UNIT 1  LOGISTICS: CONCEPT, PRINCIPLES AND FORMS*

Structure
1.0 Objectives
1.1 Introduction
1.2 Concept of Logistics: An Overview
1.3 Logistics: Principles, Activities, Classification
1.4 Operating Objectives of Logistics
1.5 Logistics Forms
1.6 Conclusion
1.7 Glossary
1.8 References
1.9 Answers to Check Your Progress Exercises

1.0 OBJECTIVES
After reading this Unit, you should be able to:

- Provide an overview of the concept of logistics;
- Discuss the principles, activities and classification of logistics;
- Elaborate the operating objectives of logistics; and
- Describe the various forms of logistics.

1.1 INTRODUCTION
In any type of organisation, the activities pertaining to the production and delivery of products and services assume importance. Their design, acquisition, storage, movement, distribution, maintenance, and several related aspects must be taken care of and managed. This, being the first Unit of the Course on Logistics Management, we shall be introducing the concept of logistics, discuss its principles and forms. We shall be familiarising you with certain terms and concepts that are important in the overall framework of the Course on logistics management. In this course the terms ‘company’, ‘enterprise’ and ‘firm’ are used interchangeably.

1.2 CONCEPT OF LOGISTICS: AN OVERVIEW
The term logistics is derived from the Greek term λόγος, which denotes ‘order’, and from the French word loger, that implies an art of war pertaining to movement and supply of armies; being the branch of military science concerned with the movement, supply and maintenance of troops. The origin of logistics is of a strictly military nature and this discipline gained significance because of the importance of the study of the methodologies employed to guarantee the

* Contributed by Col. (Dr.) Rajive Kohli, Management Consultant, New Delhi
appropriate supply of provisions, ammunition and fuel to the troops and, in general, to ensure the army the facility of moving and fighting in the most difficult conditions. In its all-inclusive sense, logistics covered those aspects of military operations that deal with:

a) Design, development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materials;

b) movement, evacuation, and hospitalisation of personnel;

c) acquisition or construction, maintenance, operation, and disposition of facilities; and

d) acquisition or furnishing of services.

In business, logistics is the management of the flow of things between the point of origin and the point of consumption to meet the requirements of customers or corporations. The Babylonians were the first to create, around 2000 BC, a military corps specialised in the supply, storage, transport, and distribution of equipment for soldiers.

Development of Logistics

The industrial revolution caused a sea change in logistics as the advent of steam engine in 1765 made possible the mass production of goods. In 1801, there was a second important transformation in the form of assembly of products. The major problem of mass distribution of products was overcome with the second industrial revolution: with major innovations in transportation and communications. The beginning of the nineteenth century witnessed some of the great revolutions in production, with F.W. Taylor propagating meticulous division of work, and Ford creating the mobile production lines wherein instead of workers moving, the product came to the worker for production. It was only after the end of Second World War that logistics was extended beyond the military context to manufacturing companies to determine all the activities aimed at ensuring effective purchase, movement, and management of materials.

Logistics development over the period was evolving when, around 1980, new concepts of logistics management assumed importance in the movement of materials involving every stage of the process including:

a) Materials management, the timely movement of raw materials, parts, and supplies.

b) Physical distribution, the movement of the firm’s finished products to the customers.

The scenario by 2000, due to technological developments was of total integration. The goal of logistics is to coordinate all efforts of the organisation to maintain a cost-effective flow of goods. In a globalised world, there are multinationals which offer their products in widely distributed markets. Innovation being the watchword, the customers earlier, were used to buying whatever was available to them, but nowadays they want the right product, at the right time, at a reasonable price, at the chosen location, and with the desired quality. This is being accomplished with excellent operations and better logistics management.
The following factors could be considered to impact the development of logistics:

a) Advances in computer technology
b) Quantitative techniques
c) Development of the systems approach
d) Total cost analysis
e) Recognition of important role of logistics

**Types of Logistics**

There are different types of logistics and we shall be discussing a few now.

**Business Logistics:** It is the part of the supply chain process that plans, implements, and controls the efficient flow and storage of goods and services from the point of origin to point of use or consumption. The business logistics plans, help in implementation, and control the efficient, effective flow and storage of goods, services, and related information. This is designed to meet customer requirements.

