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## **UNIT 4 LOGISTICS MANAGEMENT CYCLE\***

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### **4.0 OBJECTIVES**

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After reading this Unit, you should be able to:

- Explain the logistics management cycle and its components;
- Elaborate the activities of the logistics management cycle;
- Describe the logistics management information system;
- Identify the quality issues in logistics management; and
- Examine the logistics environment.

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### **4.1 INTRODUCTION**

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Logistics Management is a component of supply chain management that attempts to meet the demands of customers through better planning, control and implementation of effective movement and storage of goods and services from the point of origin to destination. It has cyclical operations. There are several key activities that fulfil the seven rights of logistics.

In this Unit, an attempt is made to explain the logistics management cycle and the importance of all the activities. The logistics management information system plays an important role in the operations which is examined. The quality issues in managing logistics and the factors that impact the logistics environment are analysed.

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### **4.2 LOGISTICS MANAGEMENT CYCLE**

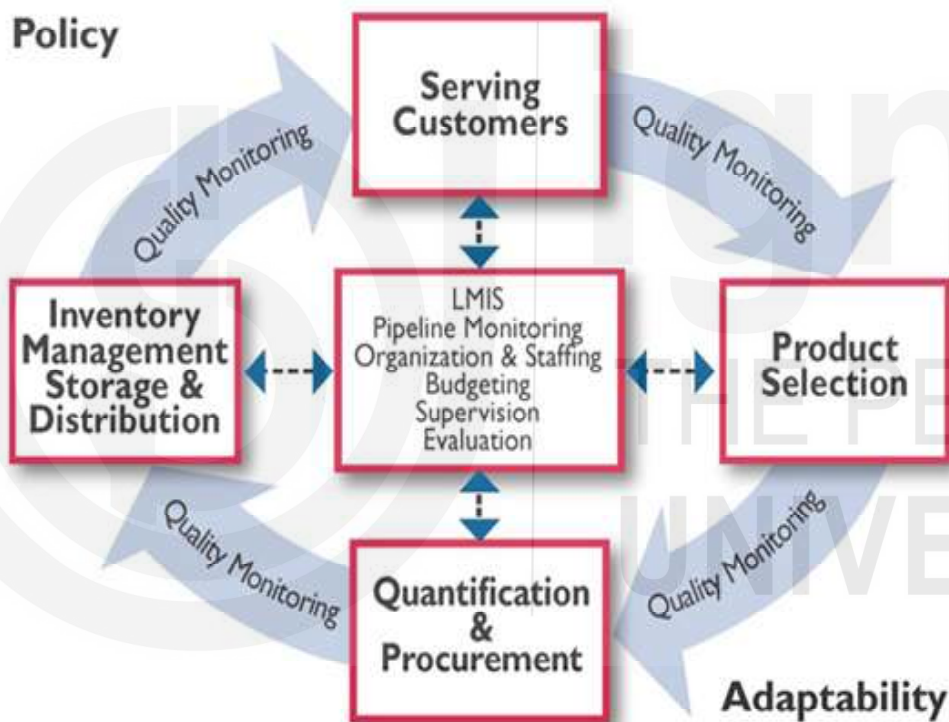
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The goal of the logistics systems is meeting the needs of end users and fulfilling the seven rights of logistics (product, quantity, condition, place, customer, time,

and price). To elaborate, the seven rights are, to deliver the right product, in the right quantity and the right condition, to the right place, at the right time, for the right customer at the right price. Logistics management includes several activities that support these rights. A systematic approach is used to organise these activities. The logistics cycle comprises the following components (Figure 1):

- Serving customers (right place, time, and cost)
- Product selection (right item)
- Forecasting and procurement (right quantity and cost)
- Inventory management and distribution (right place, time, and cost)
- Information for decision-making
- Quality assurance and monitoring

Logistics management is a circular cycle indicating the interdependence of various elements. The components of a logistics system fit together in the logistics cycle.



