk, non-delivery or non-performance, trader risk, country risk and change in the government may affect the import or the ability of the importer or exporter to receive or send the goods.
- 17. Bonding can be defined as the warehousing of the goods in custom declared area or warehouse on execution of a bond without payment of duty for a stipulated or required time period. The types of bond depend upon the quantity and kind of transaction involved. The most common types are: 'single entry bond' and 'continuous bonds'.
- 18. The various types of marine insurance policies are: open cover, specific voyage policy, mixed policy, floating policy, time policy, unvalued policy, valued policy, fleet policy and specific cover policy.
- 19. The UN Convention on International Multimodal Transport of Goods was established in Geneva on 24th May 1980.
- 20. There are two main types of terminal: passenger terminal and freight terminal.

3.20 QUESTIONS AND EXERCISES

Short-Answer Questions

- 1. What do you understand by EXIM logistics? What are the advantages of exporting goods?
- 2. Write a short note on the following:
 - Full Container Load (FCL)
 - Less-than Container Load (LCL)
 - Commercial Document
 - Auxiliary Documents
 - Regulatory Documents
 - Shipping Bill
 - Bill of Lading
 - Mate's Receipt
 - Advantages of Documentary Collection for exporters
 - Multimodal Transport
- 3. Explain the factors that affect the type of packaging.
- 4. What do you understand by valuing? Explain the various valuing methods.
- 5. What is the role of the customs department? Explain the main objectives of customs control.
- 6. Why is insurance necessary in EXIM logistics? What are various types of marine insurance policies?
- 7. Enumerate on the procedure for the shipment of export cargo.

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Long-Answer Questions

- 1. What are the levels of order picking? Explain the different methods to improve picking.
- 2. 'Before a company enters into the export business, it must understand the license and documentation requirement.' In the light of the above statement, discuss the export licensing procedure. Also enumerate on the documents required for export licensing.
 - 3. Define import logistics. Discuss the advantages and disadvantages of import logistics.
 - 4. Discuss the UN International Multimodal Transport of Goods. Analyse its impact on the Company's EXIM policy.
 - 5. Define terminal networks. What are functions of the terminal network?

UNIT 4 LOGISTICS SERVICE PROVIDERS

Structure

4.0 Introduction

- 4.1 Unit Objectives
- 4.2 Logistics Service Providers: An Overview 4.2.1 Types of Logistics Service Providers
- 4.3 Third Party Logistics (3PL) Services
- 4.4 Fourth Party Logistics (4PL) Services 4.4.1 Differences Between 3PL and 4PL
- 4.5 Common Services For 3PL/4PL
 - 4.5.1 Invoice Management
 - 4.5.2 Call Centres
 - 4.5.3 Warehouse/Distribution Centre Facility
- 4.6 Carrier Management
- 4.7 4PL Specialities
 - 4.7.1 Implementation Centre: Business Process Analysis (BPA)/Scoping
- 4.8 Development of All Activities into an Open Systems Framework
- 4.9 Product/Skill Centers: Supply Chain Engineering
- 4.10 4PL Value-Added Services
 - 4.10.1 Knowledge Transfer by 4PL Partners
 - 4.10.2 Business Development
 - 4.10.3 Functional Support
- 4.11 Summary
- 4.12 Answer to 'Check Your Progress'
- 4.13 Questions and Exercises

4.0 INTRODUCTION

Logistics involves making the right goods available at the right place, in the right condition and at the right cost. It involves activities like procurement, supply chain management, packaging, warehousing, material movement, inventory management, cross docking, fright forward, and so on. All these activities require specialized skill and knowledge. In addition, to hire the person with the required skill and knowledge or to create the required infrastructure involves huge cost. Companies in order to remain competitive, focus on their core competencies, and hence are on the lookout for alliances and strategic partnerships. They are also open to outsourcing their non-core activities and focus only on their core activities. As a result, they look towards Logistics Service Providers (LSPs). LSPs are those companies that provide logistics solutions to more than one client. These companies provide solutions for the movement of goods and materials between the points of origin to the points of consumption. The common services handled by them include shipping, packaging, warehousing, inventory, security of shipment.

This unit will discuss in detail about the role of LSP, as well as the challenges and opportunities available to them. The different types of LSP and the advantages and disadvantages of each of these types is also discussed.

4.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

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Discuss Logistics Service Providers

- · Describe the different types of Logistics Service Providers
- Distinguish between 3PL and 4PL services
- List the common services available under 3PL and 4PL

4.2 LOGISTICS SERVICE PROVIDERS: AN OVERVIEW

Logistics services are very critical for any business and managing them is a herculean task, especially if the scope of organization is huge and there is huge competition. Changing the business environment, emergence of competitors, disruptive innovations in the industry, increased shipper's demand, fluctuating capacity, and so on, have made the market more complicated and complex. Logistics operations require specialized functions and majority of the organization do not have them. The cost of building these is also huge. Thus, there is a need of outsourcing the task to someone who is expert in the field. Those companies that provide logistics solution to such companies are called logistics service providers.

The commonly outsourced services include a client that typically outsources the following services to an LSP:

- Warehousing
- Cross Docking
- Inventory Management
- Freight Forwarding
- Transportation

Some of the main reasons for outsourcing are:

- 1. Focus on Key Area: It is always better to get the job done by an expert. When a company decides to outsource, it focuses on finding a partner who can do the job better than them and lets them focus on their key areas. When the companies have outsourced logistics job, they can focus on their core competencies. Instead of worrying about logistics, they can focus on the quality of goods or services or improving their efficiency and performance. The resources previously held for the logistics can now be used for more productive jobs.
- 2. Enhanced Customer Satisfaction: As theses service providers have expert knowledge and experience in the field, they know the domain better than others and hence come up with innovative solutions to improve the customer's satisfaction. They also continuously look out for ways to deliver better experience to their customers; this also leads to customer satisfaction. Hence it helps in building a partnership that last for life long.
- Reduced Back-office Work: Most of the logistics service providers have sufficient manpower and desired system in place to take care of all logistics

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needs. Hence, if a company outsource the task all its need can be met at one place only. This will lead to improvement in efficiency and productivity.

- 4. Reduced Liabilities: As tasks like interconnected carrier contracts, insurance certificates, safety ratings, and so on, are managed by logistics service providers, the company ends up reduced liability. Even the task like working with invoice, carrier vetting etc. are also taken care by these LSP and so the company can focus on core activity.
- 5. Economies of Scale: At times, in order to set up in-house logistics operations, companies ended up spending a lot and hence cost of product goes up. At the same time, using a LSP can help in keeping the cost under control and achieving economy of scale. These also provide the opportunity to ramp up and ramp down the services at short interval in response to the market situation.
- 6. Efficient Handling of Petty Expenses: Since the LSP takes care of expenses like docking cost, insurance cost, fixed warehouse cost, transportation, etc., the companies do not have to spend resources on these small petty expenses and the accounting department is free to work on other important business matter.
- 7. Safety of Goods: Since they provide specialize services, the goods safer and secure with them. The LSP has better capacity to take care of the safety need of the products and services.
- **8. Efficient Real-time Tracking:** Most of the LSP use latest technology to keep real time tracking and visibility of goods. This ensures the customers that their product is safe and secure and they can focus on other core areas. Many a time, these LSP provide logistics services in integration with WMS and ERP.
- 9. Best in Class Practices: Since the LSP want to remain competitive, they are constantly adopting new technology and practices to strengthen themselves. Once the job is outsourced to them, the companies ended up having access to them and so they also get competitive advantage. This, in turn, helps organizations adopt effective, efficient and better business processes.
- 10. Competitive Organization: Outsourcing the job to LSP helps the organization in being more competitive. The focus on core areas helps the companies gain market access, respond better to change and gain scalability.

4.2.1 Types of Logistics Service Providers

Logistics Service Providers can be divided into the following four categories:

(i) 1PL or First Party Logistics: First parties logistic are the companies that manage their logistics operations on their own. These companies have their freight, cargo, goods, merchandise or produce transported from the point of origin to the point of consumption. This term stands for both cargo receiver and cargo sender. 1PL can be a trader, manufacturer, importer/exporter, distributor or retailer. It can be an institution like a government department moving from one place to another. Anyone having goods moved from one place to another is called first-party logistics provider.

Economies of Scale: It refers to a proportionate saving in costs gained by an increased level of production.

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Logistics Service Providers

(ii) 2PL or Second Party Logistics: Second Party Logistics are individual or service providers who provide their own assets such as trucks or warehouse services. Typical 2PL are truck operators who own or lease their trucks, or airlines which own, lease or charter their planes or shipping lines which own, lease or charter their ships. They take care of transportation and warehousing functions.



Fig 4.1 Types of Logistics Providers

- (iii) **3PL or Third Party Logistics:** Third part logistics providers provide logistics services on behalf of another company. They provide outsourced services for part or sometime for the whole of their supply chain. These LSP provides labor, physical assets, technology along with management skills and relieve the companies from performing these tasks on their own. The major services provided by 3PL are: transportation, warehousing, management consulting, pool distribution, logistics optimization, transportation management, freight forwarding, cost evaluations, rate negotiations, and contract management services.
- (iv) 4PL or Fourth Party Logistics: Fourth party logistics providers are non-asset based integrators who assembles capabilities, resources, technology from other organizations and its own and provide a comprehensive logistics solutions to their clients. They primarily integrate the competencies of the third part logistics (3PL) providers and provide breakthrough logistics solutions.

4.3 THIRD PARTY LOGISTICS (3PL) SERVICES

As discussed above, third party logistics (3PL) providers are companies that provide a range of logistics activities for their clients. The major functions performed by 3PL service providers are operations of the distribution centers or warehousing, managing transportation fleet or freight shipping and courier shipping. These services are provided through own or leased or contracted assets or services. We can also describe 3PL as contract logistics service provider who manage material flow between organizations and take care of activities like warehousing, transportation and documentation.

What do you

Check Your Progress

- mean by Logistics Service Providers? 2. List the
- commonly outsourced services.
- 3. Mention some of the main reasons for outsourcing services.
- 4. What are the different types of Logistics Service Providers?

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Types of 3PL

There are three types of 3PL providers. These are: asset based, management based and integrated providers.

1. Assets Based: Assets based 3PL are those companies that use their own warehouse, truck and personnel for operating the client's business.

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Fig 4.2 Types of 3PL

- 2. Management Based: Theses are 3PL companies that provide the technological and managerial functions to operate the logistics functions of their clients but they used the assets of other organization, it may not necessarily be their own.
- **3. Integrated Providers:** Theses are 3PL companies that are either assets based or management based but supplement their services as per the need of the customer.

Common 3PL Functions

The common 3PL functions are as follows:

1. Warehouse Management: The warehouse management function of the 3PL includes managing the warehouse and performing basic warehousing functions like receiving, storage, pick, pack and ship. It also takes care of safety and security of goods. For this, radio frequency scanning and bar code labeling of the product are also taken care of. Real times, periodic information about the movement of goods are also tracked to manage inventory. Additional services like cross docking, order fulfillment, return processing, and so on, are also taken care by 3PL providers.





Fig 4.3 Functions of 3PL

2. **Transportation Management:** The transportation management function of 3PL includes fleet management for optimization of transportation cost and service improvement and network optimization to provide better services. It also takes care of load management, driver management and routing of the vehicles. Transportation management tasks also takes care of freight claim, cargo insurance, freight bill payment and auditing.

Integrating SMS with the WMS (Warehouse Management System) helps in providing integrated logistics solutions. Information like less-thantruck load or multi-stop workload can help in serving customer better. For common destination, combination of freight from different vendors can help in economizing truck load and reduce overall cost. The transportation management function of 3PL also tries to optimize ways to do it.

- 3. **Packaging:** The packaging function of 3PL takes care of final packaging of the product at the warehouse. The availability of this facility reduces the cycle time, product handling coast and hence reduces the total cost of the product. The customized packaging solutions like label and printing, display shippers, custom pallets, insert and coupons, repackaging or conversions, wrapping and bundling, etc. also help in optimizing the logistics operations.
- 4. **Information Management:** 3PL also provides information management solutions for various functions of logistics. Tools like customer management system (CRM) are used for providing real time visibility of the customer's shipment, invoice and other data. TMS or transport management system provides networking and routing solutions to the customer. Information technology based tools are also used for connecting a wide range of applications within the organization and provide cloud based services.
- 5. **Global services:** Services like multi-shipper container consolidation, custom and freight forwarding, global air freight and export documentation are few of the global services provided by 3PL providers.
Characteristics of 3PL

The major characteristics of 3PL are as follows:

- **1. Solution Oriented**: It is oriented towards finding a solution to the problem or providing solutions to the clients' problem.
- **2. IT Capability**: IT capability gives it competitive advantage. It adopts new and emerging technologies to increase efficiency.
- **3. Logistics Know-how**: It cannot be done without the knowhow of logistics activities. The knowledge about various aspects of logistics should be there.



Fig 4.4 Characteristics of 3PL

- **4. Management and Organization Skill**: 3PL requires good knowledge of management and organization skill. Any error made at a single point can lead to loss to more than one organization.
- **5. Innovativeness**: 3PL is innovative. It always looks out for the way to improve its performance and efficiency.
- 6. Best in Class Approach: It always tries to adopt the best in the class approach and provides best in the class services to its client.

Advantages of 3PL

The various advantages to companies by using 3PL services are:

- Focus on Core Competencies: The first and the most important advantage of 3PL is that it enables companies to focus on the core activities of the businesses. The focus on core activities is important as it creates value-added activities for making better revenue. In this way, the businesses can remain focus on what they are good into and outsource the logistics activities. This will improve not only the quality of the product but also the quality of the service and hence will improve the overall performance of the organization.
- **Better Funds Management:** Another advantage of 3PL is that it helps the organization manage their funds in better way. There are many organizations that do not have their own warehouse or transportation or packaging facility and because of the financial conditions of the company, they are not able

to manage them. For all such organizations, 3PL can be a blessing. By outsourcing the logistics, they can reduce the inventory and hence can reduce the cost of the product. All these may help them in earning better revenue.

Those companies that are not short of fund, but want to spend that money on some core activity can do the same by outsourcing the logistics activities. Hence, it is beneficial both for the fund crunch and fund sufficient businesses.

• Enhanced Technological Capabilities: Outsourcing logistics give the businesses the opportunities to use better technologies. 3PL organizations keep themselves updated with the latest tools and techniques available in the market. At the same time, the businesses have the opportunity to select the best 3PL partner. Hence, it improves the efficiency of the businesses and provides them the flexibility to select the technology of their choice without doing new investment.



Fig 4.5 Advantages and Disadvantages of 3PL

- **Provide Flexibility**: Business environment is constantly changing and many times, this change has huge impact on the demand for the product. Using 3PL gives businesses the flexibility to change the scale of logistics without much effect on the core activities. The companies are guarded against creating their own infrastructure and speed up the operations.
- **Best Practices**: It enables businesses to adopt best practices and achieve best performance.
- Green Logistics: 3PL also takes care of the environment issues. The optimized distribution network, collaborations with business partners and ability to optimize the distribution network helps in reducing the carbon emission and also help in rationalizing the inventory to improve truck performance. All these help in achieving green logistics.

Disadvantages of 3PL

The various disadvantages of 3PL are as follows:

• Loss of Control: Once outsourced, the businesses may feel that they have lost control over shipping activities. 3PL puts an important activity in the control of an outsider.

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- Loss of Connect with Clients: Since 3PL partner is in contact with the client, the company may end up having right connection with the client. In case the relationship between 3PL provider and the businesses become unsustainable, there is a risk of losing the market.
- **Communication Issue:** Lack of communication between businesses and 3PL provider is another disadvantage. If the businesses do not share complete information as they feel it may make them vulnerable, it creates communication gap and affects the relationship in the long-run.
- **Cost in Long-run:** 3PL may turn out to be expensive in the long-run. It can happen in the case where the company has the expertise to run logistics inhouse and is running it efficiently but moved to 3PL as it seems cheaper in short run.

Difference between 3PL and Transportation Services

3PL should not be considered with transportation. The major difference between transportation and 3PL is as follows:

Third Party Logistics (3PL)	Transportation Services		
• They understand their client's need.	• They have very little or no understanding of the real business need of their client.		
 They command premium prices but are still competitive. They combine technology, methodology, people, and so on, to plan the logistics need 	 They only compete on the basis of price. They just work on the specification provided by the company. 		
 They add value to the servicers through innovation. Eccus on efficiency and productivity. 	 Do not innovate anything on their own. Focus only on cost. 		

Table 4.1 Differences and Transportation Services

4.4 FOURTH PARTY LOGISTICS (4PL) SERVICES

Fourth Party Logistics or 4PL services providers are integrators that accumulate resources, technologies and capabilities to run logistics solutions. This idea of the fourth-party logistics service provider was started by the consulting company Accenture. It is based on the principal that modern supply chain is complex and the capability to manage it does not lie in any one organization and hence we need someone/some organization to manage this complex network of supply chain. This organization was called 4PL. Accenture defined 4PL as 'An integrator that assembles the resources, capabilities, and technology of its own organization and other organizations to design, build, and run comprehensive supply chain solutions'.

A fourth-party logistics provider can also be considered a consulting firm specialized in logistics, transportation, and supply chain management. The general structure of 4PL is explained in Fig 4.6. 4PL is a kind of joint venture formed between two parties: primary client and partner. The clients are the businesses looking for 4PL service providers. These clients may put equity and transfer their existing logistics

Check Your Progress

- 5. Define third party logistics.
- List the different types of 3PL providers.
- What are the various advantages to companies by using 3PL services?

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staff (As they will not be required any more once the outsourcing happens) to this new entity. The client may also provide working capital to the entity.



Fig. 4.6 Structure of 4PL

The partner's contribution includes putting start-up equity, planning logistics strategy, identifying best practices and **benchmark** for the company, development of the information system capability, process re-engineering skill, etc.

Once the joint venture is materialized, the 4PL unit is created. This unit then identifies those service providers who are specialist in their job; for example, they will look out for 3PL who are good in supply chain management. They may also look out for the service providers who are good in warehousing and so on. These specialists are responsible for the execution of the different activities. 4PL provider then integrates the entire logistics management using its information system and delivers the services to its client as per the terms and conditions agreed upon.

Common Functions of 4PL

• Assembly of Resources/ Integrator: 4PL will identify people, process and service providers for its operations and hence arrange all the resources necessary for the same. It is someone who is an agent of change. It believes in innovation and identifying best practices and the same is bought forward in the area of supply chain, customer relationship management, project management, supply chain re-engineering, etc. It also focuses on integration of information across various stakeholders. It acts as an agent of change for efficient service delivery.

Benchmark:

It is a standard, or a set of standards, used as a point of reference for evaluating performance or level of quality.