**Military Logistics:** It is the design and integration of all aspects of support for the operational capability of the military forces and their equipment to ensure readiness, reliability, and efficiency. It involves the transfer of personnel and material from one location to another, as well as the maintenance of the material essential for military to be able to support an ongoing deployment or respond effectively to emergent situations.

**Event Logistics:** This relates to the network of activities, facilities and personnel required to organise, schedule and deploy the resources for any event to take place. Event logistics uses a network of activities, facilities, and personnel to organise, schedule, and plan for organising an event. It involves the deployment of resources, as well as the necessary post-event steps such as clean-up, disposal and so on.

**Service Logistics:** It encompasses the acquisition, scheduling, and management of the facilities, assets, personnel, and material to support and sustain a service operation or business.

**Key Logistics Terms:** Many logistics terms have special meanings as described below.

**Supplies, Commodities, Goods, Products and Stock:** These encompass all the items that flow through a logistics system. The terms are used interchangeably in logistics management.

**Users, Clients and Customers:** These are the people who receive supplies. The terms are used inter-changeably. *User* is a term familiar to those who collect information about “new” or continuing products. *Client* is a term often associated with receiver of the product or service. However, the people served are to be considered as *customers* like in any commercial business.

**Central Distribution Centre:** It implies a warehouse that is the sole stocking point for the distribution system that it serves. Grocery manufacturers commonly have central (or national) distribution centres, stocked by various manufacturing points and serving various retailer distribution warehouses.
**Introduction to Logistics Management**

**Service Delivery Points:** It connotes any facility where customers (users) receive supplies. Service delivery points (SDPs) are generally organisations or a facility being supplied with products. They are called SDPs, because all these locations directly serve the customers.

**Inventory:** A term used to describe all the goods and materials held by an organisation for future sale or use.

**Pipeline:** The entire chain of storage facilities and transportation links, through which supplies move from the manufacturer to the consumer, including port facilities, central warehouse, regional warehouses, district warehouses, all distribution points, and transport vehicles. In a logistics setting, the logistics system is often called a pipeline. This term was coined because a logistics system is in many ways like the pipeline that brings water into homes:

a) The logistics system, like a water pipeline has *tanks*—that is, warehouses—for storing *water*—that is, products—until they are needed.

b) Transportation links, like pipes, are also part of a pipeline. Unlike a water pipeline, which is usually continuous, a health logistics pipeline requires transportation to move supplies periodically from one warehouse to another.

**Lead Time:** This is the time between the order of new stocks and when it is received and available for use. When logistics managers evaluate how well a logistics system is meeting the demands, they measure the lead time and try to reduce it. The goods should reach customers at *the right time*—in the shortest time possible. In calculating lead time, it is important to include the total time up to when the stock is *available for use*. Depending on the system, lead time can be few hours or several months. It depends on the speed of deliveries, availability of transport, and so on.

**Role and Function of Logistics in an Organisation**

The role of logistics is clearly much greater than just distribution of products. It ranges from the purchase of raw materials, inventory management, to production management, operations control (inventory, quality, distribution and transportation), demand management (forecasting) and long-term planning (facility location, project management). Logistics is also important in the service sector like the distribution of water and gas, postal services, urban solid waste collection, maintenance of roads and electricity networks and post-sales activities of manufacturing companies. Hence, it is also the discipline that studies the functional activities determining the flow of materials, along with its relative information, in any business, from their origin at the suppliers up to delivery of the finished products to the customers and to the post-sales service.

The logistics concept includes:

a) Customer satisfaction to include (i) suppliers, (ii) intermediate customers and (iii) final customers.

b) Integrated efforts through (i) product, (ii) price, (iii) promotion and (iv) place or distribution.

c) Company profits by way of (i) maximising long-term profitability; and (ii) lowest total costs given an acceptable level of customer service.
**Systems Approach**

The concept of logistics is based on the systems approach. The flow of material from a supplier to a manufacturing plant and finally to the end customer is viewed as a single chain, ensuring efficiency and effectiveness in sequential activities to achieve the objective of customer satisfaction at a reduced cost. All the activities of material movement across the business process are interdependent and need close coordination to be managed as a system and not as functional divisions. These functional areas of logistics consist of:

- **a) Information flow:** This is needed to order, check, process, and coordinate.
- **b) Warehousing:** Material storage, load unitising and material handling, size selection and network planning, order picking and filling, and dispatch documentation.
- **c) Inventory control:** Material requirement planning and inventory level decisions for customer service objectives.
- **d) Packaging:** For handling and damage prevention, communication, and inter-modal transportation.
- **e) Transportation:** Route planning, mode selection and vehicle scheduling.