**Figure 1: Logistics Management Cycle**  
(Adapted from <https://www.capacityplus.org>)

### 4.3 LOGISTICS MANAGEMENT CYCLE ACTIVITIES

The logistics management cycle has key interrelated activities. Let us discuss these:

#### Serving Customers

The first main activity in logistics management is delivery to customers. Customer service is the process between buyer, seller, and a third party. There can be internal customers like distribution warehouse for last production point; and external

customers who/which can be different organisations or individuals. For example, if the products manufactured are to be sent to warehouse, it is the end point. Customer service is the means by which companies can differentiate their products, ensure customer loyalty, increase sales, and improve profits, being a series of activities designed to enhance the level of customer satisfaction.

The elements of customer service are:

- a) **Pre-transaction Elements:** These arise prior to the taking place of actual transaction. This comprises a written statement of policy, customer's access to statements, organisational structure, system flexibility and technical service. For example, when some product is ordered through e-commerce, the customer is in know of several aspects pertaining to the product.
- b) **Transaction Elements:** These are related to the physical transactions and are those that are most concerned with logistics.
- c) **Post-transaction Elements:** These elements include those that occur after the delivery has taken place. These are installation, warranty, alterations, repairs, parts, product tracking, customer claims, complaints, product packaging, and temporary replacement of product during repairs etc.

Each activity in the logistics cycle contributes to excellent customer service and ensuring commodity security. The loyalty of customers and the rate at which customers reorder, is a measure of success in the customer care domain of each business.

### Product Selection

A product is anything that can be offered to a market for acquisition, use or consumption. Products selected for use will impact the logistics system, so the logistics requirements must be considered in the process of product selection.

Product selection is a decision process, in which the design team selects one or few product concepts for further development. A small business unit progressively becomes large through additional investments. The new product investment areas are as under:

- a) Introduction of new product.
- b) Expansion of the existing product.
- c) Diversification in a new line of product by an already existing unit.
- d) Business integration investments, which is a step-by-step and sequential conversion of raw material into finished product. For example, the conversion of raw cotton into finished cloth through spinning, weaving, and processing.

The client's ability to select from among products is influenced by other elements of the logistics cycle such as the budget availability, as they may choose cheaper items over more expensive ones. Many users may have a list of essential items and most cost-effective alternatives. For complicated use, effort is to help choose the right product for each requirement and the correct quantity to distribute.

## Forecasting, Quantification and Procurement

After products are selected, the quantity required of each product must be determined and procured. The forecasting process estimates the quantities of the various supplies that will be needed for a specified time. The procurement process, which can be complex, is implemented as per the plan.

### Quantification

Quantification is the process of estimating the quantity and cost of the products required for specific customer ensuring an uninterrupted supply, determining when the products should be procured and distributed. The logistics manager is responsible for quantifications and consults policymakers, managers, clients, and service providers. The functions in the quantification process include:

- a) Conduct of annual quantifications and regular updates of commodity requirements and costs.
- b) Identify potential gaps in supply and mobilising resources. As part of the quantification process, logistics staff forecast the quantities of products required for a specified time, determine the costs of those products, and compare those costs with the funds available. The amount, timing, and funding commitments from all sources are updated.
- c) Develop and manage supply plans. A supply plan details the arrival dates and quantities of shipments from all suppliers. The logistics staff manage the information regarding supply plans from various suppliers. The desired stock levels are quantified to ensure a continuous supply of commodities.

### Forecasting

Forecasting estimates the quantities of each product that a customer will use in a specific period. These predictions are needed due to time lag in matching supply to demand. Logistics requirements to be forecasted include customer demand, raw material prices, labour costs, and lead times. Proper forecasting helps ensure enough supply available to meet the demand. An overestimation of demand leads to bloated inventory and high costs, whereas by underestimating demand, many customers would not get their products. Forecasting is where procurement usually takes place and often done by logistics managers, management information systems managers and others involved with the product. Forecasting is important for the following activities:

- a) Projecting Consumption
- b) Budgeting
- c) Procurement Planning
- d) Pipeline Planning
- e) Quality Assurance
- f) Preventing Supply Imbalances

There are two types of forecasting methods:

- a) **Qualitative forecasting:** These are judgmental forecasts using subjective inputs, such as
  - Executive opinions

- Sales Personnel
- Consumer surveys
- Opinion of managers and staff
- Market research methods that involve using market testing and surveys to forecast the trends particularly the newly introduced products.