Logistics Service Providers



Fig 4.7 Function of 4PL

- A Supply Chain Control Room: Another important function of 4PL is to coordinate with 3PL and the clients for providing logistics services. It acts as a control room for the supply chain servicers. They hire experienced professional in the logistics field to provide optimum solution to their logistics problem and take care of their decision support system. They manage multiple 3PL partners simultaneously and are always open to the identification and adoption of new solutions. All these activities require decision-making approach of the functioning and hence we can say that the 4PL control room is a decision centre for logistics solutions
- **Supply Chain Infomediary:** It acts as a single interface between the client and multiple logistics service providers. It is like a central nervous system of the body, from where the information is sent to various part of the body to perform actions and activities. It provides real time data and information and also converts data to information. If required, technical support is also provided by them.

• **Resource Provider:** They are the one who provide resources to the clients. Facilities like warehousing, transportation, documentation, cross docking, procurement, co-packaging, and so on, are arranged by 4PL providers.

Characteristics of 4PL

The characteristics of 4PL are as follows:

- **Hybrid Organization:** It is a hybrid organization whose core competency is in integration of different service provider and managements of information between different stakeholders.
- Joint Venture: It is joint venture between the client and the partners and is mostly established in the form of long-term contract.
- **Based on Profit Sharing:** It is completely based on the profit sharing model. Its focus is to achieve the goal of the partners and clients on the basis of profit sharing.
- **Scope of Activity:** Its scope of activity includes entire logistics operations. It is responsible for the management and operation of entire supply chain.
- Core Competency: Its core competency is in management of information between partners and 4PL organizations.
- Future Potential: It has huge scope for revenue generation.



Advantages of 4PL

The major advantages of 4PL are as follows:

• Access to a Broader Base of Potential Suppliers: It provides the clients access to broader base of suppliers. This gives the client flexibility to select the supplier and the mode of transport and at the same time, modifies it without any hassle. If required, the escalation or downsizing in the logistics services can be achieved easily.

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- **Back-end System Integration:** It integrates all the activities of the logistics and hence the complete information is available. The automated system integrates the procurement, transportation and warehousing. This makes the whole logistics management relatively easy.
- Increased Market Transparency for Goods and Services: Integration of various functional units make the system more transparent and effective.
- **Standardization of Order Placement:** 4PL process of benchmarking and optimization helps in standardization of the order placement process. This makes the business more profitable.
- Automation of Order Placement: Since various departments are integrated and there is standard procedure for the order placement, the system is less dependent on human intelligence and most of the process are automated.
- **Reduced Procurement Costs:** The optimization and network planning helps in keeping the cost under control
- **Reduced Order Cycle Times:** Integration, automation, standardization of the procedure, etc. lead to reducing the cycle time and make the system efficient. Reduced cycle time leads to less inventory, less inventory leads to less cost of the product and hence create more revenue

Disadvantages of 4PL

The major disadvantages of 4PL are:

- The client may feel a loss of direct control over the logistics process and functions.
- It may happen that what is cost effective in short-term may become a costly affair in long- run, especially those companies which are able to manage their logistics operation efficiently on their own.

A list of a few 4PL service providers are given below:

- ABX LOGISTICS
- Accenture
- APL Logistics
- BAX Global
- C.H. Robinson Worldwide
- CapGemini
- Caterpillar Logistics
- Deloitte
- DHL Danzas Air & Ocean
- Eagle Global Logistics
- Exel (DHL)
- Expeditors International
- FedEx Trade Networks / SCS
- IBM Global Services
- Kintetsu World Express

- Kuehne & Nagel
- Maersk Logistics
- Menlo Worldwide

- Nippon Express
- Pan

4.4.1 Differences between 3PL & 4PL

The difference between 3PL and 4PL is summarized in the 4.2. *Table 4.2 Differences between 3PL and 4PL*

3PL	4PL		
• They provides services either in parts or for the entire supply chain to the customer.	• They accumulate resources, capabilities and technologies to run complete supply chain solutions.		
• They focus only on their niche area and provide only the specialized services.	• They focus on a broad array of solutions to manage the entire supply chain. For this they may take the services of 3PL		
• The various services offered by 3PL include warehousing, safety, documentation, inbound and outbound transportation, packaging and transportation.	• The services dealt by 4PL include supply chain planning, assistance, managements, optimization and designing of services.		
• 3PL is best suited for the organizations who has a blue print of their supply chain and need resources to execute the same.	• It is suited for those organizations that are looking for a point to point/end to end solutions for their logistics needs. It includes need identification, designing and execution of the logistics operations.		
• It usually includes collaborations between outsources and in-house parties and the organization themselves are carrying out certain processes.	• These services are completely outsourced and company gives the complete task to 4PL providers.		
• In most cases, they target a single functions.	• They manage the entire process.		
• They may get managed by 4PL.	• They may manage 3PL.		

Special Services

The special services provided by 4PL are as follows:

- Negotiations with 3PL: These are also called services common between 3PL/4PL. Services like invoice management, call centres, warehouse/ distribution facilities, etc. are part of these kind of services
- **Implementation Centre:** These are specialized services provided by 4PL service providers. They include business process analysis/scoping and development of all activities into an open systems framework to provide optimized services to the clients.



Fig. 4.9 Special Services Provided by 4PL

- **Product/Skill Centres:** Also known as supply chain engineering, it is another specialized service provided by 4PL.
- **IT System Centre:** This centre is responsible for the selection and adoption of new technologies for design and implementation/connectivity.
- **4PL Back Office:** The various back office services like quality management, benchmarking, financial and legal activities are also performed by 4PL
- Value-added Services: The value added services of 4PL include knowledge transfer, business development and functional support.

4.5 COMMON SERVICES FOR 3PL/4PL

The common services for 3PL and 4PL are discussed below.

4.5.1 Invoice Management

An invoice is defined as a commercial document that itemizes a transaction between a seller and a buyer. It is a commercial document issued by a seller to a buyer. It contains information related to a transaction between buyer and seller. Information like quantity of product, specification of the product, method of payment, agreed price, discount (if any), date of shipment, mode of shipment. Another name for invoice is bill or sales invoice. It is a non-negotiable commercial instrument issued by seller to buyer.

There are four types of invoice:

1. **Pro-forma Invoice:** It is also known as an estimate or quote. It is a preliminary invoice of sale sent by the seller in advance of a shipment or delivery of goods. It contains description of the purchased items, cost, quantity, weight and other information like transportation charges, taxes, etc. The main purpose of sending it is to get the approval of the customer. It also includes the term and conditions of sale and delivery details.

NOTES

Check Your Progress

- 8. Explain the idea behind fourth party logistics.
- List some common functions
- of 4PL.

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- **2. Commercial Invoice:** It is a final approved pro-forma invoice; it is a legal document between the customer and supplier. It contains information about the sold goods and the amount to be paid by the customer. It is the main document used by the custom department to determine custom duties.
- **3.** Custom Invoice: It is an extended form of commercial invoice. It consists of information like selling price, quantity of goods, freight, packaging cost, selling price, insurance, packaging cost, weight or volume of goods, terms of delivery and payment in a format specified by custom.
- **4. Consular Invoice**: It is an invoice required in export and import of goods. This document is submitted to the embassy or consul of the country to which goods are to be exported before the goods are sent.

Importance of Invoice

An invoice is important for the following reasons:

- 1. It is a great tool for record keeping. If managed appropriately, it helps in tracking earning and spending. It also helps in documenting all the business transactions and allow the businesses to review past and forecast future expenditure.
- 2. As it contains information about the product, the clients are aware about what they are paying for.
- 3. It creates professionalism. The ways invoices are created and handled indicate the culture of the organization. If an organization creates an innovative invoice, it is considered as professional.
- 4. It gets paid on time. Jobs and projects where the arrangement of payment is informal usually takes more time than the one which is structured and supported an by invoice. It also helps in maintaining billing cycle.
- 5. It is a legal document and in case of any dispute, it can be challenged in the court of law.
- 6. It is also required for the claim of goods from the custom.
- 7. In case of financial audit, it acts as evidence.

Both 3PL and 4PL are required to manage invoices. Invoice plays a great role in managing the business operation. Outsourcing partners need to manage documents from the vendor and suppliers. They use various software solutions to manage billing and invoice. Various activities managed by service provider are

- Preparation of the pro-forma invoice, commercial invoice, custom invoice and consular invoice.
- Price book management
- Handling and storage of the material
- Activity-based billing

4.5.2 Call Centres

A call centre can be defined as a place where class are placed or received in high volume for the purpose of customer service, marketing, sales, technical support, telemarketing and other specialized business activities. A call centre is the first point of contact by the customer and hence plays a major role in creating and maintaining

relationship. There are two types of call that are handled at the call centres: inbound and outbound. When a customer calls the contact centre or call centre it is known as inbound call and when a call centre employee contacts the customer it is call outbound calls. The inbound calls are mainly for the product-related queries and support, technical support, customer service, product return policy or for the information related to products and services. The outbound calls are made for the marketing and sales activities, feedback or for the purpose of research. Along with phone calls, the communications also happens over email, web-chats or post.

(a) Services Provided at the Call Centre

- **Billing support:** Whenever the customers have query related to the billing statement, the call centre is the first point of contact. Questions related to charges, interest, price, taxes, etc. are handled by the call centre in this regard and the required information is provided.
- **Complain Resolution:** Today, all the organizations provide the contact detail (email, phone number, live chat link) of their customer support desk or call centre for contact in case of complain. These call centres are equipped to discuss the problem of the customer and provide them alternatives. They are also trained to understand customer need and preference and take measure to support the customer.
- **Collection:** Call centre also takes care of the payments and collection. Many times the representatives call the customer to remind them about their payment due date or to pay the past dues.
- **Document or Order Processing**: They also take care of document processing and order processing activities. A customer can place the order via the call centre. They also provide assistance in filling the documents or provide guidance on document requirement.
- **Telemarketing:** Telemarketing is one of the most important outbound activities handled by the call centre. They make calls to sell products or services to new customer. In case of inbound call form the existing customer, the call centre makes attempt to cross sell or up-sell the product.
- **Inquiry Services:** A call centre also takes care of the queries of the customer and handles enquiries related to product or services.
- **Technical Support or Help desk:** Today, all the organizations provide the contact detail (email, phone number, live chat link) of their technical support desk or call centre for information or assistance on use, assembly, warranty, functionality, registration, and so on, the role of call centre in this case is to provide the required solution.

(b) Call Centre Technology

There are many technologies that have added to the growth of the call centre. Each of these technologies has provided new and advance ways of managing customer and providing information. A few of the most popular technologies used in the call centre are:

• Interactive Voice Response (IVR): This technology allows the customer to call a telephone number and by dialling directed numbers or codes, it gets information.

- Automatic Call Distribution (ACD): This technology helps in automatic routing of the call to the available call centre representative. When a customer calls and all the lines are in use, the moment a representative is available, the customer's call gets diverted to that employee.
- Fax on Demand: This technology allows the customer to get the required information in the form of fax. The customer is supposed to call a telephone number, select the option from the available one and then enter his own fax number. The information is then faxed to the entered fax number.
- E-mail Management Response System: This system helps in sharing information between customer and representative using e-mails. This makes the communication faster and can help the customer receive data attachment and documents.



Fig. 4.10 Call Centre Technologies

- Internet Call-back System: This technology is very helpful for the individuals who are surfing website for some particular information but need more specific information. In this technology, the customers provide their telephone number to the website while browsing on the internet and continue to browse. This triggers a predictive dialling this system, which dials customer's number and the representative speak to the customers
- **Online Information Fulfilment System**: This technology allows the customer to get in touch with the customer support representative via e-mail or can request the information through email.
- Interactive Web Chat: This technology allows the service provider and the customer to have a conversation via internet.
- Voice mail: This technology allows the recording of the messages, when the representative is not available and requests a call back. The agent can call back later.

(c) Benefits of Using 3PL and 4PL for Call Centre Activities

Since managing the call centre is not the core job of a manufacturing or service organization but a very important business activity from the point of customer satisfaction, most of the businesses outsource these. The outsourcing partners

provide both manpower and technology to manage the same. The benefit of outsourcing the call centre is as follows:

- **Cost-Effective:** Customers have always been considered as a cost because of the amount of time, manpower and money spent on them. Also running it in house involves a huge resource constrain and hence companies find it more effective to outsource. With the help of 3PL and 4PL partners, the operation and technical cost really comes down and companies get access to latest technologies and core competencies for their businesses.
- **Trained Staff:** These outsourcing agencies train their employees to handle the product and services of their customer. The company is saved from investing in training the staff. Also the call centre have a team of professional who understand the business and customer's expectation better and speak as the voice of the company.
- Improved Customer Experience: Due the availability of trained staff, the 3PL and 4PL managed call centres are able to provide better customer experience. They know how to manage customer and provide consultation and responses.
- Flexibility: Outsourcing provides the flexibility to manage change in demand in an efficient manner without impact on the quality of the service. They can also adopt short term changes better than the in-house team. It is also very helpful while moving to a new market or adding a new product. The company does not have to bother about the size of the workforce or the cost of the additional infrastructure.

(d) Challenges of using 3PL and 4PL for Call Centre Activities

- **Confidentiality Issues:** The businesses have to share the sensitive customer data with the call centre. This, at times, exposes it to risk. Hence, a high check is required while outsourcing the call centre. Outsourcing a business function leads to less control and hence a risk to quality of service.
- **Reduced Focus:** A 3PL or 4PL service providers may have many clients to be served; hence they may not focus entirely on a single client. It may lead to compromised services. Outsourced call centre agents are often unfamiliar with company culture, practices and values. They therefore may not able to provide a level of service that is in line with company standards and reflects the company culture.
- Lack of Collaboration and Communication: It is possible that all the services are not outsourced to a single service provider and hence a coordination and collaboration between different departments and agents is required. Outsourcing, if not monitored properly, may lead to poor coordination.
- **Hidden costs:** Outsourcing has its own hidden cost. There are costs like, cost of legal issues, cost of losing a customer, cost of reacquiring a customer, etc. The quality of service and the credibility of the 3PL and 4PL partner must be ensured before outsourcing to call centre.





Fig. 4.11 Benefits and Challenges of Using 3PL and 4PL for Call Centre

4.5.3 Warehouse/Distribution Centre Facility

A warehouse can be defined as a place for the storage of goods, till they are required. The routine function of warehousing includes sorting, shipping and replenishing stocks. Companies use warehouses for storage of the finished product and sending them to the distribution centres. These are useful for large scale storage and storage for extended time.

A distribution centre is a little more dynamic than a warehouse. It offers more services as compared to warehouse. Services like transportation, order fulfilment, cross docking, labelling and packaging are offered to complete the order cycle. Activities like order preparation, shipping, receiving, returned goods processing, and performance measurement are carried out in the distribution centres. The major focus of the distribution centre is serving the customer.



Fig. 4.12 Warehouse and Distribution Centre

Warehousing services are more suitable for long-term storage and is good for those companies who have their distribution centre out of the way. For those companies that have their distribution centre at a convenient location focus on the distribution centre only.

The outsourcing agency will look into the need of the company and suggest whether the company should go for warehousing services or distribution or a mix of the two.

Goals for Warehousing and Distribution

Any activity that is undertaken without a goal is redundant. The same is true for the warehousing and distribution as well. The competition in the market does not give any scope for error and hence it becomes more important to be clear about the goal.

The major goals of warehousing and distribution are:

- **Customer Service**: The first and the foremost important goal of warehousing and distribution is to provide storage and transportation services to the customer. It is important to serve in a manner the customer feels valued and satisfied. The feedback and complaint should also be handled promptly.
- **Cost Reduction**: Another goal of the warehousing and distribution strategy is to take measures to reduce the transportation and storage cost. This helps in keeping the cost of the product low and optimizing the revenue.
- **Continuous Improvement**: Companies always look out for waste reduction, improved service quality, elimination of efficiencies and unnecessary activities to improve their system. This helps them to go for continuous improvement achieves customer satisfaction.

Challenges

The major challenges faced by the companies in managing warehouse and distribution are as follows:

- **Damage:** The way in which the goods are stored at the warehouse affects the volume of product that may get damaged while storage or distribution. Hence it is very important to take care of the product at this stage. The manner in which goods are handled can affect its physical condition hence it is important to provide appropriate storage, material handling, inventory handling policy. Inventory strategies like LIFO (Last-in-first-out) or FIFO (First-in-First-Out) ensure reduced damage and waste.
- **Theft:** Another challenge when the goods are in warehouse is theft. Both internal and external theft can occur and hence the strategies to curb the same are required. CCTVs, RFID or Bar Codes are used to take care of the same.
- Wrong Quantity: Receiving wrong quantity of goods can prove fatal for the organizations. There are customers who do not accept this mismatch and the company may end up losing the customer. Also if this goes unnoticed, the company may lose huge on revenue front. Hence they need a system to keep track of the movement of the quantity of goods and their inventory
- Accidents: At times, accidents may occur in the warehouse, both minor and major. The warehouse should be equipped to take care of such situations. Measure like appropriate placing of materials as per the weight, size, frequency of requirement and product movement should be formulated.

Key Objectives and Benefits of Warehousing and Distribution Centre

Traditionally the role of the warehouses was to provide storage and staging facilities. Finished product is used to wait in the warehouses for use. But now the roles have changed. Though the storage and staging functions still exist, the key objectives of today's warehouses and DCs are: customer service, velocity and adding value.

Customer Service: Customer service has become a key driver of warehouse and distribution management practices. There are many companies that look out for facilities like packaging, labelling, ticketing, delivery, etc. along with storage and changing the role from a storage place to the place of final stage of production line. Along with that the provision to manage the return of the product is also taken care by the warehouse.

Velocity: Velocity here means the speed of carrying out task effortlessly and with minimum wastage. The focus is to reduce the size of inventory by adopting JIT (Just-in-time); moving products swiftly using technology like bar coding, radio frequency and employee tracking, etc. the focus is to keep a check on the movement of the product so that its exact location can be known and precise, real time information can be share with the client.

Adding Value: Value is a key component of today's warehouses and distribution centre. The various value-added facilities provided includes assembly, customization, private labelling packaging, ticketing, product repair, etc. are expected to be provided at warehouses and at distribution centres.

Because of the above expectation and changing role of the warehouse and distribution centres, the companies have started outsourcing the activity.