The concept of logistics is based on a total systemic view of the multitude of functions in movement of materials and goods from sources of supply to users. It entails management to think in terms of managing the total system; rather than just one part of it.

**1.3 LOGISTICS: PRINCIPLES, ACTIVITIES AND CLASSIFICATION**

Logistics management aims to facilitate the flow of material across the supply chain of an enterprise to cost effectively make available the right product at the right place at the right time. Logistics must achieve the two critical goals of customer satisfaction and making available products at least cost. This is possible only when all the logistics functions are working as a unified system to achieve the common goal.

**Principles of Logistics**

Initially logistics was considered a custodial activity with storekeepers being the custodians of stored supplies. This view has changed with logistics concerned with the efficient movement of materials to the customers. The central principles of logistics are given as the Seven Rights of Logistics. It encompasses movement of

1) The *Right Materials/Products* so that always the product/service required at the time must be made available.

2) In *Right Quantity* so that the correct amount is available, as smaller amounts result in the halting of production, while larger amounts result in building up stocks.

3) In *Right Condition* so that the right quality of the product/service be made available that the client requires.
4) **At the Right Time** ensuring the product/service be made available at the time required by the client.

5) **To the Right Place** so that the product/service be made available at the place where the client needs it.

6) **At the Right Cost** ensuring the product/service be made available at the cost accepted by the client.

7) **To the Right Customers, Associates, Suppliers and Stockholders.**

These seven rights highlight the importance of moving and storing materials in an efficient, timely, and reliable manner. The seven rights also link logistics to the key strategic objectives of cost competitiveness, quality, flexibility, and delivery. The seven rights demonstrate that logistic activities provide the foundation for high levels of customer satisfaction.

We shall be focusing on these seven rights in Unit 4 on Logistics Management Cycle.

**Key Logistics Activities**

The logistics of an organisation is the physical distribution of goods along with related activities that comprise following:

**a) Order processing:** This encompasses activities for receiving, handling, filing, recording of orders and to ensure that they are accurate, reliable, and fast. The commercial team accepts the order from the customer and places the order to the warehouse. This is an important step in logistics activities because any lapse in this step (wrong entries of quantity, delivery address etc.,) can affect the whole logistics process.

**b) Procurement:** Obtaining materials from outside suppliers, includes supply sourcing, negotiation, order placement, inbound transportation, receiving and inspection, storage, and handling.

**c) Material handling:** Material handling is the movement of goods within the warehouse. It involves handling the material in such a way that the warehouse can process orders efficiently. It is important to properly arrange the material within the warehouse to facilitate easy movement and dispatch. Material handling systems are generally mechanised, semi-automated or automated systems.

**d) Warehousing:** Warehousing is the storing of finished goods until they are sold. The manufacturing activity for large companies might be at one point, but the distribution could be across the world. The important point is that the warehouse should be nearby to the dealer or the distributors’ place and it should facilitate the easy delivery of goods.

**e) Inventory Control:** Inventory that is stock, should be enough to meet customer requirements, and simultaneously its carrying costs should be lowest. Having correct inventory requires continuously monitoring the demand and procuring accordingly to be ready for supply without investing much in manufacturing. Inadequate inventory would lead to loss of orders, whereas excessive inventory would lead to useless investment.
f) **Transportation**: Transportation involves the physical delivery of goods from the organisation to the distributor or dealer and from the dealer to the end customer. It is one of the major logistics activities which consumes lots of revenue of the organisation. The better the warehousing and the inventory management of a company, the lower are its transportation costs.

g) **Packaging**: Packaging the product is the responsibility of the logistics team because the product may reach in a damaged condition to the end customer and this becomes a huge cost to the company. There are two types of packaging (i) The package which the customer sees on the shelves of stores in markets that appears attractive and makes the customer buy the product. (ii) The transport packaging where the products are packed in bulk and transported safely with minimum breakage or spillage.

h) **Information**: Logistics is basically an information-based activity of inventory movement across a supply chain. Therefore, the information system plays a vital role in delivering a superior service to the customers. Use of technology tools helps in information identification, access, storage, analysis, retrieval, and decision support. This enhances their competitiveness.