**b) Quantitative forecasting:**

- Time series model uses previous data assuming that the future will be like the past.
- Associative model: uses explanatory variables to predict the future.

**Procurement**

Procurement and supply management is a logical process flowing from quantification to forecasting and supply planning aimed at producing procurement tables that guide procurements.

**Supply planning**

Supply planning is to counteract the identified risks of stock outs and excesses/ expiry. The supply plan shows a way to maintain the stock levels within the accepted minimum – maximum levels. It is more of an interactive and continuous process that requires lots of stakeholder management skills. Supply planning proposes solutions to the risks of stock outs and expiry.

**Procurement**

After a supply plan has been developed as part of the quantification process, quantities of products must be procured. The procurement can be from international, regional, or local sources of supply, or through a procurement agent. However, procurement should follow a set of specific procedures that ensure an open and transparent process.

**Procurement Tables**

It lays down the funding source/supplier, items to be supplied, quantity to be supplied and preferred delivery date for each supply. This table should be shared with funding sources/suppliers so that they can also plan at their level.

**Inventory Management: Storage and Distribution**

It is important to determine how much stock should be stored. High inventory due to overestimation of demand is to be avoided as it increases labour and storage costs if the inventory must be moved to another storage facility to make way for new inventory. For perishable goods, further loss is incurred due to deterioration of unsold inventory. High inventory results in selling at a discount, which reduces the profit margins and income.

**Inventory Control System**

The best way to ensure that stock does not run out is to establish an inventory control system. It enables the storekeeper to determine when to order or issue, how much to order or issue, and how to maintain an appropriate stock level of all products to avoid shortages or oversupply. The important types of inventory control systems are given below.

- a) **Maximum-Minimum Inventory Control System:** This system ensures that quantities in stock are within an established range. This is the simplest method of inventory control. When the stock of a certain product reaches the minimum level, it is an indication to reorder and reach the earlier level.
- b) **Maximum Stock Level/Maximum Quantity:** This is the maximum level of stock above which inventory levels should not rise under normal conditions. The maximum stock level is fixed, whereas the quantity varies as consumption changes.
- c) **Minimum Stock Level/Minimum Quantity:** This is the level of stock at which actions to replenish inventory should occur under normal conditions. The minimum stock level is fixed, whereas the quantity varies as consumption changes. Reaching the minimum may be an indicator to monitor stocks carefully until the next order is placed or the emergency order point is reached.
- d) **Review Period Stock:** The review period is the routine interval of time between assessments of stock levels to determine if an order should be placed.
- e) **Safety Stock Level:** This is the buffer, cushion, or reserve stock kept on hand to protect against stock outs caused by delayed deliveries, markedly increased demand, or other unexpected events.
- f) **Lead-Time Stock Level:** The lead-time stock level is the level of stock used between the time the new stock is ordered and when it is received and available for use.
- g) **Emergency Order Point:** This is the level of stock that triggers an emergency order.

### Storage

After an item has been procured and received by the company, it must be transported to the service delivery level where the client or customer will receive the products. During this process, the products must be stored till they are sent to the next lower level, or until the customer needs them. Almost all businesses store a quantity of stock for future customer needs.

### Purpose of Storing Products

Storage is a basic part of warehousing being more than just shelving products. To have viable products available for distribution, the quality of a product and its packaging must be ensured. Excessive quantities of damaged and expired goods could mean that some products will not be available for customers. All products require procedures for safe storage that maximise their shelf life and make them readily available for distribution. All products have a shelf life which is usually specified by manufacturer. Some are stable products having long shelf life of four to five years; others may have much more variation in shelf life. They all must be stored and distributed in a way that ensures they are received by customers in good condition and in time to be used before their expiration dates.

### Storage Procedures

Proper storage procedures can help ensure that only high-quality products are issued by a storage facility. When all levels of the pipeline follow these procedures, customers can be assured that the same high-quality product has been provided to them. Warehouse managers can evaluate how well their warehouse is performing against these procedures and look for ways to improve storage quality.