The benefit that outsourcing provides are as follows:

- Experience and Expertise: Most of the businesses do not have core competency to handle warehousing as it is not their core activity. In this case, outsourcing the job gives them access to expertise and experience to handle the warehousing. The expertise and experience obtained help in retaining the business and serving the customer.
- Ease of Scaling: As the company grows and the demand for the product increases, the requirement of the warehousing and transportation also changes. The outsourcing partners help in meeting this changed demand more effectively. Outsourcing warehousing and distribution helps in mitigating increased cost and helps the company manage their inventory better.
- Amalgamation of Shipments: It helps in managing multiple shipment to different locations. It saves the time of the companies as they do not have to look out for the resources for the new location. It also provides economic benefit as they may get discounts when dealing in bulks.
- Low Capital Expenditures: Outsourcing the warehousing and distribution helps the company plan their capital expenditure. They are saved from spending heavily in these areas.
- Access to Solutions: Since 3 PL and 4PL service providers are aggressive in adopting new technologies, even a small business can have access to it. Tools like warehouse management system; radio frequency identification, etc. help the companies manage their businesses well. The warehouse management system helps in tracking real time inventory data and can also track historical data on order and receipt

3PL and 4PL Warehouse and Distribution Services

The various services provided by 3PL and 4PL service providers in warehouse and distributions are as follows:

1. Outbound Order Fulfilment: The services provided in the outbound order fulfilment are:

- Shipping
- Order Receipt
- Picking/Replenishing
- Inventory Visibility
- Electronic Shipping Confirmation
- Shipment visibility
- 2. **Basic Returns Facility**: Outsourcing agencies also provide return solutions. Basic returns services provided to clients include:
 - Returns to Vendor
 - Returns Receipt
 - Returns Disposition
 - Returns Triage
 - Return to Stock
 - Return Refurbished
 - Hold for Customer or Vendor
- **3. Value-Added Services:** 3PL and 4PL partners also offer variety of value-added services to make the warehouse and distribution services more efficient. The common among these are:
 - Repackaging
 - Configuration/Customization
 - Product Labelling
 - Assembly/Kitting
 - Material Insertion
 - Price Ticketing
 - Labelling
 - Quarantine
 - QA inspection
 - Testing
- **4. Repair and Refurbish Services:** 3PL and 4PL service providers also take care of minor repair and refurbish services at the warehouse or at the distribution centres. This saves a lot of time and effort of the manufactures and they can focus on their core area.

4.6 CARRIER MANAGEMENT

Carrier management is responsible for obtaining freight for their firm, negotiating freight rates, planning the mode of transfer, time of movement, traffic management, etc. The various functions of carrier management services can be categorized into following five categories:

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Check Your Progress

- 10 Define invoice. What are the types of invoice?
- 11. List various services provided at the call centre.
- 12. What is the main difference between warehouses and distribution centres?
- List the major challenges a company faces in managing warehouse and distribution.

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1. Model Management: The model management function of carrier management includes identifying the type and size of the vehicle as per the requirement of the organization and safety of goods and legal standard. It also negotiates the freight rate for the vehicle and additional charges (if any).



Fig. 4.13 Functions of Carrier Management

- 2. Administration: The administrative function of carrier management takes care of the safety need and manages contract and documentation. It inspects the selected carrier for its suitability for the task. The safety function ensures that all the documents are in place. Documents like insurance, bill and invoices, legal compliances are in place and are available on demand.
- **3. Performance Management:** The performance management function reviews the performance of the carrier and does the route plan and rerouting if required. It also reviews the performance of the carrier among different route and identifies the key performance indicators for future decisions. This makes the process of carrier selection relatively easy.
- **4. Space and Equipment:** Carrier management also involves the management of quantity, types and of quality of carrier. It has to ensure that the promised carrier is available and shipment requirements are met.
- **5. Shipment Management:** The shipment management function takes care of the tracking of the shipment and keeps an eye on its visibility. In case some shipments are not functioning as per the schedule, the same is conveyed to various stakeholders.

Carrier management services include the following:

- Transportation Management
- Private Fleet Management
- Freight Claims and Cargo insurance
- Consolidation
- Transportation Cost and Service Improvement
- Freight Bill Payment and Auditing
- Reverse Logistics
- Green Logistics
- Sustainability Services



Fig. 4.14 Carrier Management Services

Role of 3PL and 4PL Service Providers in Carrier Management

The role of 3PL and 4PL service providers in carrier management are as follows:

- It allows customers to focus on its carrier procurement strategy and core business.
- It provides access to the market trend and the new services available in the market.
- It provides direct communication between shipper, receiver and carrier and hence maintains communication flow.
- The tracking facility provides the visibility of the carrier to the shipper, receiver and the carrier partner.
- It provides the flexibility to change size of the carrier as per change in demand.

4.7 **4PL SPECIALITIES**

Whenever a manufacturer or service provider decides to outsource its logistics operations, they look out for a single company who can provide all the logistics services, but in reality there is no such service provider, the whole market is fragmented. Hence, they approach to 4PL service providers who contract with different providers, assemble end to end solutions, manage them and serve as a single point of contact to the shippers.



Fig. 4.15 Special Services Provided by 4PL

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Logistics Service Providers

Logistics Service Providers

The special services provided by 4PL are:

• Implementation Centre (Business process analysis/scoping, Development of all activities into an open systems framework)

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Business Process Analysis: It refers to the analysis of various business operations classified into processes or series of related tasks for a particular objective. • Product/Skill Centres (supply chain engineering)

4.7.1 Implementation Centre: Business Process Analysis (BPA)/Scoping

Business Process Analysis is defined as the analysis of various business operations classified into processes, or series of related tasks for a particular objective. The purpose of the analysis is to study the way in which the processes happens along a value chain and critically examine each activity. Along with monitoring the system, it uses various tools to measure the efficiency and productivity of the system. Tools like flow charts, benchmarking, advance visual interfaces, etc. are used for the analysis.

Objectives of Business Process Analysis

The objectives of business process analysis are as follows:

- 1. Business process analysis starts with the objective of initiating an effort to understand the process and analyzes it with predefined objectives and goals.
- 2. Once the goals are pre-defined and activities are identified, a framework is created and practiced for the process improvement.
- 3. The complex business processes are identified and are defined with simpler modeling techniques.
- 4. The critical activities or the most essential component of the business are identified.
- 5. Potential improvements are evaluated and are prioritize to work upon them.
- 6. The complex processes are also decomposed into smaller sub-processes to make it manageable.
- 7. All the proposed changes are identified and the detail impact of each activity is studied. Based on the result of the study, a transition plan is acted upon.
- 8. The effectiveness of each solution is also evaluated.

Steps of Business Process Analysis

- **1. Identify the Processes:** The first step of BPA is to identify the processes that need improvement. It is these processes which the company needs to understand and study to work upon. The aim and the objective of the analysis should be considered while identifying the process to be improved.
- 2. Establish Project Team: A team is established to work on the analysis. The people who have some past experience or are part of the process on daily basis should be considered for the brainstorming, interview as these are the people who are aware about the bottleneck and flaws. They are also aware about the steps, information and goals of the system.
- **3.** Create a Business Process Flowchart: Creating a business process flow chart gives a real view of what the process really is. This also helps in identifying the flaws and bottlenecks and reviewing the system.

- **4. Define the AS-IS Process:** The next stage is to define the existing status (AS-IS) of the process under study. It is a critical activity to understand the real situation.
- **5. Specify the Improvement Points:** In line with the goal of the organization and the existing stage of the system, the strategic goals are suggested and the points of improvements are identified for further action.
- 6. **Develop and Propose Recommendation**: Based on the above five steps, the recommendations for the improvement are developed and are proposed before the authorities.



Fig. 4.16 Steps of Business Process Analysis

Logistics Process Analysis & (Re) Design

The role of 4PL partners in business process analysis is to help the companies develop a logistics strategy to manage their operations more effectively. The area of analysis in logistics may include:

- Enabling technological integration for better performance
- Identification and elimination of non-value adding activities
- Assigning process ownership to the right function
- Setting up performance indicators that matter to your supply chain
- Process alignment to achieve strategic goals with improved customer satisfaction
- Achieve tighter control over your supply chain by creating visibility

4.8 DEVELOPMENT OF ALL ACTIVITIES INTO AN OPEN SYSTEMS FRAMEWORK

Business Process Analysis and Scoping helps in identifying the critical and noncritical activities of the business. It also helps in identifying those activities which are required to be modified for the system improvement. This provides an opportunity to look into all the activities and evaluate their existing status and look out for the scope of improvement. This helps in developing the activities into an open system framework for analysis. The core and the non-core activities can be separated and the same can be evaluated.



Fig. 4.17 4PL Organizational Structure

For example, for a logistics system where the firm provides 4PL services, it has its own infrastructure, human resource, technology and procurement or contract strategy. In the light of the above, it provides inbound, outbound, operations, sales and other related logistics services.

There are many strategic performance management tools that are used to align the business goal with the strategy of the entity. One such tool is Balance Score Card. It is a tool developed by Kaplan and Norton in the 1990's at Harvard Business School. This tool divides the entire company's performance into four perspectives and helps in identifying the status of the organization. This process makes the process less complicated.

Internal Business Perspectives

The internal business perspective refers to the internal business process of the organization. This helps the manager to understand the current status of the business. It helps to identify the conformance of the processes as per the requirement of the customer. One has to design this matrix very carefully; if the customer is mapped in wrong manner, the whole process will go in vein as the dissatisfied customer will

move to the competitor. The customer should be analyzed for kind of process and kind of customer group.



Fig. 4.18 Internal Business Perspectives

The Customer Perspective

Customer satisfaction is the core of any business; dissatisfied customer will find out another service provider. Hence indicator like meeting the timelines, quality of service, performance of the service partners, etc. should be evaluated. While providing logistics services, the customer should be evaluated for the kind of services being received and the kind of customer.

Financial Perspective

Another area for the analysis is the analysis of processes is the financial perspective. Indicators like cost saving, value maximization, productivity, timely payments, etc. should be evaluated to understand the effectiveness.

Learning and Growth

The system should be self-assessed for meeting the present and the future goal of the organization. Be it development of new skill or new technology, once assessed on time, it can prove fruitful for the organization.

Employee Empowerment

Employee empowerment is the centre of all the activities. All these can be achieved only when right kind of employees are available. For this the self-assessment by the workers should be motivated and they should be encouraged to work on skill improvement. Also the quality of work environment and the leadership should be encouraging.

All these help the 4PL to refine their work and provide better services to their clients.

4.9 PRODUCT/SKILL CENTERS: SUPPLY CHAIN ENGINEERING

The product centre of the 4PL organization is supply chain engineering. They provide management expertise for supply chain. Supply chain engineering can be defined as the method for the conceptual construction and realization of logistics and product-oriented supply chains within a company and beyond its borders. The focus is not only on optimizing the part of the supply chain but the entire value chain.

The three major benefits provided by the 4PL for the supply chain engineering are: global talent pool, strong process and effective system.



Fig. 4.19 Benefit of 4PL Organization

- **1. Global talent pool:** 4PL provides a global pool of individual with deep expertise in their area.
- **2. Effective System:** They provide a system which can effectively oversee the network of activities performed by 3PL's and asset-based providers selected by the organization.
- **3. Strong Process:** They have a strong process with focus on providing monitoring, reporting and reengineering of activities.

4PL re-engineering offers the end to end supply chain of the clients, client's customers and client's suppliers for both external and internal supply-chains. These relations are develop with all the parties to achieve optimal solution.

Supply chain engineering can happen at four stages. These are:

- 1. Planning Supply Chain: Planning supply chain includes activities like supply chain designing, demand planning, production planning and transport planning. Depending upon the demand, the clients do the production planning and ask for a supply chain solution. The role of the logistics is to provide the transportation and supply chain services accordingly. The focus should be to optimize the cost and satisfy the customer.
- 2. Completing Supply Chain: Activities like material management, material handling, order fulfilment, warehouse management lead to completing supply chain. The 4PL has to ensure that all these activities happen on time. The task perform by the 4PL to managed these activities effortlessly are part of supply chain engineering.



Fig. 4.20 Supply Chain Engineering

- 3. Coordinating Supply Chain: Coordinating supply chain activities include event management like inbound and outbound logistics, invoice services, bills, insurance, documentation, and so on, to manage the supply chain. The selection of the kind of vehicle and the mode of transport to optimize cost and time is also a part of it. 4PL takes this coordination activity to reengineer the supply chain.
- 4. Cooperation within Supply Chain: Tools like Collaborative Planning and Forecasting and Replenishment, (CPFR), Vendor Management Inventory (VMI), Supplier Management Inventory (SMI), etc. help in managing supply chain and coordinating among various functional units. This also helps in reducing the inventory and optimizing the supply chain.

A 4PL service provider effectively re-engineers the end-to-end supply chain. They work with 3PL partners who provide them physical assets. The collaboration between the 3PL and 4PL are developed strategically in view of the need of the client. Hence they are able to provide supply chain modification and re-engineering solution as per the need and helps in managing the logistics.

4.10 4PL VALUE-ADDED SERVICES

At a certain point of time, companies go the extra mile to provide comfort, assurance, trust and satisfaction to their customer and provide additional services either free or at an attractive cost. These services that are not the core services but add value or enhance the customer experience are called value added services.

These services provide advantage to both customer and service provider. Where customers have the opportunity to receive something extra or above their expectations, the service providers have the opportunity to improve or nurture rapport with the client and at the same time earn additional revenue.

Value-added services are non-core services and are generally marketed as premium features and add-ons to basic core services.

A few of the value added services provided by 4PL includes:

- Container loading and Unloading
- Tender Submission Assistance, Maintaining and Updating data

- Product Recall Assistance
- · Online Credit and Invoice Downloads
- · Information related to product and pricing
- Business to Business IT Capabilities
- · Development of Customized IT Solutions such as Web Forms
- Lot & Batch Tracking
- Disaster Plan Inventory Storage, Management and Distribution
- Comprehensive Business Reporting Suites
- Freight Management

These services can be further categorized into three categories: knowledge transfer, business development and functional support.



Fig. 4.21 Value-added Services of 4PL

4.10.1 Knowledge Transfer by 4PL Partners

The process by which ideas, information, knowledge and experiences move from one source to the other is called knowledge transfer.

Organizations nowadays indulge in alliances, partnerships and collaborations to work on areas of improvement and suggest measures for the same. All this requires transfer of information, knowledge related to technology, best practices, and so on. 4PL partners can transfer their knowledge to the clients to optimize their business.

A few common areas where 4PL provides knowledge transfer are:

- Business Intelligence
- · Development of Customized IT Solutions such as Web Forms
- · Online Credit and Invoice Downloads
- Information Related to Product and pricing
- Business to Business IT Capabilities

Logistics Service Providers

Business intelligence services help the client understand the market better. This makes them capable of understanding the market demand and accordingly, they plan their manufacturing and service capacity. It also helps them in product innovation.

Customized IT solutions help in managing the business functions better. Facilities like tracking of logistics activities, invoice management, web based solutions, cloud-based **ERP (Enterprise Resource Planning)** solutions streamline the business functions.

The sharing of information online and providing the facility to download various documents like credit documents, invoices or bill make it easy for the client to manage the outsources business. It also builds trust and the ease of doing business keeps the partnership with the client.

Sharing of information related to products and pricing also help in making the things transparent and building trust.

Sharing of the IT capabilities with the client help them find value in the partnership and continue the relationship.

4.10.2 Business Development

Business development services are those non-financial services or products that are offered to the clients at various stages of their business need. This mainly includes skill transfer and business advice and is provided to the businesses for taking care of their market need.

The value-added services provided by the 4PL provider for the business developments includes:

- Marketing Services
- Development of Customized IT Solutions such as Web Forms
- Comprehensive Business Reporting Suites

Many 4PL providers provide marketing services to their client. These include providing market insight, market segmentation, and competition analysis or market strategy. The identification of a suitable 3PL partner for a particular market and development of the market and product positioning is also part of value-added services of many 4PL providers.

Many 4PL providers provide customized IT solutions such as web forms for taking care of marketing and business development need of the company. Many a time, they carry out research for the client and provides a comprehensive report that contains information on how to manage their business better and how the future will be. These researches also provide suggestions for further improvement.

4.10.3 Functional Support

Functional support includes delivering support services to the end-user. Value-added functional services provided by 4PL partners include:

- · Container loading and Unloading
- Tender Submission Assistance, Maintaining and Updating data
- Product Recall Assistance
- Lot & batch tracking

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Enterprise Resource Planning: It is a process by which a company (often a manufacturer) manages and integrates the important parts of its business.

- Disaster Plan Inventory Storage, Management and Distribution
- Freight Management

Companies look towards 4PL providers for a broad set of logistics solutions. The following steps help them to identify the right 4PL partner for them. These steps are as follows:

Step 1: The first step is to look out for a partner who has some specialization in the specific industry. There must be many 4PL providers but all may not have the necessary resources and skill to operate into the particular segment. Hence, one needs to identify a 4PL who has some knowledge of the business, process, product and market.

Step 2: In this era of outsourcing, there is no need to buy and implement own technology. The plug and play (Buy readymade services) technology models are best to be opted for. They are already tested and implemented. Identify a 4PL provider who can give such technology and support planning, inventory management, forecasting, customer relationship management functions etc.

Step 3: The next step is to check the agility of the 4PL. The outsourcing partner should be such that it can change the strategies as per the market demand.

Step 4: Companies should look out for logistics providers who have a proven record of credibility and strong management and who can give some value to the business. Their past record should indicate service commitment.

4.11 SUMMARY

Some of the important concepts discussed in this unit are:

- Creating the required infrastructure involves huge cost. Companies in order to remain competitive want to focus on their core competencies and hence are on the lookout for alliances and strategic partnerships. They are also open to outsourcing their non-core activities and focus only on the core activities. Hence, they look forward to Logistics Service Providers (LSP) the companies that provide logistics solutions to more than one client.
- When a company decides to outsource, it focuses on finding a partner who can do the job better than them and let them focus on their key areas.
- They are four categories of Logistics Service Providers: First Party Logistics (1PL), Second Party Logistics (2PL), Third Party Logistics (3PL) and Fourth Party Logistics (4PL) providers.
- The major functions performed by 3PL service providers are operations of the distribution centres or warehousing, managing transportation fleet or freight shipping and courier shipping. These services are provided through own or leased or contracted assets or services.
- The first and the most important advantage of 3PL providers is that it enables companies to focus on the core activities of the businesses. The focus on core activities is important as it creates value-added activities for making better revenue. Services like Multi-shipper container consolidation, custom and freight forwarding, global air freight and, export documentation are few of the global services provided by 3PL providers.

Check Your Progress

- What do you understand by Business Process Analysis? State its purpose.
- List a few of the value-added services provided by 4PL providers.

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- Fourth Party Logistics services providers are integrators that accumulate resources, technologies and capabilities to run logistics solutions. This idea of the fourth-party logistics service provider was started by the consulting company Accenture. 4PL is a kind of joint venture formed between two parties: primary client and partner. The clients are the businesses looking for 4PL service providers.
- Warehousing services are more suitable for long-term storage and is good for those companies who have their distribution centre out of the way. For those companies that have their distribution centre at a convenient location focus on the distribution centre only. The outsourcing agency will look into the need of the company and suggest whether the company should go for warehousing services or distribution or a mix of the two.
- Carrier management is responsible for obtaining freight for their firm, negotiating freight rates, planning the mode of transfer, time of movement, traffic management, etc.
- Whenever a manufacturer or service provider decides to outsource its logistics operations, they look out for a single company who can provide all the logistics services, but in reality there is no such service provider as the whole market is fragmented. Hence, they approach 4PL service providers who contract with different providers, assemble end to end solutions, manage them and serve as a single point of contact to the shippers.
- Business Process Analysis and Scoping helps in identifying the critical and non-critical activities of the business. It also helps in identifying those activities which are required to be modified for the system improvement.
- At certain point of time, companies go the extra mile to provide comfort, assurance, trust and satisfaction to their customer and provide additional services either free or at an attractive cost. These services that are not the core services but add value or enhance the customer experience are called value-added services.
- Many 4PL provide marketing services to their client. These include providing market insight, market segmentation, competition analysis or market strategy. The identification of suitable 3PL partner for a particular market and development of the market and product positioning is also part of value-added services of many 4PL.