**Classification of Logistics**

Logistics may be classified into two types:

a) **Inbound or upstream logistics**: This connotes the activities which are related to sourcing, acquiring, receiving, storing, and delivering the raw materials and parts to the product or service department. It is part and parcel of the operations, for a manufacturing firm. There is need for smooth and cost-effective inflow of materials and other inputs (that are needed in the manufacturing process) from suppliers to the plant. For proper management of inbound logistics, there is need for a continuous interface with suppliers or vendors. In simple terms, inbound logistics is a basic activity, which focuses on buying and scheduling the inflow of materials, tools, and final goods, from suppliers to the production unit, warehouse, or retail store.

b) **Outbound or downstream logistics**: This involves the collection, storage and distribution of the final goods and related information flows, from the manufacturing unit to the end user or buyers. It covers all those activities (i.e. selecting, organising, transporting, etc.) which are involved in the outflow of merchandise from seller to the buyer. It covers the physical distribution management or supply chain management; is concerned with the flow of finished goods and other related information from the firm to the customer. For proper management of outbound logistics, there is need to maintain a continuous interface with transport operators and channels of distribution.
1.4 OPERATING OBJECTIVES OF LOGISTICS

The primary objective is to move the inventory effectively and efficiently to extend the desired level of customer service at the least cost. In terms of logistics management, each firm must simultaneously achieve at least six different operational objectives. These operational objectives, which are the primary determinants of logistical performance, include rapid response, minimum variance, minimum inventory, movement consolidation, quality, and life-cycle support.

1) Rapid Response: Rapid response is concerned with a firm’s ability to satisfy customer service requirements in a timely manner. Information technology has increased the capability to schedule the logistics operations to the desirable time and then accomplish rapid delivery of required inventory. The result is elimination of excessive inventories traditionally stocked in anticipation of customer requirements.
2) **Minimum Variance:** Variance is any unexpected event that disrupts system performance. Variance may result from any aspect of logistical operations. Delays in expected time of customer order, an unexpected disruption in manufacturing, goods arriving in a damaged condition to the customer’s location, or delivery to an incorrect location—all result in a time disruption in operations that must be resolved. Information technology in present times plays a key role in this area, to the extent that variances are minimised and logistical productivity is improved because of economical operations. Thus, the basic objective of overall logistical performance is to minimise variance.

3) **Minimum Inventory:** Inventory as an asset has capital costs associated with it. The objective is to reduce and manage inventory to the lowest possible level while simultaneously achieving desired operating objectives.

4) **Movement Consolidation:** One of the most significant logistical costs is transportation. Transportation cost is related to the type of product, size of shipment, and distance. Many logistical systems that focus on premium service depend on high-speed and small-shipment transportation. Premium transportation is typically of high cost. To reduce transportation costs, it is desirable to achieve movement consolidation. Generally, the larger the overall shipment and the longer the distance it is transported, the lower is the transportation cost per unit.

5) **Quality Improvement:** Maximising customer satisfaction is the key objective of any company. A fifth logistical objective is to seek continuous quality improvement. Total quality management (TQM) has become a major commitment throughout all facets of industry. Overall commitment to TQM is one of the major forces contributing to the logistical renaissance. If a product becomes defective or if service promises are not kept, very little value is added by the logistics.

6) **Life-Cycle support:** The final logistical design objective is life-cycle support. Few items are sold without some guarantee that the product will perform as advertised over a specified period. Product recall is a critical component resulting from increasingly rigid quality standards, product expiry date and responsibility for hazardous consequences. We come across cases where a company does a product recall. In India, there have been cases of automobile companies recalling cars to ensure certain quality specifications. Return logistics requirements also result from the increasing number of laws prohibiting disposal and encouraging recycling of beverage containers and packaging materials.

### 1.5 LOGISTICS FORMS

Logistics can be split into five forms or types: procurement logistics, production logistics, sales logistics, recovery logistics, and recycling logistics. Each of these is explained below.

1) **Procurement logistics:** This entails procuring raw materials and parts. Procurement logistics is the flow of goods when the raw materials and parts necessary for manufacturing are procured from suppliers.
2) **Production logistics:** Production logistics includes materials management, product management and shipping. It is the flow of goods that includes the management of procured parts and materials, distribution inside a factory, product management, packaging, and shipping to warehouse.