4.12 ANSWER TO 'CHECK YOUR PROGRESS'

- 1. Those firms that provide logistics solution to companies are called Logistics Service Providers.
- 2. Commonly outsourced services includes Warehousing, Cross Docking, Inventory Management, Freight Forwarding and Transportation.
- 3. Some of the main reasons for companies to outsource services are as follows:
 - (i) Focus on Key Area
 - (ii) Enhanced Customer Satisfaction
 - (iii) Reduced Back-office Work

- (iv) Reduced Liabilities
- (v) Economies of Scale
- (vi) Efficient Handling of Petty Expenses
- 4. Logistics Service Providers can be divided into four categories: 1PL or First Party Logistics, 2PL or Second Party Logistics, 3PL or Third Party Logistics and 4PL or Fourth Party Logistics.
- 5. Third party logistics providers are companies that provide a range of logistics activities for their clients. The major functions performed by 3PL service providers are operations of the distribution centres or warehousing, managing transportation fleet or freight shipping and courier shipping.
- 6. There are three types of 3PL providers. These are: (i) Asset based; (ii) Management based; and, (iii) Integrated providers.
- 7. The advantages of 3PL are as follows: (i) Focus on core competencies; (ii) Better Funds Management; (iii) Enhanced Technological Capabilities; (iv) Flexibility; (v) Best Practices; and (vi) Green Logistics.
- 8. The idea of a fourth-party logistics service provider was started by the consulting company, Accenture. It is based on the principal that modern supply chain is complex and the capability to manage it does not lie in any one organization and hence we need some organization to manage this complex network of supply chain.
- 9. The common functions of 4PL are: Assembly of Resources/Integrator, a Supply Chain Control Room, Supply Chain Infomediary, and as a Resource Provider.
- 10. An invoice is defined as a commercial document that itemizes a transaction between a seller and a buyer. It is a commercial document issued by a seller to a buyer. There are four types of invoice. These are:
 - Pro-forma Invoice
 - Commercial Invoice
 - Custom Invoice
 - Consular Invoice
- 11. The various services provided at the call centre are:
 - Billing Support
 - Complain Resolution
 - Collection
 - Document or Order Processing
 - Telemarketing
 - Inquiry Services
 - Technical Support or Help Desk
- 12. A distribution centre is a little more dynamic than a warehouse. It offers more services as compared to a warehouse.
- 13. The major challenges faced by a company in managing warehouse and distribution include damage, theft, wrong quantity and accidents.

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14. Business Process Analysis is defined as the analysis of various business operations classified into processes, or series' of related tasks for a particular objective. The purpose of the analysis is to study the way in which the processes happen along a value chain and critically examine each activity.

- 15. A few of the value added services provided by 4PL providers include:
 - Container Loading and Unloading
 - Tender Submission Assistance, Maintaining and Updating data
 - Product Recall Assistance
 - Online Credit and Invoice Downloads
 - Information Related to product and Pricing
 - Business to Business IT Capabilities
 - Development of Customized IT Solutions such as Web Forms, etc.

4.13 QUESTIONS AND EXERCISES

Short-Answer Questions

- 1. Write a short note on the advent of Logistics Service Providers.
- 2. Explain the main reasons for the companies to outsource some of their services.
- 3. Write in brief about Fourth Party Logistics (4PL) providers.
- 4. List the major functions performed by 3PL service providers.
- 5. Write short notes on the following:
 - (a) 4PL Value-Added Services
 - (b) Knowledge Transfer
 - (c) Business Process Analysis and Scoping
 - (d) 4PL Specialties
- 6. Discuss the stages in which supply chain engineering takes place.

Long-Answer Questions

- 1. Enumerate the benefits that outsourcing provides to companies.
- 2. Discuss the major differences between 3PL and 4PL service providers.
- 3. Examine the role of call centres highlighting the various services provided by them.
- 4. Discuss the various functions of carrier management,
- 5. What do you understand by warehouse/distribution centre? Describe 3PL and 4PL Warehouse and Distribution Centre Services.

Special Logistics

UNIT 5 SPECIAL LOGISTICS

Structure

- 5.0 Introduction
- 5.1 Unit Objectives
- 5.2 Inter and Multimodal Transport
- 5.3 Industrial Projects Transportation
- 5.4 Trade Fairs and Events Transportation
- 5.5 International Supply Chain Management
- 5.6 Consolidation and Groupage
- 5.7 Logistics of Time Perishable
- 5.8 Logistics of Quality Perishable
- 5.9 Lifecycle Logistics for Projects/Products
- 5.10 Gs1 System of Worldwide Supply Chain Standards
- 5.11 Summary
- 5.12 Answers to 'Check Your Progress'
- 5.13 Questions and Exercises

5.0 INTRODUCTION

Like most other industries, transportation and logistics has witnessed some interesting transformation and trends. The new consumption patterns, ever increasing demands, growing usage of information technology, rise of electronic commerce and global trade treaties have impacted warehousing and transportation formats, and like all change, this brings both risk and opportunity for businesses. With the market focusing on providing various delivery and pickup options, it has become essential for logistics service providers to ensure maximum utilization of their assets with a tight control on wastage. In this unit, we will discuss in detail about the special developments in the field of logistics.

5.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Define inter and multimodal transport, its elements, objectives, advantages and disadvantages
- List the challenges associated with Industrial Projects
- Discus the way to manage logistics before, during and after the event
- Describe how to manage the International Supply Chain
- Distinguish between on-site consolidation and off-site consolidation
- Identify the challenges of managing logistics of time perishable and quality perishable goods
- Define Lifecycle Logistics for Projects/Products and its goal
- Define the GS1 System of Worldwide Supply Chain Standards System

Intermodal: It refers to shipment of goods involving two or more different modes of transport.

5.2 INTER AND MULTIMODAL TRANSPORT

In the transportation industry, there are number of ways to transport goods from the seller to the buyer such as by rail, road, air and ship. Earlier, the whole transportation system was segmented and each mode saw the other as a competitor and exploited its own advantage in terms of reliability, cost, service and safety. All these carriers tried to retain their business and increase revenue by maximizing line haul under their control. However, one innovation that has changed the whole global freight movement landscape is the intermodal container. It utilizes special standardized containers to transport cargo by trucks, freight trains and ships. These standardized containers are large rectangular boxes, capable of being secured to special trailers. The containers are durable, constructed of steel and built so that they can be transferred between the different modes of transportation. The intermodal transport may use several modes of transport but only one loading system, usually containers, movable boxes or trailers. The movement of goods from one modes of transport to another commonly takes place at a terminal especially designed for the purpose.

As **intermodal** transportation involves use of at least two modes of transport, it allows integration of several modes of transport. The aim of integration of modes is to integrate them to achieve economy of scale. Here, each mode has a different carrier responsible for shipment and has its own independent contract. Thus, each leg of transport is handled by a separate transport carrier. Here the shipper has several contracts, one with each transport carrier to handle specific leg of transport. For examples, using rail containers for long distance transportation and using trucks for local pickup and deliveries. The entire trip is operated like a single unit with each marked by an individual operation and a separate set of documentation.

Conditions

The conditions that are needed to be observed in intermodal transport are as follows:

- It is organized as a sequence of transportation, called the intermodal transport plan. The prominent modes supporting intermodalism are Rail, Trucks, Barges and Maritime. Air transport usually requires only one mode of intermodal, i.e., a truck for its first and last mile and is not used in combination with any other mode.
- This kind of transportation is suitable for intermediate and finished goods.
- It is more popular for long distance travel.
- As low value transports prefer to use point to point shipment like rail or maritime and high value prefer to use direct shipment like air transport, intermodal transport is useful for intermediate cargo value.
- It is more suitable for the cases or conditions where a routine cargo of a particular kind or of a particular quantity flows.

Basic Elements of Intermodal Transport

The basic elements of Intermodal Transport are as follows:

1. **The carrier**: The carrier for air transport is air cargo; for rail, it is railroads; for water, it is shipping lines and for trucks or buses, there are motor carriers, intercity bus carriers and city bus carriers.

- 2. **The Conveyance**: The conveyance for air travels are airplanes and for rail, it is trains; for water transport, it is ships and barges and for road transport, it is trucks, intercity buses and local buses.
- 3. **The Terminals**: Airports are the terminal for the air transport and for rail, it is rail freight terminals. For water transport, it is ports and for road transport, it is truck terminals and bus terminals.
- 4. **Infrastructure Requirement**: Airways, Railways, Waterways and Roadways are the infrastructure for air, rail, water and road transport, respectively.

In India, most of the carriers and conveyance are provided by the private sector whereas the terminal and infrastructure is provided by the public sectors. It is only the railways which is completely owned by the public sector.

System Element	Modes					
	Air	Rail	Water	Road		
Carrier	Air cargo	Railroad	Shipping lines	Motor Carrier, Intercity Bus carrier, City bus carrier		
Conveyance	Airplanes	Trains	Ships and barges	Trucks, Intercity Buses, City buses		
Terminal	Airports	Rail freight terminals Rail passenger terminals	Port	Truck Terminal, Bus Terminals		
Infrastructure	Airways	Railways	Waterways	Roadways		

 Table 5.1 Intermodal System Elements

Objectives of Intermodal Transport

The major objectives of intermodal transport are as follows:

- To lower the cost of transportation as the price of various modes is agreed in advance.
- To optimize the time taken to complete the order.
- To improve the overall services offered to the companies by various modes individually.
- To reduce inconvenience caused by various modes
- To increase productivity and efficiency and thus improving competitiveness.
- To improve energy consumption and environmental quality.

The beginning of intermodalism dates back to 1960, with the development of containers. The marine sector was the first one to adopt containerization. It was this mode which was constrained by the amount of time spent on loading and unloading of the vessel. Containerization helped significantly reduced this time.

The various steps involved in the intermodal transport process are:

1. Composition: Also called 'first mile,' it is the process of assembling and consolidation of freight at a terminal that offers an interface between regional and local distribution system or national and international distribution system. Goods coming from different suppliers are

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assembled at distribution centers and are then forwarded to high capacity modes like rail and maritime shipment. Activities like packaging and warehousing are also included in the composition process.



Fig. 5.1 Intermodal Transport Chain

- **2. Transfer:** Also called 'connections,' it involves the movement of the containership or train or trucks between terminals. The purpose of connections is to achieve economy of scale.
- **3. Interchange:** At the transshipment point, the intermodal function of changing vehicle takes place. The aim is to provide continuity within the transportation chain. The major interchange point are ports and transshipment terminals.
- **4. Decomposition:** It is also called 'last mile'. At this stage, the load after reaching the terminal close to its destination gets transferred to the local or regional distribution system. It is this local distribution system that transports it to the customer or consumers.

Types of Intermodal Transport

There are four types of intermodal transport. These are as follows:

- 1. **Piggyback**: This multimodal transport system is the outcome of collaboration between railways and roadways. It is also called 'Trailer on Flat Car' (TOFC) or 'Container on Flat Car' (COFC). In this system, containers or a truck picks up the goods and loads it on a flat car or rail for long distance travel. At the destination point, the trailers are detached form the rail and are again attached to the truck for the final deliver.
- 2. Air Truck: In this intermodal system, the combination of road and airways is used. The goods are transported to the airport using trucks and from there they are carried by airplanes. At the destination airport, they are again loaded on the truck and are moved to the final destination using trucks. It is also called bird back.
- **3. Transship**: This system involves the combination of railway and waterways for the shipment of bulk goods. Goods are transported to the port using railways and then loaded onto ships. At the destination, the goods are again unloaded and loaded on the rail cars and are transported to the final destination.
It is mostly used for the transportation of ores and minerals and other bulk items.

4. Fishyback: In this mode of delivery, the combination of road and water is used. It is similar to the piggyback except that after detaching the containers from the truck, the goods are loaded on ships. At the destination, the containers are unloaded from the ship and are delivered to the final destination using trucks. It is very popular in case of Import/ Export.

Advantages of Intermodal Transport

Some of the advantages of intermodal transport are:

- Fewer inspections as containers are sealed and hence faster processing.
- As the entire load goes into the same container, loading and unloading time are lower.
- Operational expenditures are less and prices are negotiated in advance.
- Lower risk of theft since there is only one intermediary. Single intermediately leads to more control over the merchandise.

The planning and scheduling of transport, route, resources and human are easier.

Disadvantage of Intermodal Transport

The disadvantages of the intermodal transport are:

- Requirements like crane for containers movement make the infrastructure requirement expensive.
- The reliability is low as there are several means of transport.
- The packaging cost may go up as they are required to be packed for multiple movements.

5.2.1 Multimodal Transport System

Multimodal transport can be defined as the transportation of goods using several modes of transport under one contract. For example, goods can be transported to the railway stations or to the port with the help of road transport and from there, rail or ships could be used to transport the goods. From the destination port or railway station, again road transport can be used for transporting the goods to the destination. It is mostly used for transporting the goods between different countries. Hence, we can say that multimodalism is all about:

- Coordination of the different modes of transport
- Coordination of documentation
- Coordination of the commercial and physical aspects of the commercial transaction between the buyer and the seller.

Key Players of Multimodal Transport

There are three key players involved in multimodal transport operation. These are: transport users, service providers and the government.

• **Transport Users:** Theses include importers and exporters. They use multimodal transport for their international trade transactions.

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Multimodal: It refers to the shipment of goods characterized by several different modes of transport under one contract.

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- Service Providers: These include freight forwarders, modal carrier, banking institutions, MTO (Multimodal Transport Operators) and insurance companies.
- **Government:** The role of government in the multimodal transport is to design and implement rules and regulations related to trade and transport.



Fig. 5.2 Key Players of Multimodal Transport

Benefits of Multimodal Transport

The short-term and the long-term benefits of multimodal transport for each of these key players are as follows:

(a) Short-term Benefits

- **1. For Transport Users:** In short term, the transport user can expect economic benefit in the form of:
 - Pre-agreed price for the door-to-door transport operation
 - Reduced transit time, increased cargo security and punctuality particularly at interface points
 - · Closer commercial relationships with services providers
 - Reduced transport and other associated costs because of use of modern transport-related technologies like cargo tracking, containers, EDI, etc.
 - New trading opportunities from non-traditional exports under the stimulus of improved transport services.
- **1.** For Service Providers: The benefits in short-term for the service provider are numerous. It helps them to:
 - Increase their existing market shares by providing opportunity to operate in a new market overseas
 - Increase their financial liquidity via the collection of prepaid freight on containerized door-to-door transport contracts.
 - Boosting their profession as international transport operators.
 - · Adopt commercial incentives like containerization and EDI
 - Concentrate their activities in "niche" operations to serve specific commodities on specific trade routes
- **2. For Government:** There are numerous benefits for the government. It helps governments to:

- Stimulate trade and promote new activities for the country's transport sector.
- Streamline and update trade- and transport-related administrative.
- Strengthen the complementarily between transport modes, instead of creating competition.

(b) Long-term Benefits

- **1. For Transport Users:** In the long-term as reliable and efficient multimodal service develops, the transport users can think of reorganizing their distribution outlet. It can help in development of simplified trade practices like simplification in the border crossing, development of logistics hubs, etc.
- **2. For Service Providers:** In the long-run, to remain competitive and successful, the service providers may enter into contract with foreign companies, restructure their operations and will try to differentiate their offerings. By doing all these, they will try to grasp a major market share and increase their profit.
- **3.** For Government: In the long-run, the governments have to plan infrastructure development and design institutional organizations with increased attention to the needs of the transport industry. They also need to develop regulatory measures to harmonize transport liability regimes and insurance practices. They are also expected to provide appropriate legal framework for the establishment and development of MTOs. In the long-run, they also need to develop policy measures for custom and transport operations so that misallocations of resources can be avoided.

Differences between Multimodal and Intermodal Transport

The following are the main differences between multimodal and intermodal transport:

- In multimodal transport, there is one contract only that covers all the modes of transport whereas in intermodal, there is a different contract for each mode of transport.
- In intermodal transport, the focus is to transport the goods using single container and thus reduce handling. Theses containers may not necessarily be used in the multimodal transport.
- There are multimodal transport operators (MTO) who do the whole planning and arrangement for the movement of the goods but in case of intermodal, the company can define its own route plan and modes and has to independently contact each transport operator.

General Advantages of Multimodal Transport

The advantages of multimodal transport are as follows:

- Lower risk of theft or damage as there is single intermediary and hence more control over merchandise.
- It is easy to plan route, cost and human requirement.
- It reduced the burden of documentation and formalities, as these are taken care by MTO.

- Minimizes the time loss at the transshipment point and provides faster transit of goods.
- Helps in achieving economies of scale in transport negotiations by better use of available infrastructure and more efficient means of transport, focused on cost reduction
- It also helps in reducing indirect costs e.g. human resources.

5.3 INDUSTRIAL PROJECTS TRANSPORTATION

Industrial projects have placed great emphasis on operational risk associated with men and machine. The transportations of equipment and material for such projects are required to be carried out with great care and safety. It is not only the money that is involved with these materials but also at risk are the life of people and timeline of the project. Any delay at any stage due to delay in shipment, can derail the whole project from its schedule completion and hence can increase the cost considerably. In many cases, there are penalties associated with projects and so completing it on time is all the more important.

A few examples of industrial projects are:

- Port Handling Equipment
- Oil & Gas Equipment for Onshore and Offshore Infrastructure
- Mine Construction
- Heavy Machinery
- Refinery and Petrochemical Plant Equipment
- Renewable Equipment for Onshore and Offshore Infrastructure
- Port Construction Material and Equipment
- Pipeline Construction
- Modules and Pre-assembled Units
- Floating Cargo
- Dam Construction
- Power Plants and Power Generation Equipment
- Rolling Stock

Industrial projects like construction of dams, pipelines, mines, offshore platform, energy plants and other such projects require enormous, expensive and in some cases, uniquely manufactured equipment. In addition, most of these projects are carried out in remote areas and possess physical infrastructure challenges. Hence transporting such material is more critical. For all such transportation, the following points should be considered:

There are numerous reasons why project transportation needs special attention. These are as follows:

• The cost of project cargo is very huge and any damage to it will make the project more expensive. Paying attention to the safety of the goods can help in reducing the risk to a considerable extent and so should be considered.

Check Your Progress

- 1. In the transport industry, what are the common ways to transport goods?
- 2. Which innovation has changed the whole global freight movement landscape?
- 3. What modes of transport do intermodal transportation involve?
- 4. List the basic elements of intermodal transport.
- What do you mean by Multimodal Transport System?
- List some advantages of the Multimodal Transport System.

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- Any damage to the project cargo can delay the whole project. Hence measures should be taken to avoid it.
- The damage to the cargo can also land the shipper into legal battle of loss settlement and trained personnel and suitable vessels should be used.
- Damage during transportation can delay the project and may result in expensive litigation. Hence measures should be taken to transport materials safely.

Responsibilities in Industrial Projects Transportation

The following are the responsibilities of industrial projects transportation:

- It requires good teamwork.
- A transport manual should be prepared in advance and should be agreed by both the parties.
- Responsibility of each party should be defined in advance and should be agreed upon.
- The cargo should be insured and a warranty survey should also be done.

Scope of Work of Transporter

The scope of work of the transporter in industrial projects is delineated below:

- The monetary interest of the customer should be secured by the shipper. The packaging, lifting, loading, unloading strategies and equipment should be designed in a way to protect the interest of the customer.
- They should also facilitate in the creation of documents for transportation planning.
- The shipper should help the customer in route planning and should also propose alternate route if the primary one cannot be used.
- Careful planning should be done about lifting and on ground handling of the material in collaboration with the client. The shipper should be aware about the transport and lifting gear to be required for the material.
- The goods should be packed with utmost care. If required, specialized packaging should be designed for the client. The packaging should be capable of taking care of both product and human need.
- The shipper at times have to provide engineering support to the client.
- End-to-end logistics solutions are required as the goods are very critical and expensive for the project.

5.4 TRADE FAIRS AND EVENTS TRANSPORTATION

Trade fair and events transportation is another special type of project for which logistics providers have to give special consideration. It consists of both forward and backward logistics, i.e., deployment and withdrawal of resources according to the schedule of the event. This requires significant contingency planning and powerful presence of logistics functions.

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Challenges of Managing Trade Fair and Event Planning

The challenges of managing a trade fair and event planning are discussed below:

- All such events require planning for safety, reliability and efficiency and response to any additional need within a short frame of time.
- Since arranging a substitute part at the place of event is almost impossible, all the materials are required to be transported very carefully. Special packaging should be done to avoid any breakage. The care should also be taken during the loading and unloading of the material at the event site.
- Another very important aspect of event transportation is to be in line with the schedule. The transporter has to ensure that the material should reach to the site as per the planned schedule. Any delay in same will affect the event.
- Once the event is over, all the materials are required to be packed again in a safe manner and to be transported back. In case there is some additional event tied up with the current event, the shipper has to make arrangement to make the material available to the new site also. Hence, all time and safety deadlines are required to be met.



Fig. 5.3 Challenges of Managing Trade Fair and Event Planning

- Many times, the shipper has to arrange the entire custom document for the movement of goods. Hence, the shipper needs to have efficiency in documentation to handle events transportation.
- The shipper should have knowledge about the specific regulation and formalities of the event (if any).
- The entire transportation with various modes should be well coordinated. The shipper needs to track the movement of the vehicle in international as well as domestics transport.

Services Required at Various Stages of Event

The various services are required to manage the event. These include:

(a) Before the Event

- 1. Listening to Requirements: The shipper must understand the requirement of the customer w.r.t the schedule, packaging, documentation, material handling and other requirement (if any) before he can suggest the service to the customer.
- 2. Planning the Detail of the Logistics: Once the needs of the customer are known, the shipper can do the logistics planning and make the customer aware of the same.
- **3.** Import, Export and Transit Formalities: In case the event is a global event the logistics provider had to understand the need of the customer and handle the custom and documentation formalities of import/ export.
- 4. Reporting and Recommending Solutions: Once both the shipper and the customer are agreed upon the logistics details, the shipper suggests solutions to the customer's need. Any modification (if required) happens at this stage.
- 5. Planning the Logistics: Based on the requirements of the customer, the logistics provider arranges the services and executes the plan as per the required time frame of the customer.

Before the event	 Listening to requirements Planning the detail of the logistics Import, export and transit formalities Reporting and recommending solutions Planning the logistics 		
During the Event	 Staff Support Handling and collecting of empty packages Storage facility 		
After the Event	 Safe return Packaging for Return Transport to next trade Fair Long/ Short Term Storage 		

Fig. 5.4 Services Required at Various Stages of Event

(b) During the Event

1. Staff Support: The job of the logistics providers does not get over with the dispatch of goods and its unloading at the site of the event. They have to ensure that there is ground staff to manage the material at the site of the event. Many a time, logistics provider also provides staff for the assembly work at the site of the event.

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- **2. Handling and Collecting of Empty Packages:** There should be enough people/staff to collect empty packages form the place of event. All these packages are required to be stored appropriately as they might be required once the event is over.
- **3. Storage Facility:** Many times, the event lasts for many days and there are few products that are required to be packed and stored safely for the next day. For all such products, the service provider should provide the facility.

(c) After the Event

- **1. Safe Return:** Once the event is over, the logistics provider has to ensure that the product is returned safely to the customer's site.
- **2. Packaging for Return:** Once the event is over the packaging of the goods is to be carried out. Again all the safety measure should be considered to avoid damage and breakage of the product.
- **3.** Transport to Next Trade Fair: In case, the goods are required to be transported to another trade fair, the shipper had to ensure safe transportation of the goods to the new site and provide all the services agreed upon with the customer at the new site4. Long/ Short Term Storage: Many times, after the event is over, the customer does not want the material to be shipped back rather he wants the logistics provider to store it for a certain time period. If required, such services are provided by the logistics provider.

5.5 INTERNATIONAL SUPPLY CHAIN MANAGEMENT

In the last fifty years, there has been tremendous growth in global trade. Companies exploit the opportunity of cheap production in one country and supply the manufactured products throughout the world. Moreover, there are cases where the domestics market does not have much demand and so companies are looking out for new markets and hence goods are required to cross the boundary of the nation. The reduction in trade barriers is another aspect that has led companies to produce in one country and transport it globally rather than transporting locally. Hence there is a growing demand for the international supply chain management.

Decision Framework of International Supply Chain

Supply chains are becoming increasingly complex; it is no longer a source of inputs or services but is an integral source of value added. The structure of the supply chain, the suppliers and customer who participate in it are critical factors to be considered for supply chain planning. The international supply chain is similar to domestic supply chain in many ways, except that it is spread across a wider geographical area. However, they are very critical factor for the success of the business and can provides additional opportunities to the company if managed appropriately. The

Check Your Progress

List some examples of industrial projects.

 State some of the challenges for managing trade fairs and event planning.

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Activities Related with International Supply Chain

(a) Activities

- 1. Network Design: The decision about route planning, facility location, vehicle planning, market and supply location, material handling process, and so on, should be well defined in international supply chain for network planning. Also all the related documents should be available with the shipping vehicle.
- **2. Risk Management**: The risk associated with supplier, customer, market and business environment should be accessed in advance.
- **3. Governance**: The rules and regulations should be well studied and followed in international supply chain. The suppliers also need to keep a track of development related to political and legal development in the country of import.

(b) Enabler

The enablers of international supply chain are commoditized transportation and information and communication technology.

- **1. Commodifized Transportation**: The availability 3PL and 4PL providers have made the work of international supply chain more easy and error proof. These service providers provide end-to-end supply chain solutions.
- **2. Information and Communication Technology**: Another enabler of international supply chain is information and communication technology. These technologies reduce the risk of theft in the supply chain, help in tracking the movement of the vehicles and also in identifying goods shipped and thus enable a smooth supply chain.



Fig. 5.5 Decision Framework of International Supply Chain

(c) Drivers

The factors that promote international supply chain are:

1. Factor Costs: According to Adam Smith in his work *The Wealth of Nations*, 'If a foreign country can supply us with a commodity cheaper than we

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ourselves can make it, better buy it of them with some part of produce of our own industry, employed it in a way in which we have some advantage.' The cost factor is one of the most important factors for companies going global. Outsourcing, because of low-cost, is one of the main reasons. Companies like to import goods from countries having low-cost product, large production volume and low transportation cost.

2. Economy of Scale: Producing in masses helps in keeping the cost per unit low. These mass manufactured products can be shipped in large volume to keep per unit transportation cost low.

(d) Risk

There are many risk associated with international supply chain, these are;

- Local Responsiveness/Time to Market: The decision to enter into the market is very important in international business and should be taken after well-thought-after- consideration. The same is true for decisions related to the international supply chain. It is very important to deliver the goods as per the agreed time and for this, they need to schedule supply chain accordingly. The time laps in port and custom formalities should be given due consideration. If these consideration are not taken, the company may end up delaying the delivery.
- **2. Inventory and Handling Cost**: The inventory and handling cost should be kept low as these leads to the cost of product.
- **3. Transportation Breakdown**: The risk associated with long distance supply chain is transportation breakdown. This should be taken care with maintenance and upkeep of the vehicle and having a tie up with the companies providing on the breakdown and maintenance services while the vehicle is on move.
- **4. Geopolitical Threat (War, Terror):** Geographical threats like war and terrorist attack are another risk in global logistics. The shipment and the vehicle should be insured and (if possible) route to such countries and places should be avoided.

Challenges of Globalization

Some of the major challenges companies face in a globalized world are discussed below:

- 1. Meeting intensifying competition from around the world.
- 2. Supplying a unique value proposition to customers around the world.
- 3. Adapting to multiple national environments with differing cultures, political and economic systems, business practices, tax and legal systems.
- 4. The availability and level of infrastructure in transport and telecommunications.
- 5. The global politics of economic and trade relationships.
- 6. The complexity of managing an extended network of suppliers, production plants, intermediaries and customers in the supply chain.
- 7. The impact of geography: time and distance and the location of markets.

8. Responding to changes in monetary exchange rates by shifting production to lower cost sites, with the consequent changes in network configurations and routings

Risk Mitigation Strategies of International Supply Chain

The various risk mitigation strategies of international supply chain are: increase capacity, acquire redundant suppliers, increase responsiveness, increase inventory, increase flexibility, pool or aggregate demand or increase capability.

Mitigation Approach	 Focus on low-cost, decentralized capacity for predictable demand. Build centralized capacity for unpredictable demand. Increase decentralization as cost of capacity drops. 		
Increase Capacity			
Acquire Redundant Suppliers	 Favor more redundant supply for high-volume products, less redundancy for low-volume products. Centralize redundancy for low-volume products in a few flexible suppliers. 		
Increase Responsiveness	 Favor cost over responsiveness for commodity products. Favor responsiveness over cost for short life-cycle products. 		
Increase Inventory	 Decentralize inventory of predictable, lower- value products. Centralize inventory of less predictable, higher- value products. 		
Increase Flexibility	 Favor cost over flexibility for predictable, high-volume products. Favor flexibility for low-volume unpredictable products. Centralize flexibility in a few locations if it is expensive. 		
Pool or Aggregate Demand	 Increase aggregation as unpredictability grows. 		
Increase Capability	 Prefer capability over cost for high-value, high-risk products. Favor cost over capability for low-value com- modity products. Centralize high capability in flexible source if possible. 		

Fig. 5.6 Risk Mitigation Strategies in International Supply Chain

5.6 CONSOLIDATION AND GROUPAGE

Consolidation is the practice of combining diverse cargoes into a single shipment to achieve substantial savings on costs. It is also known as groupage. The container is controlled by the service providers who are specialized in the job.

Check Your Progress

- 9. State one difference between the international and domestic supply chain.
- 10. List some of the major challenges companies face in a globalized world.



Consolidation: It refers to the practice of combining diverse cargoes into a single shipment to achieve substantial savings on costs.

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It is mainly useful when companies have to send ship of small amount of goods to the area they are specialized in. Since booking the whole vehicle will be a wastage of money, they group their goods with the similar goods of the other companies for cost optimization.

Sometimes, these shipments come from multiple suppliers or locations and need to be combined to avoid paying higher rates. When such consolidation happens, the consolidating warehouse receives the consolidated material from a number of manufacturer destined to a specific customer on a single transportation shipment.



Fig. 5.8 Consolidation and Groupage

Benefits of Consolidation

There are several benefits of consolidation. These are as follows:

- 1. The first and the most important benefit of consolidation is cost effectiveness.
- 2. Along with saving money, it also helps in combining orders. This is very helpful when the company is buying from different sellers. All these sellers can send the goods to the consolidation warehouse from where it can be shipped together.
- 3. Less congestion at loading docks.

- 4. It gives businesses the flexibility to make small and frequent purchases.
- 5. Consolidation also helps in placing orders with the suppliers who normally do not sell goods below a certain order quantity.
- 6. Since one shipper is responsible for many supplier, there is less product handling.
- 7. It provides flexibility in the transportation, timeline and inventory flexibility.
- 8. It usually takes less time than the LCL.
- 9. It helps in building stronger carrier relationships.
- 10. Since all consolidated materials will reach together, it provides more control over due dates and production schedules.

On-site vs. Off-site Consolidation

Once the company is able to identify the opportunity of consolidation, the physical combining of freight happens. The combining can happen in two different ways: On- site and Off- site.

On-site Consolidation

On-site consolidation is the practice of combining shipments at the original point of manufacture or distribution center where the product is shipping from. It is based on the philosophy that 'lesser the products, lesser will be the handling and better would be the product'.



Fig. 5.9 On-site Consolidation

Off-site Consolidation

Off-site consolidation is the process of taking all the shipments, often unsorted and in bulk, to a separate location. Here, the shipments can be sorted and combined with those going to like destinations.

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Fig. 5.10 Off-site Consolidation

On-site consolidation is best suited for shippers having more advanced visibility of their orders to see what is pending, as well as the time and space to physically consolidate the shipments. Whereas off-site consolidation is usually best for shippers with less visibility to what orders are coming, but more flexibility with due dates and transit times. On-site consolidation ideally happens for upstream logistics whereas off-site happens ideally for downstream.

5.7 LOGISTICS OF TIME PERISHABLE

A perishable good is any goods whose quality deteriorates with time due to environmental conditions like temperature, pressure, moisture, and so on. The examples of such goods are: fruits, vegetable, dairy products, sea food, flowers, pharmaceutical products, meat and poultry, chemicals, processed foods, etc. Most of the perishable products require some sort of refrigeration or temperature control.

Managing the supply chain of perishable product has always been a challenge because of short life cycle of these products. The spoilage due to fast deterioration leads to significant amount of wastage and hence loss for the companies.

The European Union and other developed countries have established a set of regulations for temperature control and equipment performance at different stages of logistics management of such goods.

There are parameters to be followed during storage at the warehouse and during transit:

- The product temperature regulations along the supply chain.
- Obligatory recording of air and product temperature in refrigerated vehicle
- Standardized equipment confirmed by attesting.

In case of perishable foods, the warehousing operation aims to address the following issues:

- Preservation of high quality standards
- · Covering seasonal demand
- Monitoring of storage conditions
- Reduction of operational cost

Check Your Progress

- 11. What do you mean by Consolidation and Groupage?
- 12. What is off-site consolidation?

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- Reduction of response time between delivery and demand generation
- Storage of variety of products.

Warehouse Challenges for Managing Perishable Goods

The storage of perishable goods cannot be done in the way the non-perishable goods are stored. Hence information like expiry date of the product, incoming quantity, temperature, product tracking, storage location, and so on, are important.

The challenges faced by the warehouse operations include:

- 1. Expiry Date Control: One of the important tasks that warehousing has to do for perishable products is to control the expiry date of the products. It involves tracking the expiry date of the product once it reaches the warehouse. The goods having short expiry date should be treated on priority. In addition, the goods should be stored in such a way that the one having short expiry is picked first.
- **2. Temperature Monitoring:** Temperature monitoring is another important factor for the maintenance of perishable food. There are certain temperature range that is specified for the items, this temperature range is required to be maintained to avoid perishability of the items. Maintaining and monitoring of temperature is important from receiving the product till the dispatch of the product from the warehouse.



Fig. 5.11 Warehouse Challenges of Managing Perishable Goods

3. Product's Storage Location: Storing the product within the warehouse is another challenge with the warehouse management. At the time of receiving, products are labeled with their storage location and then they are placed in that location.

Cold chain: It refers to a temperature controlled supply chain.

- **4. Product Tracking:** Product tracking helps in faster picking of the product. It also helps in identifying products position in the warehouse and the stock quantity.
- **5. Incoming Quantity Forecast:** Another challenge with the warehouse operations is forecasting the quantity to be received and arrangement for the quality verification of each of these units is made.

Distribution of Perishable Goods

Distribution is a key activity that makes the availability of goods to the customer. This process has a huge cost as compared to other logistics activities. Since perishable goods deteriorates over a period of time if exposed to extreme weather conditions, a great care should be taken in their entire journey.

In order to reduce spoilage, they should reach to the customer as quickly as possible in the best condition. The cold chain of perishable goods is as follows:



Fig. 5.12 Cold Chain for Perishable Goods

The **cold chain** is a series of interdependent operations engaged in manufacturing, transporting, storing, servicing, and retailing temperature-sensitive food products. Here the wholesaler receives the goods and stores it in their warehouse. From there the repackaging happens and arrangements are made to ship them to the distributors. Till the shipments are made, the goods remained stored with the wholesaler.

Goods are carried to the distributors using specialized vehicle and remained stored with the distributor till further shipment to the retailers or point of sale. Again vehicles with cold storage facility is used for sending the goods to the distributors and retailers. At the point of sales, they are again stored in the temperature controlled environment and are made available to the customers for purchase.

Vehicle Choice

Since maintenance of temperature is the most crucial problem in the logistics of perishable goods, vehicle selection is the most crucial issue.

The optimal range of temperature for various kinds of perishable goods is given in Table 5.2.

Table 5.2 Optimal Storage Temperature of Common Perishable Food Products

Food product	Optimal storage temperature		
Deep-frozen food			
Meat	-25 °C or colder		

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Poultry	-24 °C or colder	
Fish	-29 °C or colder	
Fruits and concentrated juices	-18 °C or colder	
Vegetables	-18 °C or colder	
Frozen food	-20 °C or colder	
Frozen butter	0 °C to 2 °C	
Chilled food	6 °C to 9 °C	
Fresh meat	-1.5 °C	
Meat products	-2 °C	
Manufacturing meat	-2 °C	
Poultry	-1.5 °C	
Fish	in melting ice (0 °C to -0.5 °C)	
Dairy products	0 °C to 2 °C	
Fruits and vegetables		

Daily products	0 0 10 2 0			
Fruits and vegetables				
Low temperature (apple, blueberry, carrot, lettuce, etc.)	0 °C to 2 °C			
Moderate temperature (Carambola, melon, pumpkin, etc.)	6 °C to 9 °C			
High temperature (banana, cucumber, grapefruit, etc.)	12 °C to 16 °C			

Based on the range of temperature to be maintained, different types of vehicles are used for shipping different goods. Table 5.3 provides different types of trucks that should be used for transporting different types of goods.

 Table 5.3 Truck Selection Based on Required Transport Temperature of Products and Journey Time

Truck type	Maximum Travel Time for Product at		
	+10°C to +12°C	0°C to +2°C	<-18°C
Open Tray Top			
Double trapped load	1 hour	Not recommended	Not recommended
Curtainsider			
Unrefrigerated	3 hours	Not recommended	Not recommended
Refrigerated	6 hours	3 hours	Not recommended
Insulated Van			
Unrefrigerated	3 hours	1 hour	Not recommended
Refrigerated	Unlimited	Unlimited	Unlimited

Reefer			
No power	3 hours	1 hour	Not recommended
With generator	Unlimited	Unlimited	Unlimited

In case, the goods require a temperature range between 10-120C, they can be transported using open tray, truck if the journey time is up to 1 hour; in case the journey time is up to 3 hours, they can be transported using curtainsider or insulated van or reefer without refrigeration but if the journey time is more than 6 hour, they should also be transported in refrigerated conditions.