3) **Sales logistics:** Sales logistics is for delivery of products from warehouse to wholesalers, retailers, and consumers. It typically transfers from delivery centres and logistics warehouses to distribution points such as wholesalers and retailers. Now direct delivery also makes up a large amount of this volume due to online shopping and e-commerce. Higher efficiency in transportation and delivery and shrinking inventory are indispensable for delivering the necessary goods to the people in the necessary quantities and at the necessary time. This also contributes to improving customer satisfaction.

4) **Recovery/reverse logistics:** Recovery or reverse logistics is important for recovering and recycling products, containers, and packaging. Recovery logistics is the flow that recovers and recycles products, containers, and packaging that have fulfilled their role.

5) **Recycling logistics:** Recycling logistics is concerned with recovering and recycling the recyclable products and containers and like recovery logistics. These involve recovering and recycling empty cans, plastic bottles, and old paper, containers, packaging material, old computers, and inkjet cartridges.

Global companies have several logistics systems for selecting, procuring, and distributing supplies to clients. Often different products manage and distribute supplies for their own type which are called vertical logistics because they are managed by separate management units at the central level. A vertical system is a logistics system that supplies and manages products for only one type of product.

Many companies have been moving away from having several vertical logistics systems toward having just one system which is integrated that distributes supplies for all products. Vertical and integrated systems each have their own advantages and disadvantages. Depending on the company requirements, and nature of operations it has to be adopted.

**Check Your Progress 2**

**Note:** 1) Use the space gives below for your answers.

2) Check your answers with those gives at the end of the Unit.

1) List the operating objectives of logistics.

........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
2) Explain the forms of logistics.

1.6 CONCLUSION

In this Unit we have learnt that purpose of a logistics system is to supply the right goods, in right quantities, in the right condition, to the right place, at the right time, and at the right cost. From its largely military origins, logistics has accelerated into becoming one of the key business issues of the day, presenting formidable challenges for managers. Logistics is a cross-functional subject, drawing on contributions from marketing, finance, operations, and corporate strategy as part of a business process.

Logistics extends beyond the boundaries of the organisation into the supply chain requiring coordination of the movement of materials and information between many business processes. This leads to the logistics management process that begins with raw material accumulation to the final stage of delivering goods to the destination. By adhering to customer needs and industry standards, logistics management facilitates process strategy, planning and implementation. Logistics management includes both physical distribution and physical supply.

1.7 GLOSSARY

**Business Logistics:** It is the set of activities involved in the flow of materials and products through an organisation and the supply chain to the market. It specifically manages efficient, effective flow and storage of goods, services, and related information in a supply chain.

**Inventory Control:** It is the process to ensure that appropriate amount of material or stock is maintained by an organisation to meet the customer demands. The objective of inventory control is to generate maximum profit with minimum costs of maintaining stock in hand.

**Load Unitising:** It is an efficient means of packaging, arranging, and transporting products into an appropriate unit for easy handling by material handling equipment.

1.8 REFERENCES


## 1.9 Answers to Check Your Progress Exercises

### Check Your Progress 1

1) Your answer should include the following points:

- Logistics management basically is concerned with movement, supply and maintenance of supplies or materials in an organisation.
- It deals with flow of material across the supply chain of an enterprise to cost effectively make available the right product at the right place and right time.

2) Your answer should include the following points:

- Order Processing
- Procurement
- Material handling
- Warehousing
- Inventory Control
- Transportation

3) Your answer should include the following points:

- There are two types of logistics
  - a) Inbound logistics
  - b) Outbound logistics
- Inbound logistics consists of those activities that are concerned with sourcing, acquiring, receiving, storing and delivering the raw materials and parts to the product or service department.
- Outbound logistics is concerned with collection, storage and distribution from the unit to the end user or buyer.

### Check Your Progress 2

1) Your answer should include the following points:

- Rapid response
- Minimum variance
- Minimum inventory
- Movement consolidation
2) Your answer should include the following points:

- Procurement logistics that deals with procurement of raw materials and parts.
- Production logistics that includes materials management, product management and shipping.
- Sales logistics involve measures for delivery of products from warehouses to wholesalers, retailers, and consumers.
- Recovery logistics is concerned with recovering and recycling products and packaging.