For goods requiring a temperature range between 0 to 20C, they can be transported using curtainsider or insulated van or reefer. When transported using curtainsider, it should be in refrigerated condition. For insulated van and reefer, if the journey time is less than 3 hour, they can be shipped unrefrigerated else it should be shipped in refrigerated condition only.

Goods requiring temperature below -180C should always be transported in refrigerated condition using insulated van or reefer.

5.8 LOGISTICS OF QUALITY PERISHABLE

The key to get good fresh food is an efficient perishable supply chain and transportation network. Lengthy transit hours and poor handling not only lead to spoilage and wastage but to many foodborne illnesses. With the increase in consumption of perishable food, it is now more important to reduce transit time or 'Time to Market' for these goods. This needs finding innovative solutions for logistics strategies, and means to improve shelf life.

Fruits, vegetables and animal produce are 'living tissues' and are subject to change/ decomposition once harvested or cut. These changes are unavoidable but their speed can be increased or reduced using certain preventive measures. These measures are:

- 1. Some fruits and vegetables ripen and release ethylene, a gas that can cause other produce to become spotted, soft, or mealy. To prevent this, ethylene-sensitive fruits and vegetables are kept separated from ethylene-producing fruits and vegetables.
- 2. Specialized packaging materials are used that are capable of withstanding all kind of hazards during transit.
- 3. Most of the perishable products are transported by air.
- 4. The packages are stored or transported as a pallet load.
- 5. In the case of sea transportation, the bulk pack of potatoes/onions are sent as containerized cargo either in refrigerated containers or ordinary general purpose containers with one door kept open for air circulation.

Role of Technology in Managing Perishable Logistics

The role of technology in managing perishable goods are as follows:

• Bar coding and RFID tags for identification of products.

Special Logistics

- Sensor to indicate the level of temperature and send signals when temperature is not appropriate.
- Technology like Remote Control Management (RCM) helps in tracking the internal environment of vehicle.
- Warehouse technology for managing movements of goods like picking, packing and coding for expiry dates and 'Best before Date'.

5.9 LIFECYCLE LOGISTICS FOR PROJECTS/ PRODUCTS

The complexity of supply chain leads to increased use of material, time and effort which lead to higher cost and an impact on environment. This leads to finding innovative solutions to keep the cost and environmental impact low. One such approach is lifecycle logistics. It treats the supply chain as a continuous stream rather than separate set of independent stages and plans the phases of product's life-time in agreement with the supply chain partner in consonance with economic and ecological criterion.



Fig. 5.13 Lifecycle Logistics

It is also defined as planning, development, implementation and management of a comprehensive, affordable, and effective systems support strategy within total life cycle systems management including system's lifecycle, acquisition, sustainment, and disposal.

The life of product starts from concept creation and so does the lifecycle logistics. It involves generating the product or project concept after giving due consideration to economic and ecological criterion. Similarly, during the material arrangement stage, this approach encourages to look into resources to optimize cost, time and environmental impact. The same is considered during manufacturing, transportation and other stages of logistics.

Benefits of Lifecycle Logistics

The benefits of lifecycle logistics are as follows:

1. It helps companies avoid fragmented supply chain.

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- 2. It helps in taking prompt decisions.
- 3. It reduces excess time.
- 4. It reduces handling cost.
- 5. It increases agility.
 - 6. Faster movement of products improves the performance of the supply chain in the short and in the long-term.
 - 7. Cost of product ownership decreases.

Logistics Lifecycle Management Goals

The objectives of logistics of lifecycle management are as follows:

- 1. To design and develop a decision support system utilizing performance-based logistics which enhances performance and productivity.
- 2. Another goal of logistics operation is to gather information from various sources to decide about the product design. The aim is to find out an affordable and operational project/ product design and make the system sustainable.
- 3. Logistic lifecycle management aims to acquire and concurrently deploys the supportable system. Various support features include operational suitability, maintainability and the supply chain, timely repair/replacement, isolation of system anomalies, etc.
- 4. Logistic lifecycle management also aims to maintain and improves readiness, affordability of the system and minimizes footprint. Process efficiency reflects how well the system can be operated, produced, serviced and maintained. It also reflects the extent to which the logistics processes have been balanced to provide an agile, deployable, and operationally effective system.

5.10 GS1 SYSTEM OF WORLDWIDE SUPPLY CHAIN STANDARDS

GS1 is a global voluntary organization that develops and maintains global standards for business communication. The GS1 system develops standard for bar codes, XML Schemes, EDI transactions, etc., that help to improve the efficiency of supply chain and hence business. It has 112 local member organizations and 1.5 million user companies across the globe.

These standards are designed to improve the efficiency, safety and visibility of supply chains across physical and digital channels in 25 sectors. They took over EAN International and Uniform Code Council (UCC) and now maintain the largest item identification system in the world. These well designed standards allow organizations to focus on how to use information rather than on how to create them. As these standards are common, they help in making logistics more efficient, profitable and sustainable.

Benefits of Using GS1 System

The benefits of GS1 are as follows:

1. Global: These systems are global and so no matter where the company or its suppliers are located, they are functional.

Check Your Progress

- 13. What is a perishable good? Why has it been a challenge to manage the supply chain of perishable product?
- 14. What do you mean by lifecycle logistics?

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- **2. Robust:** As these systems are built for purpose, they perform their faction with almost perfection. This system is highly reliable and has keys of fixed length. These keys have a check digit in them that prevents accidental key stroke errors.
- **3. Multi-sector:** This system works within and outside the organization and can be used in all sectors. They have alliances and partnership with organizations like Efficient Consumer Response (ECR), Consumer Goods Forum, World Customs Organization (WCO), Association for Automatic Identification and Mobility (AIM), United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT), to name a few.
- **4.** User-Generated: All the GS1 standards are built and maintained through GSMP (Global Standards Management Process) which is very open and transparent process. It involves volunteers from all industries and all part of the world to identify needs for standards, assemble business requirements, document best practices, obtain consensus on solutions, and then develop and implement the resulting supply chain standards.
- **5. Scalable:** These standards are suited for all kind of organizations. Whether large or small, single product focused or dealing in multiple products, all are equally benefited from it.

Working of GSI System

The GS1 system forms a business language that identifies, captures and shares key information about products, locations, assets and more.

(a) Identification Keys

Business gets standard for identifications of products, logistics and shipments, services, assets, location, etc. so that these may be subjected to electronic information that is stored or communicated by stakeholder in the supply chain. Identification keys called GS1 ID are used for identifying these entities. Various GS1 identification keys are:

- 1. GTIN: This is the ID key for products/ goods/ service. Global Trade Item Number (GTIN) assigned to any item (product or service) that may be ordered, or invoiced or priced, at any point in any supply chain. The GTIN is then used to retrieve predefined information about the item.
- **2. SSCC**: Serial Shipping Container Code (SSCC), the GS1 Identification Key for an item of any composition was established for transport and/or storage (logistic unit) which needs to be managed through the supply chain.
- **3. GLN**: This is the ID key for location. Global Location Number (GLN) is used to identify locations where there is a need to retrieve predefined information to improve the efficiency of communication within the supply chain.
- **4. GRAI:** Global Returnable Asset Identifier (GRAI) is the key used to identify returnable assets like re-usable transport equipment like trays, crates, pallets or beer kegs that are used and then returned to be used again.
- **5. GIAI**: Global Individual Asset Identifier (GIAI) is used to identify fixed assets of any value within a company that needs to be identified uniquely such as a computer, a desk or a vehicle.



Fig. 5.14 How GS1 System Works

- **6. GSRN**: Global Service Relation Number GSRN) is used to identify a service relationship between a business and a client, such as club membership, loyalty programs, or a patient in a hospital.
- **7. GSIN:** Global Shipment Identification Number (GSIN) is a globally unique number that identifies a logical grouping of logistic units for the purpose of a transport shipment that travels under the one bill of lading.
- **8. GDTI:** Global Document Type Identifier GDTI) is used to identify a document by type. The term 'document' is applied broadly to cover any official or private papers that infer a right e.g. proof of ownership, tax demands, proof of shipment forms, insurance policies, internal invoices, nationalized or standardized exams, and passports, etc.
- **9. GINC**: Global Identification Number for Consignment (GINC) identifies a logical grouping of goods (one or more physical entities) that has been consigned to a freight forwarder or carrier and is intended to be transported as a whole. A consignment can comprise one or many logistic units.

(b) Capture

The data hidden in the identification code are captured through technologies like barcodes and RFID (Radio Frequency Identification) technologies.

(c) Share

The information that is contained and captured in the form of bar codes and RFID are shared to make them available for electronic transactions. This helps in having latest information about the product or service to the entire stakeholder. Any change in the data base at one point is reflected automatically in the data base of all the stakeholders. Hence it give access to all the customer and supplier access to same

Check Your Progress

- 15. What is GS1 system?
- Mention some of the identification keys of the GS1 system.

Self-Instructional 194 Material data at same time and helps in creating quicker, smoother and less expensive system of doing business.

Common Advantages of GS1

Some of the common advantages of GS1 are enumerated below:

- It helps in rapid and accurate identifications of item or asset or location of goods or services.
- It also helps in improving efficiency & visibility in supply and demand chains.
- It provides rapid, efficient & accurate business data exchange.
- It is provides standardized, reliable data for effective business transactions.
- It provides more accurate, immediate and cost efficient visibility of information.
- This also helps in uniquely identify physical things like trade items, logistic units, assets, shipments, and physical locations, etc. between provider and recipient
- This also helps in uniquely identify logical things like corporations or a service relationship between provider and recipient.

5.11 SUMMARY

Some of the important concepts discussed in this unit are:

- With the market focusing on providing various delivery and pickup options, it has become essential for the logistics service providers to ensure maximum utilization of their assets with tight control on wastage.
- Earlier, the whole transportation system was segmented and each mode saw the other as a competitor and exploited its own advantage in terms of reliability, cost, service and safety. However, one innovation that has changed the whole global freight movement landscape is the intermodal container.
- As intermodal transportation involves the use of at least two modes of transport, it allows integration of several modes of transport. The aim of integration of modes is to integrate them to achieve economy of scale.
- The prominent modes supporting intermodalism are rail, trucks, barges and maritime.
- The beginning of intermodalism dates back to 1960, with the development of containers. The marine sector was the first one to adopt containerization. It was this mode which was constrained by the amount of time spent on loading and unloading of the vessel. The containerization significantly reduced this time.
- Multimodal transport uses several modes of transport but under one contract. For example, goods can be transported to the railway stations or to the port with the help of road transport and from there, rail or ships could be used to transport the goods.
- Industrial projects have placed great emphasis on operational risk associated with men and machine. The transportations of equipment and material for such projects are required to be carried out with great care and safety.

Special Logistics

• Trade fair and event transportation is another special type of project for which logistics providers have to give special consideration. It consists of both forward and backward logistics, i.e., deployment and withdrawal of resources according to the schedule of the event.

- Supply chains are becoming increasingly complex. It is no longer a source of inputs or services but is an integral source of value added. The structure of the supply chain, the suppliers and customer who participate in it are critical factors to be considered for supply chain planning. The international supply chain is similar to domestic supply chain in many ways, except that it is spread across a wide geographical area.
- The various risk mitigation strategies of international supply chain are: increase capacity, acquire redundant suppliers, increase responsiveness, increase inventory, increase flexibility, pool or aggregate demand or increase capability.
- Managing the supply chain of perishable product has always been a challenge because of short life cycle of these products. The spoilage due to fast deterioration leads to significant amount of wastage and hence loss for the companies.
- With the increase in consumption of perishable food, it is now more important to reduce transit time or 'Time to Market' for these goods. This needs finding innovative solutions for logistics strategies, and means to improve shelf life.
- GS1 is a global voluntary organization that develops and maintains global standards for business communication. GS1 system forms a business language that identifies, captures and shares key information about products, locations, assets and more.

5.12 ANSWERS TO 'CHECK YOUR PROGRESS'

- 1. In the transportation industry, there are number of ways like rail, road, air and, ship to transport goods from the seller to the buyer.
- 2. One innovation that has changed the whole global freight movement landscape is the intermodal container. It utilizes special standardized containers to transport cargo by trucks, freight trains and ships.
- 3. Intermodal transportation involves use of at least two modes of transport. It allows the integration of several modes of transport. The aim of the integration of modes is to integrate them to achieve economy of scale.
- 4. The basic elements of Intermodal Transport are:
 - The Carrier
 - The Conveyance
 - The Terminals
 - Infrastructure Requirement
- 5. Multimodal transport can be defined as the transportation of goods using several modes of transport but under one contract. For example, goods can be transported to the railway stations or to the port with the help of road transport and from there, rail or ships could be used to transport the goods.
- 6. Some of the advantages of Multimodal Transport system are:

- Lower risk of theft or damage
- It is easy to plan route, cost and human requirement.
- It reduced the burden of documentation and formalities.
- It minimizes the time loss at the transshipment point and provides faster transit of goods.
- It helps in achieving economies of scale
- 7. A few examples of industrial projects are: Port Handling Equipment, Oil & Gas Equipment for onshore and offshore infrastructure, Mine Construction, Heavy Machinery, Refinery and Petrochemical Plant Equipment, Port Construction for Material and Equipment, Pipeline Construction, Dam Construction, Power Plants, Power Generation Equipment, etc.
- 8. Some of the challenges of managing trade fairs and event planning are:
 - All such events require planning for safety, reliability and efficiency and response to any additional need within a short frame of time.
 - All the materials are required to be transported very carefully. Special packaging should be done to avoid any breakage.
 - Another very important aspect of event transportation is to be in line with the schedule.
 - Once the event is over, all the materials are required to be packed again in a safe manner and to be transported back.
- 9. The international supply chain is similar to the domestic supply chain in many ways except that it is spread across a wider geographical area.
- 10. Some of the major challenges companies face in a globalized world are:
 - Meeting intensifying competition from around the world.
 - Supplying a unique value proposition to customers around the world.
 - Adapting to multiple national environments with differing cultures, political and economic systems, business practices, tax and legal systems.
 - The global politics of economic and trade relationships.
 - The complexity of managing an extended network of suppliers, production plants, intermediaries and customers in the supply chain.
 - The impact of geography: time and distance and the location of markets.
- 11. Consolidation is the practice of combining diverse cargoes into single shipment to achieve substantial savings on costs. It is also known as groupage. The container is controlled by the service providers and who are specialized in the job.
- 12. Off-site consolidation is the process of taking all the shipments, often unsorted and in bulk, to a separate location. Here, the shipments can be sorted and combined with those going to like destinations.
- 13. A perishable good is any good whose quality deteriorates with time due to environmental conditions like temperature, pressure, moisture, etc. Managing the supply chain of perishable product has always been a challenge because of short life cycle of these products. The spoilage due to fast deterioration leads to significant amount of wastage and hence loss for the companies.

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- 14. The complexity of supply chain leads to increased use of material, time and effort which lead to higher cost and an impact on environment. This leads to finding innovative solutions to keep the cost and environmental impact low. One such approach is life cycle logistics.
- 15. GS1 is a global voluntary organization that develops and maintains global standards for business communication. The GS1 system develops standard for bar codes, XML Schemes, EDI transactions, etc. that help to improve the efficiency of supply chain and hence business.
- 16. Various GS1 identification keys are: GTIN, SSCC, GLN, GRAI, GSRN, GSIN, GDTI, etc.

5.13 QUESTIONS AND EXERCISES

Short-Answer Questions

- 1. Write in brief about the emergence of intermodal transport.
- 2. Discuss multimodal transport and identify its key players.
- 3. Explain how managing an industrial project is a challenging task for logistics providers.
- 4. Distinguish between on-site consolidation and off-site consolidation.
- 5. How is managing an international supply chain different from managing a domestic supply chain?
- 6. List the role of lifecycle logistics in the supply chain.
- 7. How does GS1 play a vital role in making logistics more efficient, profitable and sustainable?

Long-Answer Questions

- 1. Explain the various steps involved in the intermodal transport process.
- 2. Discuss the long-term benefits of multimodal transport.
- 3. Why does projects transportation require special attention? Discuss in detail.
- 4. Discuss the various services which are required to manage events.
- 5. Analyse the risk mitigation strategies of the International Supply Chain.
- 6. Enumerate the benefits of Consolidation and Groupage.
- 7. Discuss the role of technology in managing perishable goods.

UNIT 6 LOGISTICS INFORMATION SYSTEMS

Structure

6.0 Introduction

- 6.1 Unit Objectives
- 6.2 Logistics Information Systems: Need, Characteristics and Design
- 6.3 E-Logistics: Structure and Operation
- 6.4 Logistics Resource Management
- 6.5 Automatic Identification Technologies (AIT)
- 6.6 IT System Center: Design/ Implementation/Connectivity
- 6.7 Warehouse Simulation
- 6.8 Reverse Logistics
- 6.9 Summary
- 6.10 Answer to 'Check Your Progress'
- 6.11 Questions and Exercises

6.0 INTRODUCTION

This is the era of Information Technology or IT. It is transforming everything, whether it is the way to do business, or the way to carry out business operations. The way in which a company captures information give them a competitive edge over other companies. The efficient use of information is becoming the most important means of gaining competitive advantage for businesses today. A growing number of firms are under pressure from their partners to change their traditional management style, both operationally and organizationally, replacing them with integrated systems that help increase the speed and fluidity of physical and information flows. In order to reach this kind of integration, they are investing on new Information Technology tools.

An information system allows a company to get information about the environment in which their goods are transported. They can keep an eye on the movement of material in and out of the system and can also track the location of the material. Information like demand of the goods, ordered processed, kind of goods being transported, and so on, provide real time and updated information. This unit will discuss the use of information technology in logistics operations.

6.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Discuss the need, characteristics and design of e-logistics
- Describe the structure of e-logistics
- Explain the operations of e-logistics
- Discuss logistics resource management
- · Explore the use of automatics identification technology
- Explain warehouse simulation
- Discuss reverse logistics

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6.2 LOGISTICS INFORMATION SYSTEMS: NEED, CHARACTERISTICS AND DESIGN

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The shift in the economy from the industrial era to the economic age has profound implications for the management of information systems. Logistics management is a relatively new discipline which coordinates the activities between transportations management, purchase management and distribution management along with customer service and quality management, inventory management and logistics information system.

Logistics is an information-based process wherein the flow of information is the key to the success of the process. The beginning point of this system is the receipt of the order from the customer. The customer places the order to the supplier and depending upon the need of the customer, the quality and quantity of the order, the availability of the products, the process is initiated. The initiation of the system depends upon the receipt of the order and then this information is communicated to all the stakeholders. Hence, information flow is an important aspect of the logistics operations. The information is required for operational planning and control, system development and for strategic decision making. The operational planning includes registration of customer order, order processing, procurement, storage, order picking, packing and transportation. Strategic planning includes logistics capacity and capacity planning and network design. The needs of strategic planning are very different from the needs of operational planning. It is strategic planning where there is maximum risk and hence there is a need to develop a logistics information system.

Levels of Logistics Information System

The information required for making decision is needed at all level of logistics decision making. However, the type of information required depends upon the level of the logistics system.



Fig. 6.1 Levels of Logistics Information System

The levels of the logistics information system are as follows:

- 1. Operating Level: This level starts with the receipt of the order from the
- customer and then the order is processed. The various information which are required to be coordinated at this level includes information about the placed order, order processing, storage, picking, packing, inventory planning, warehousing, distribution, transportation and delivery.
- 2. Strategic Level: It includes obtaining information to gain a competitive edge. It involves information on capability and capacity planning, alliance and partnership and customizing.
- **3.** Control Level: The major application of the Logistics Information System (LIS) is in the area of control. Based on the data obtained from the operating level, LIS generates report on the operating cost of the logistics system, reports on customer service, system productivity, cost control and asset utilization. The deviation in the report is probed for the timely and corrective actions.
- 4. Tactical Level: At tactical level, information system is required to provide information for formulation and implementation of logistics strategy. The decision area includes inventory management, facility planning, channel integration, vehicle route planning, scheduling and outsourcing.

Need for Logistics Information System

A strong Logistics Information System is needed for the following reasons:



Fig. 6.2 Need of Logistics Information System

- 1. Needed for Planning: In order to make operation planning like size of inventory, safety stock, reorder level, and so on, the information of the past demand trend, existing capacity and the inventory status are required. This information can be readily made available if the company is using LIS and hence it is needed for the planning. It is also needed for the planning of the material flow in the supply chain.
- 2. Needed for Co-ordination: Another reason why LIS is needed is for coordinating between sales planning, marketing planning and production scheduling. At every stage of the logistics planning, be it registration of the customer order, its processing or supply chain management, availability of the information helps in coordinating various activities.

Logistics Information Systems

- **3. Needed for Customer Service and Communication:** It is needed for keeping track on the dispatch and distribution, and inbound shipment.
- **4.** Needed for Control: LIS is needed for the controlling customer service level and vendor management. It is also needed to analyze system performance.

Characteristics of Logistics Information System (LIS)

The basic characteristics of a LIS are as follows:

- **1. Accuracy:** LIS should provide accurate data. For example, the inventory level visible in the LIS should be same as the actual inventory level in the warehouse. It must reflect the current status. In case the difference between the actual and indicated inventory is high, the gap should be filled by keeping a huge safety stock to cover the uncertainty.
- **2. Availability**: LIS must ensure the consistent availability of information on order status, inventory status, etc. This information is useful in responding to the customer's query and making future decisions.
- **3. Timeliness:** Another characteristic of LIS is timelines. It must provide quick management feedback. Timeline can be defined as the difference between the commencement or the occurrence of an activity and when the activity is actually visible in the logistical information system. The greater the timeline, the greater is the ineffectiveness of the system.
- **4. Flexibility:** LIS must be flexible enough to meet the need of both customer and the user. The varying need of both the parties should be met.
- **5. Exception:** Those activities whose status requires a continuous review are considered as exceptions. In LIS, a constant review is required for the inventory level of various products, customer, suppliers' outstanding replenishment, etc. LIS should also highlight very large orders, products having little or no inventory, decrease in operating productivity or delayed shipment.



Fig. 6.3 Characteristics of Logistics Information System

6. Appropriateness: LIS reports must be appropriately formatted so that they contain the right information in the right structure and the right sequence. The report should be such that the combined information should enable the manager to reach the decision.

Design of Logistics Information System

There are three elements of logistics information system: Input, Process and Output.



Fig. 6.4 Designing a Logistics Information Systems

Input: The inputs for the logistic information system are the data obtained from customers, company records, and company personnel and published data. This kind of data is needed for planning and operating logistics system.

Process: The process of the Logistics Information System involves choice of method to process the input data and retrieve the stored information. It also involves selection of data to be stored and retrieved.

Output: The output includes:

- Status reports of inventories or order progress.
- Summary reports of cost or performance statistics.
- Exception reports that compare desired performance with actual performance, and reports that initiate action.
- Output can also be in the form of documents such as transportation bills of lading and freight bills.

Hence, we can say that Logistics Information System coordinates the following activities:

- Material management
- Material flow
- Physical distribution

Building Blocks of LIS

The basic building blocks of the LIS are as follows:

1. Transaction System: The role of transaction system is to record individual logistics activities like customer enquiry, order registration, inventory management, pricing, shipping, invoicing, etc.

to provide management feedback regarding the service level and resource utilization. This helps in identifying exceptions and taking control measures.**3. Decision Analysis**: The aim of this part of the LIS is to identify, evaluate and

2. Management Control Systems: The role of management control system is

- compare logistics strategic and tactical alternatives. Decisions like facility location, vehicle routing and scheduling cost- benefit analysis, etc. are also evaluated for their impact.
- **4. Strategic Planning:** This part takes care of strategic planning. In this level, the information obtained from the lower levels are collected and are fit into a range of business planning and decision making tools. These models help in evaluating the probabilities and payoff of strategies.





Elements of LIS

The elements of LIS are listed below:

- **1. Information Source:** There are two major sources of information: internal and external source. The internal sources include data from employees and from the functional areas of the company like sales data, purchase data, etc. External data includes data from customer.
- 2. Information Collection System: The customer may place the order in the form of written purchase order or order over electronic system. This data is fed into the logistics information system. The customer orders are assigned some code to track the order and make it traceable by the various informational users. The data generated by the internal sources is fed into the system manually or using automatics identification technologies like bar codes, RFID tags, etc.
- 3. Storage: The information collected via the above medium is stored on CD or hard disk of a centralized computer or on cloud space owned by the companies.
- **4. Processing:** The stored data is processed using appropriate tool to get the information needed.
- **5. Retrieval:** data warehousing and data mining system facilitate instant data retrieval at the user terminal.
- **6. Report Formatting:** The appropriate software helps in generating appropriate report in the desired format.

Check Your Progress

- 1. How does an information system help the company to gain competitive advantage?
- How is information flow an important aspect of logistics operations?
- 3. What are the different levels of the Logistics Information System?
- 4. List the characteristics of LIS.
- 5. List the basic building blocks of the LIS.

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6.3 E-LOGISTICS: STRUCTURE AND OPERATION

In the era of growing application of information and communication technology, **e-commerce** is another way of doing business. There are three ways in which business is done through e-commerce. These are B2B, B2C and intra-business commerce. The products and services are electronically displayed and all the transactions, be it order processing or payment, are carried out electronically. Thus the logistics needs of e-commerce business model are different from the logistics needs of other businesses.

As in case of e-commerce, all the transactions are carried out electronically, the movement of information is faster. This business is characterized by large volume of, small value transactions. The customers are spread across wide geographical area and the value of the individual order is small. Another challenge of e-logistics is that products are required to be delivered to odd places. Activities like order processing inventory management, transportation, packaging and delivery requires a well-coordinated IT infrastructure.

The following points should be considered while designing e-commerce logistics solutions:

- Online facility for placing order
- Facility for tracking the order status online
- · Order dispatch and documentation invoice
- Auto reminder for payment
- · Online alert for critical information through mobile or WAP
- · Seamless interface with existing SCM or ERP system

E-logistics structure and operation involves following steps:

- 1. Order Processing: The consumer visits websites of the company and goes through the various products available online and selects the one (or more) that he finds for himself. These products can be stored in the electronic cart for immediate purchase or for future purchase. Once the customer wants to buy the item in the card, certain information like address of shipping and mode of payment are asked. The customer can also review the order at this stage and modify the same. Depending upon the mode of payment (cash on delivery/internet banking/card payment), the payment is processed. The inbuilt system checks the prices, taxes, payment terms and delivery and the order will be accepted for delivery only after it is technically cleared and the same is confirmed to the customer. It is a very important stage as it sets the standards to meet the customers' expectations.
- 2. Order Execution: The next stage after processing the order is executing the order. Order execution involves passing the instructions to the inventory manager or the vendor for the case filling and packaging. The delivery instructions passed contain information like detail of consignee, product detail, quantity and size of the product. Once the product is picked and packed, the orders are placed to the courier service or 3PL partner for the pickup and delivery of the consignment to the customer. Once dispatched by the logistics

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E-commerce: It is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the Internet.

partner, the tracking details are shared with the customer along with the copy of invoice.

- **3. Inventory Management:** Another important operation of the e-logistics system is inventory management. The e-commerce company needs to integrate all online orders in order to update the status of the stock of goods. There are many companies that use to give information about the 'number of units left in the stock', if the item is about to go stock out or a very limited inventory is available. In case the company has run out of stock, the customer should be informed about the delay delivery date before the order is accepted. Fulfilling delivery commitment is very important to remain in the business. The entire process of movement of goods from the point of procurement to the point of distribution should be well coordinated.
- 4. Shipping: Depending upon the size of the consignment, the arrangement for shipping will be done. Either the courier company or the logistics provider will arrange the transportation. The software will identify the courier or logistics provider depending upon the location of the delivery, the size of the order, dispatch schedule and other eventualities. The shipping means also depend upon the kind of means preferred by the customer. Many times, the customer prefers 'next day delivery' and makes additional payment for the same. While organizing shipping, the software looks into this aspect also.
- **5. Tracking and Tracing:** Once the order is placed, the customer is interested in knowing the status of the order or the location of the order during transit. The tracking facility helps the customer in getting this information. Systems like bar coding, RFID tags or GPS-enabled system help the customer to know the whereabouts of the product. Most of the e-commerce service providers provide this service at their portal or website.
- 6. Payments: In case of B2B transactions, payments are accepted through debit or credit cards. For all such transaction, the system requires credit management support to decide on credit terms of individual client based on their transaction and purchase history. The payment system helps in generating online invoices, debit note, deliver credit and outstanding report, payment reminders, etc. It also keeps client's credit management record.
- **7. Transaction Security**: The transaction security is maintained by the company by establishing an electronic fraud checking system. This system runs sets of anti-fraud algorithms or authentication process to manage the transaction security.
- 8. Order Postponement, Cancellation and Substitutions: E-commerce service providers have to formulate their Order Postponement, Cancellation and Substitutions policy very carefully. Sometimes, due to challenge in the supply chain, the service provider is not able to deliver the product on time to the customer. In such cases, the company needs to inform the customer about the cancellation and manage refunds. The policies related to cancellation, postponement, and substitution should be defined with utmost care. The firm may also offer the customer to deliver the substitute products or postponed the delivery.

9. Reverse Material Flow: Many a time, the customer needs to return the product as the product is either damaged or its performance is below standard or a wrong product is being sent. For all such cases, the return policy of the company should be well defined and the customer should be aware about it. The timeframe to return the product should be well defined and the responsibility of the buyer and seller should be spelt very clearly in the contract document. The website should also contain information on the procedure to return the products and the term and conditions of return. The mechanism to take care of the reverse logistics may be a standalone system or integrated in the forward logistics depending upon the volume of return.

The efficiency and effectiveness of the e-commerce logistics depends upon the comprehensiveness of the web-based logistics solutions. There has to be a comprehensive and continuous communication from customer to warehouse to transportation to distribution to inventory and reverse logistics. The various areas across which the information needs to flow in an e-commerce business is shown below:



Fig. 6.6 E- Commerce Software Logistics Applications

6.4 LOGISTICS RESOURCE MANAGEMENT

Logistics resource management is a new information technology tool providing browser-based software for automating, planning, managing and optimizing e-commerce logistics activities. It is a platform for commanding and controlling logistics execution which can act as a central clearing house of logistics data to meet a variety of other decision making needs of the e-commerce firm. The logistics data pertaining to transportation management, warehouse management and logistics performance management is collaborated using this tool.

Logistics Information Systems

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Check Your Progress

- What do you mean by e-commerce? What are the ways in which business is done through e-commerce?
- Mention some points which should be considered while designing an e-commerce logistics solution.

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- Labour management system
- Cross border regulatory and security compliance
- Transportation integration
- Alert notification in exceptional situations
- Flow through techniques
- · Total landed cost including taxes, duties and levies
- Analytical modelling
- · Support carrier selection and negotiation
- Route and lane optimization

The key features of logistics resource management are:

- It provides complete visibility in inbound and outbound logistics to the company, suppliers and customers.
- It is a vehicle management software, which includes the use of pre-schedule and dynamic scheduling.
- It is a proactive system of notification of exceptions, operation on real time basis.
- It provides real time routing of truck and material handling equipment, automatic material picking applications.
- It provides true cost data for cross boarder shipment in in-bound and out bound logistics.

Check Your Progress

- 8. What is logistics resource management?
- List some key features of logistics resource management.

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6.5 AUTOMATIC IDENTIFICATION TECHNOLOGIES (AIT)

Automatic Identification or Auto-ID or Automated Data Capture or Automatic Identification and Data capturing technologies are the technologies that automatically identifies the objects, collects the related data, stores and enters the data directly into computer systems. In majority of the cases, AIT works without human interface. The only human involvement is to scan the AIT equipped goods and the data is automatically transferred.

Data Capturing Structure

The object is scanned or is read for its information. The data about the goods are captured in the form of image, voice, finger print, etc. This information about the object is called identification data. This data is converted into digital files before typing the data into computer system.



Fig. 6.8 Data Capturing Structure

The task of converting digital data into a digital file is done by a transducer. This stored file is analyzed by the computer to confirm the identity of the product. It matches the identity with the stored data and updates the information.

AIT consists of three principle components. These are: data encoding, machine scanning and data decoding.



Fig. 6.9 AIDC Components

- **Data Encoding**: In this, the alphanumeric characters will be translated into the form that can be read by machine.
- Machine Scanning: The machine scanner reads the encoded data and converts the data into electric signals.



Data encoding: It refers to the process of applying a specific code, such as letters, symbols and numbers, to data for conversion into an equivalent cipher.

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• **Data Decoding:** The electrical signals will be transformed into digital data which are later converted into alphanumeric characters.

Advantages

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The advantages of Automatic Identification Technologies are enumerated below.

- **Cost saving:** Reduce paper work and processing time and hence help in cost reduction.
- Accuracy: It helps in error free transactions
- **Convenience:** These technologies are user friendly and provide connectivity to wide range of processing and controlling equipment.
- **Speed:** Huge volume of data can be transferred and shared at the click of a button.

Types of Automatic Identification Technologies

The different types of Automatic Identification Technologies are:

(a) **Barcodes:** Barcodes is the most popular identification technology that is in use in numerous applications. These codes can be seen in almost all products today. These are used for identification, handling, storage, retrieval of goods at the warehouse and the store. The codes can be read with bar code scanners.

Barcoding involves placing computer readable codes on items, cartons, containers, as well as railcars. These codes facilitate the tracking of the item in the warehouse during inventory audit or material pickup. It also helps in tracking the goods during transportation or inspection at the customer end. These codes facilitate error-free data entry, real time data availability, uniformity and easy usage. These codes are also globally accepted.

Barcoding symbols are divided into three main categories:

- **1. Linear:** These kind of symbols consist of single row of bars and can be read by single line scanner
- **2. Stacked:** A stacked technology consists of several rows of bars and spaces and can be read by multiple ID scanner with moving laser beams.
- **3. Matrix:** These kind of bar codes are in the form of polygonal array of data cell and are read with the help of 2D image scanner.

Barcodes also come in one or two dimensional type. Multidimensional codes and container codes are two most significant developments in logistics. Multidimensional codes help in transferring more information as they are designed in a way that they can be stacked one over the other. A container code allows manufacturers as well as distributors to share container identification from point of production to point of sale.



Barcode: It refers to a machine-readable code in the form of numbers and a pattern of parallel lines of varying widths, printed on a commodity and used especially for stock control.



Fig. 0.10 Barcoae Symbols

- (b) Radio Frequency Identification Device (RFID): RFID is an automatic identification methods based on the use of electromagnetic fields to automatically identify and track the data stored on devices called RFID tags attached to goods transported. These tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. This technology is mainly used for object identification and tracking without making direct contact with the item.
- (c) Electronic Article Surveillance (EAS): This technology is used to identify items as they pass through a gated area. It is popular in showrooms, warehouses, retail outlet, and so on. The aim of using this technology is to alert the unauthorized possession.
- (d) Memory Buttons: This technology is used in place of bar coding for the identification of goods. Memory buttons contains a microprocessor that can hold information up to several pages. This device is suitable for use as a portable device for product identification in harsh conditions. It can also be used for large unit load containing large number of items. The information stored in the button can be read with the help of an electronic device without touching the package. These are very much suitable for the overseas dispatch as they can contain all the information in one small button and hence help in speedy clearance.
- (e) Real Time Locating Systems (RTLS): It is a fully automated system with wireless radio frequency solution that continuously monitors the position of the material to be tracked and provides information related to real time locations of tracked resources. The information is transmitted at frequent interval via low power radio signal to a central processor. The locating system is deployed as a matrix of locating devices installed at a spacing of anywhere from 50 to 1000 feet and these locating devices determine the locations of the RFID tags.
- (f) Radio Frequency Tags (RFT): These tags are used as an alternative to the bar codes. Radio Frequency Tags are piece of silicon chips to store data in the microcircuit. They have erasable programmable memory. RFT tags hold data in the form of codes and are communicated through radio waved. These tags are of two types: 'read only' and 'read write'. In case of a 'read only' tag, the data can only be read from the tag but the information cannot be altered, whereas in case of a 'read write' tag, the information can be updated. These

tags can be active tags or passive tags. Active tags can communicate data to the reader directly, whereas passive tags depend upon the energy from the reader to initiate the communication. As these tags contains information about the consigner, consignee, value of item, item in the inventory, they are helpful in quick custom and octroi clearance. These can be used in the warehouse for pallet information as they can hold lots of information.

Electronic Data Interchange (EDI)

This technology allows intercompany computer to computer exchange of business documents in standard format. EDI replaces postal mail, fax and email. In absence of human involvement EDI documents can flow straight through to the appropriate application on the receivers and processing can begin immediately. The most common documents exchanged via EDI are purchase orders, invoices and advance ship notices, bill of lading, inventory documents, customs documents, shipping status documents and payment documents. The popular EDI standards in use today are: ANSI, EDIFACT, TRADACOMS and ebXML. And, for each standard, there are many different versions. When two companies decide to exchange EDI documents, they must agree on the specific EDI standard and version.



Advantages of EDI

There are numerous advantages of EDI. These include:

- It reduces operating cost by reducing expenses on paper and processes.
- It improves internal productivity as it is faster since there is no human involvement, as a result the risk of error is also less.

- It helps in improving channel relationships as the communication is fast and *La* transparent.
- It improves external productivity by making the information available to all channel partners.
- It has ability to compete internationally by adopting new technologies.

E- Tracking

The tracking services help the shipper to know the information about the location of their freight at any point in its journey. Since shippers are worried about delay, highway robbery, accidents, truck's detention, etc., vehicle tracking is a crucial factor for providing efficient transportation information.

The benefits of these tracking services includes:

- 1. **Reduce Costs, Improves Processes:** Using the data generated with the tracking management system, the shipper can analyze and communicate with the carrier and check in-transit time and delay or on pickup time.
- 2. Gain Visibility, Enhance Performance: Tracking services provide visibility in in-bound and out-bound transportation. With the help of tracking data, the shipper and customer can see the shipment's progress and determine any action if needed. The information can also be used by the seller to inform the customer about any delay. The customer can use the information to plan unloading or in bound services.
- **3. Better Customer Experience, Minimize Delays:** The ability to track freight provides peace-of-mind to the end-user and a better customer experience. The information can help the shippers to notify the customer about changes of status of product and its delivery (if any). It is a very crucial factor for providing effective transportation services.
- **4. Global Positioning System (GPS):** Global Positioning System or Geographical Positioning System helps in tracking a vehicle with the help of geostationary satellites. It consists of a network of 24 orbiting satellites that are eleven thousand nautical miles in space and in six different orbital paths.



Fig. 6.12 Global Positioning System

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- Electronic Article Surveillance used?
- 13. How does e-tracking help a shipper?

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The Global Positioning System works in the following way. The vehicle is fitted with GPS tracking system and wherever it on the planet, at least four GPS satellites keep an eye on it. Each of these satellites transmits information about its position and the current time at regular intervals. These signals are intercepted by the GPS receiver and it pinpoints the location of the vehicle based on trilateration process.

- **5. Highway Automation System**: This system is used for monitoring two way communication. This system is operated through a chain of kiosks set up on highways. These kiosks record the movement of passing trucks. The trucks are fitted with an electronic monitoring device, each having a unique code. The kiosk picks up the radio frequency signals from the truck and relay it to all the networked kiosks across the country. The information about the movement of the vehicle can be accessed from any of the kiosk across the country.
- **6. Web-based Tracking:** Many logistics providers provide web-based consignment tracking to their clients. The customer can enter the consignment number provided by logistics partner and track the status of the consignment.

6.6 IT SYSTEM CENTER: DESIGN/ IMPLEMENTATION/CONNECTIVITY

With the growing role of information technologies in business operations, companies are looking forwards to leveraging these technologies for improving their operations and increase the efficiency and performance of the business. For this they are creating an IT System Centre in their organizations. The role of the IT system is to use information technology to develop products, services and competencies providing businesses to gain advantage over competitors. This leads to the setup of strategic information system supporting the business strategies and position among the competitors. Two very popular tools for logistics are: ERP and DRP.

ERP (Enterprise Resource Planning)

ERP or Enterprise Resource Planning is an integrated software which deals with the entirety of organizational, financial and managerial activities of an organization. It enables an integration of all the data and business processes of the organization into one unified system. The gathered information can be forwarded to the necessary management level as soon as possible when encountered a situation or problem. The broad area which ERP covers includes:

- 1. Financial and Logistics Management
- 2. Importing, Marketing and Distribution Management
- 3. Inventory and Acquisition Management
- 4. Manufacturing Processes
- 5. Budget
- 6. Pricing
- 7. Mobilized Service and Maintenance Systems
- 8. Leasing and Renting System

- 9. Car Fleet Management
- 10. Retail Systems
- 11. Warehouses and Logistics Centres Management
- 12. Management of Funding and Loans Systems
- 13. Factoring Management
- 14. Solutions for Field Workers
- 15. Service and CRM Systems
- 16. Bidding Management



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Fig. 6.13 ERP System

The major companies providing ERP solutions in India are: SAP, Oracle, PeopleSoft, etc.

The advantages of having ERP for logistics are as follows:

- Due to accessibility to data to various departments, businesses are able to response quickly to customer's demand.
- It also helps in improving inventory turnover rate.
- Better data visibility helps in managing inventory in better way.
- It also helps in reducing logistical cost.
- Improvement in service level.

The major benefits of using ERP for organizations are:

- 1. Total Visibility: The first and the most important advantage of having ERP is that it provides total visibility of information to all the stakeholders. It makes data from every department accessible to the senior management. Information like status of inventory, status of various orders, procurement and placed orders, goods in transit, etc. helps in better decision making. The visibility of information also helps in better collaborations between departments and hence improves efficiency.
 - 2. Lower IT Costs: An integrated ERP system lowers the IT-related expense like management and administration staff, infrastructure need, licensing, support staffs, training requirement, etc. Since a single system takes care of most of the organizational needs, very less training is required.
 - **3. Improved Reporting and Planning:** Implementing an ERP means the organization has a single, unified reporting system for every process and all the reports and analytics can be generated at any time. Availability of information at a single platform also helps in comparing functions across departments. Many ERPs offer business intelligence services. This helps organizations gain better understanding of their businesses.
 - 4. Complete Customization: Most ERP service providers offer platforms that can be customized according to business needs. Companies can pick and choose the components that work best for them. Another customization is availability of on-premises and cloud-based applications. Cloud-based ERP removes the hassle of creating ERP infrastructure.
 - **5. Improved Efficiency:** It reduces the time required by the employees to carry out daily operations and also helps in eliminating many repetitive and manual works, hence improving the efficiency.
 - **6. Improved Collaboration and Workflows:** An ERP platform simplifies the process of collaborating with other departments by providing access code. This provides real time update and communications among the departments.
 - 7. Distribution Centre Management System (DCMS): It is a warehouse management tool which automates the entire process of receiving, managing and shipping goods to customer from warehouse. It improves warehouse efficiency by removing the risk of stock pile-up, stock outs, losses of sales due to customer dissatisfaction and pending orders. The feature of this IT system includes:
 - Support of process flow through pick, pack, ship and receive including transaction logs
 - Parts replenishment system automates requisitions to streamline purchase of depleted stock
 - · Colour-coded demand queue provides a visual prioritized 'to do' list
 - Asset management with inventory searches by item, serial number or advanced filter
 - The major advantages of this system are:
 - It supports all warehousing strategies, including mobile inventory.

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- It helps in visualization of demand and assets, encompassing warehouses, *La* vans, customer sites, repair chains, spares pools, parts exchanges and in transit
- It improves stock level control, reducing carrying costs and expediting premiums due to out-of-stocks
- 8. Distribution Requirement Planning: It takes into consideration multiple distribution stages and their characteristics in the distribution channel. It helps in determining the demand for the finished good by considering the variables at multiple distribution centres located in different market. It also helps in optimizing the transportation cost by transportation route planning. By improving inventory visibility, it helps in keeping optimum inventory level and thus optimizing warehouse space and warehousing cost.

6.7 WAREHOUSE SIMULATION

in-transit.

Warehouse simulation can be defined as a computer-based modelling of a real warehousing system. It allows an organization to analyze and experiment with its warehousing process in a virtual setting and hence decreases the time and cost requirements associated with physical testing.

The various reasons why the company should look out for simulating warehousing activities are:

- 1. **Proof of Concept:** Simulation is helpful is giving an environment of the real situation. The simulation model can be used to access the effectiveness of the planned layout of the warehouse, material handling system, schedule and staffing etc. Since the real life situations can be imitated in simulations, it provides as opportunity to critically analyze each decision. It can find designing flows, well before the construction of the actual warehouse and thus saves the valuable time and money of the company.
- **2. Executive and Employee Buy-In:** When the company is looking for modifying and improving its existing warehousing system, the simulation can provide a platform to actually see how the new system will work and what difference it would make in comparison to the old one.
- **3. Optimize Operational and Business Rules:** Simulations can also be used to view the functioning of the warehouse in line with the business requirements. Running a test with the model is helpful in interpreting the success of the real one.
- 4. Revalidate the Design: A warehouse simulation is used for revalidating the warehouse design and identifying bottlenecks (if any). This helps in modifying the warehouse design. The virtual warehouse design gives an opportunity to analyze the design for the existing supply chain need, material handling need, etc.

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Advantage of Warehouse Simulation

There are several advantages of warehouse simulation. These are as follows:

1. Increase Warehouse Efficiency: Simulation can help in increasing warehouse efficiency by selecting the right racking system, right layout and truck mix.

- **2. Material Handling Optimization and Fleet Sizing:** Based on the need of the logistics and the material handling need, simulation can help in identifying the correct material handling process and hence optimizing the same.
- **3.** Congestion Analysis and Reduction: The study of the layout planning can help in identifying where the real system will face any congestion while in operation or not and accordingly, the modifications can be done.
- **4.** Schedule and Staffing: It also helps in calculating the necessary manpower per shift and thus helps in scheduling and staffing.
- **5.** Automation Validation and Design: It also helps in accessing the performance of automation equipment and thus validating their use.
- 6. Facility Layout & Design: Before the actual warehouse is ready on the ground, the simulation provides an opportunity the see how it would look like and how it would function and thus helps in designing and layout planning.

6.8 **REVERSE LOGISTICS**

Traditionally, the role of logistics ends with the delivery of the goods to the customer. The belief was that once the product was sold and delivered to the customer, the role of manufacturer was over. Replacing product during the warranty period was the only limited after sales services provided by the manufacturer. Also, there was no consideration for the packaging waste, used material, disposable product waste generated out of finished product. However, the growing concern about the environment and competition in the market has forced the companies to look into recycling and dismantling for products and materials, product returns, repairs, maintenance, etc. Thus, a system of reverse material flow came to existence. This system is called reverse logistics.

Reverse logistics can be defined as any logistics involved in moving goods from the place of use to the place of manufacturing for refurbishment, replacement, repair, return, waste disposal or even excess inventory. Overall it incorporates running products in reverse through the supply chain to gain maximum value.

The major circumstances that require reverse logistics are:

- Product recall for quality or safety reason
- Return of unwanted goods
- · Used products or packaging for recycling or disposal
- Return of goods from customer for non-performance
- · Return of inputs not used by manufacturer/ goods not sold by distributor
- Exchange of product
- Product recycling

Scope of Reverse Logistics

Though reverse logistics seems to make hole in the pocket of the companies, in this era of competitiveness, it can be leveraged as a tool for customer satisfaction. Every day more and more companies are adopting the reverse logistics. The reasons for this adoption are:

- · Growing regulation on recycling and waste disposal
- Growing public concern for environmental pollution
- Stiff competition
- Growing consumerism

Reverse Logistics Services

The services and activities associated with reverse logistics services includes various types of activities depending on whether the goods are returned from a distributor or end-user. The kind of packaging of the goods also affects the reverse logistics activities.

The services associated with reverse logistics include are as follows:

- 1. After inspection, the goods are sorted for activities like re-sell, recycle, scrap disposal and waste.
- 2. **Retrieve**: Reverse logistics starts with the retrieving of goods form the end user or distributer end.
- 3. Transportation: The retrieved good is transported to the warehouse.
- **4. Receiving and Inspection:** The goods are received at the warehouse and are inspected for the condition
- **5. Sort:** Management or other activities like maintenance, repair, refurbishing etc.



Fig. 6.14 Reverse Logistics Services

Activities

The reverse logistics can be designed for the following activities:

1. Repair and Refurbishing: There are certain sectors for which repair is a regular feature. For example, consumer durable sector. As long as the product is under warranty, the company has to manage it for repair and maintenance.

Check Your Progress

- List some advantages of ERP for logistics.
- 15. What is significance of warehouse simulation?
- 16. What do you understand by reverse logistics?

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During the warranty period, refurbishing is done to the damaged goods, defective goods are the goods whose performance is below the expected level. For this the manufacturer establishes a reverse logistics process which takes care of the goods during the warranty and expended warranty period. The defective product is collected through the dealers' network and are sent to the nearest service centres. This system operates through the service centres especially designed to take care of such services.

- 2. **Re-filling:** There are many companies in which reverse logistics are integrated in their chain because of the kind of business they are in. For packages, such as class bottles, plastic or tin containers, metal cylinders are collected by the company itself. In this type of reverse logistics management, there is no extra transporttaion cost as the delivery vehicle follows same route for the collection of the filed bottles or cans and distributes it to the customer. And from customer, it collects the empty bottles, cans or contyainers.
- **3. Product Recall:** Many a time, the company has to recall its product due to the following situations:
 - Incomplete product
 - · Product not giving guranteed performance
 - · Quality complain
 - Defective design
 - Ethical consideration
 - · Quality complains from many customers
 - Violation of government regulations

This is an emergency situation and puts financial burden on the company. But this could be seen as an opportunity to increase customer satisfaction.

- 4. Recycling and Waste Disposal: In many countries, it is mandatory to dispose of or recycle waste generated during the course of business in an environment friendly manner. Hence companies have to collect wrappers, packages, waste, etc. causing environmental pollution for their recycling and appropriate disposal. The recycling process includes:
 - (i) Collection of the waste material
 - (ii) Delivering them to the unit responsible for recycling
 - (iii) Processing recycling and creating secondary inputs
 - (iv) Using secondary material for manufacturing new material
 - (v) Returning the product to the manufacturer for recovering input for reuse.

5. Re-Manufacturing: In many countries, companies manage reverse logistics for re-manufacturing. In this process, the worn out part of the products are removed and are replaced with new parts and the functionality of the product is also upgraded to the new level.

6.9 SUMMARY

Some of the important concepts discussed in this unit are:

- Firms are under pressure from their partners to change their traditional management style, both operationally and organizationally, replacing them with integrated systems that help increase the speed and fluidity of physical and information flows. In order to reach this kind of integration, they are investing on new Information Technology tool.
- Logistics is an information-based process wherein the flow of information is the key to the success of the process. The beginning point of this system is the receipt of order from the customer. The initiation of the system depends upon the receipt of the order and then this information is communicated to all the stakeholders.
- In the era of growing application of information and communication technology, e-commerce is another way of doing business. There are three ways in which business is done through e-commerce. These are B2B, B2C and intra-business commerce. The products and services are electronically displayed and all the transactions, be it order processing or payment, are carried out electronically.
- The efficiency and effectiveness of the e-commerce logistics depends upon the comprehensiveness of the web-based logistics solutions. There has to be a comprehensive and continuous communication from customer to warehouse to transportation to distribution to inventory and reverse logistics.
- Logistics resource management is a new information technology tool providing browser-based software for automating, planning, managing and optimizing e-commerce logistics activities.
- Automatic Identification Technologies are the technologies that automatically identify the objects, collects the related data, stores and enters the data directly into computer systems.
- Barcodes are the most popular identification technology used in numerous applications. These codes can be seen in almost all products today. These are used for identification, handling, storage, retrieval of goods at the warehouse and the store. The codes can be read with bar code scanners.
- EDI technology allows intercompany computer to computer exchange of business documents in standard format. EDI replaces postal mail, fax and email. In the absence of human involvement, EDI documents can flow straight through to the appropriate application on the receiver and processing can begin immediately.
- With the growing role of information technologies in business operations, companies are looking forward to leveraging these technologies for improving their operations and increase the efficiency and performance of the business. For this, they are creating IT system centres in their organizations.
- Warehouse simulation is a computer-based modelling of a real warehousing system. It allows an organization to analyze and experiment with its warehousing process in a virtual setting and hence decreases the time and cost requirements associated with physical testing.

• Reverse logistics is any logistics involved in moving goods from the place of use to the place of manufacturing for refurbishment, replacement, repair, return, waste disposal or even excess inventory. Overall, it incorporates running products in reverse through the supply chain to gain maximum value.

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6.10 ANSWER TO 'CHECK YOUR PROGRESS'

- 1. The way a company captures information gives them a competitive edge over other companies. The efficient use of information is becoming the most important means of gaining competitive advantage for businesses today. The beginning point of this system is the receipt of the order from the customer.
- 2. Logistics is an information-based process wherein the flow of information is the key to the success of the process.
- 3. The different levels of the logistics information system are:
 - Operating Level
 - Strategic Level
 - Control Level
 - Tactical Level
- 4. The basic characteristics of LIS are: (i) Accuracy; (ii) Availability; (iii) Timeliness; (iv) Flexibility; (v.) Exception; and (vi) Appropriateness.
- 5. The basic building blocks of the LIS are as follows:
 - Transaction System
 - Management Control Systems
 - Decision Analysis
 - Strategic Planning
- 6. In the era of growing application of information and communication technology, e-commerce is another way of doing business. There are three ways in which business is done through e-commerce. These are B2B, B2C and intra-business commerce.
- 7. Some points which should be considered while designing e-commerce logistics solution are:
 - Online facility for placing order
 - Facility for tracking the order status online
 - Order dispatch and documentation invoice
 - Auto reminder for payment
 - Online alert for critical information through mobile or WAP
 - · Seamless interface with existing SCM or ERP system
- 8. Logistics resource management is a platform for commanding and controlling logistics execution which can act as a central clearing house of logistics data to meet a variety of other decision-making needs of the e-commerce firm.

9. The key features of logistics resource management are:

Logistics Information Systems

- It provides complete visibility in the inbound and outbound logistics to the company, suppliers and customers.
- It is a vehicle management software, which includes the use of preschedule and dynamic scheduling.
- It provides real time routing of truck and material handling equipment, automatic material picking applications.
- 10. Automatic Identification Technology automatically identifies the objects, collects the related data, stores and enters the data directly into computer systems.
- 11. AIT consist of three principle components. These are: data encoding, machine scanning and data decoding.
- 12. Electronic Article Surveillance is used to identify items as they pass through a gated area. It is popular in showrooms, warehouses, retail outlet, etc. The aim of using this technology is to alert the unauthorized possession.
- 13. E-tracking services help the shipper to know the information about the location of their freight at any point in its journey.
- 14. Some advantages of ERP for logistics are:
 - Businesses are able to response quickly to customer's demand.
 - It also helps in improving inventory turnover rate.
 - Better data visibility helps in managing inventory in better way.
 - It also helps in reducing logistical cost.
- 15. Warehouse Simulation allows an organization to analyze and experiment with its warehousing process in a virtual setting and hence decreases the time and cost requirements associated with physical testing.
- 16. Reverse logistics can be defined as any logistics involved in moving goods from the place of use to the place of manufacturing for refurbishment, replacement, repair, return, waste disposal or even excess inventory.

6.11 QUESTIONS AND EXERCISES

Short-Answer Questions

- 1. Write a short-note on logistics information systems.
- 2. Why is a strong LIS needed?
- 3. List the various steps involved in e-logistics structure and operation.
- 4. State the various information that is provided by Logistics Resource Management.
- 5. How does the Global Positioning System or GPS work?
- 6. List the numerous tracking services through e-tracking.
- 7. What are the major benefits of using ERP for organizations?
- 8. Why should companies look out for simulating warehousing activities?

- 1. Discuss the building blocks of LIS. Explain the characteristics and design of LIS.
- 2. Explain the various automatic identification technologies used in logistics.
- 3. How does EDI help in reducing transaction cost and time? Explain.
- 4. Describe the Distribution Centre Management System (DCMS) and discuss its important features.
- 5. How is the logistics requirement of e-commerce different from other businesses? Discuss in detail.
- 6. Describe the activities and services of reverse logistics.