### Visual Inspection

In a perfect pipeline, all products are stored under ideal conditions according to proper storage guidelines. In reality, the quality of storage conditions may vary widely from place to place. In a warehouse facility, storekeepers can best verify the quality by regularly checking the condition of all products visually. To ensure the quality of the product in warehouse and pipeline, a visual inspection is conducted whenever:

- the product is received from the manufacturer/supplier,
- a physical inventory is conducted,
- any complaints from lower levels or customers,
- supplies are about to expire; or
- supplies show signs of damage.

Products suffer two basic types of damage during shipping and storage: mechanical, caused by physical stresses, and due to chemicals, which is more difficult to detect and usually not obvious during visual inspection but require laboratory testing.

### Physical Inventory of Stock on Hand

A physical inventory is the process of counting by hand the total number of units of each commodity in the store at any given time. Its purpose is to compare actual stock on hand with the amount recorded on the stock card. A physical inventory confirms how much stock is there and whether forms are being properly completed. It is also an opportunity to inspect products visually for quality assurance. In case of large number of products in a warehouse that must be counted, some facilities may shut down for a few days each year to do a complete physical inventory. But in many situations this is not possible and cycle counting of a few dozen items each month is done ensuring all items have been counted by end of the year without disrupting store operations. Cycle counting is a popular inventory counting method that involves counting several items in several areas within the warehouse without having to count the entire inventory.

### Check Your Progress Exercise 1

- Note:** 1) Use the space given below for your answers.  
 2) Check your answers with those given at the end of the Unit.

- 1) List the components of logistics management cycle.

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2) What are the key terms of inventory control system?

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## 4.4 LOGISTICS MANAGEMENT INFORMATION SYSTEM

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Information is a key requirement for the smooth functioning of logistics system. It helps in access to informed choices. Managers gather information about each activity in the system and analyse that information to coordinate future actions. For example, information about inventory levels and consumption must be gathered to know how much more to procure. Logistics Management Information Systems (LMIS) is the heart of the logistics cycle. The purpose of a LMIS is to collect, organise, and report the data that is used to make decisions. Its key components include generation of data, maintenance of logistics records and reporting.

### Generation of Data

The essential data needed for LMIS is:

- a) **Stock on Hand:** Quantities of usable stock available at all levels of the system.
- b) **Rate of Consumption:** The average quantity of an item dispensed to users during a particular time period.
- c) **Losses and Adjustments:** Losses are the quantity of stock removed from the pipeline for any reason other than consumption by clients (e.g., losses, expiration, theft, damage). Adjustments include quantities issued to or received from other facilities at the same level.

### Maintenance of Logistics Records

The supplies in a pipeline are either stored, moved (in transit), or consumed (used) which are monitored with the following three types of logistics records. The data they contain must encompass:

- a) **Stock Keeping Records:** These are meant to record information about items in storage. At a minimum, stock keeping records must contain the quantity of stock on hand and the quantity of losses and adjustments. The formats are stock /bin cards, store ledgers and inventory control card.
- b) **Transaction Records:** The purpose of these is to record information about the movement of stock from one storage facility to another. Transaction records need not include any essential data items. The most common formats are packing slips, receiving records, issue vouchers, and requisition vouchers.



- c) **Consumption Records:** These record the quantity of each item dispensed to clients.

### Reporting Processes

It has the essential data into a format useful for decision making. The collected data is made available in a form suitable for decision making by giving information through reports such as:

- a) Summary reports having all essential data items—stock on hand, consumption, and losses and adjustments.
- b) Feedback reports inform lower levels about their performance, sometimes providing additional information about reporting from other facilities. Feedback reports also inform higher level managers about how well the system is functioning.

LMIS is particularly important in designing a relevant, useful system that provides data which facilitates decision making.

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## 4.5 QUALITY MONITORING OF THE ACTIVITIES

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Quality assurance and monitoring take place throughout the logistics cycle between each of its activity as under:

**Between Product Selection and Forecasting:** This is done to ensure and monitor the quality of procurement decisions as the most appropriate product for the system.

**Between Procurement and Storage:** A products procurement request should include specifications for manufacturers to follow. After procuring items, their quality must be monitored before they enter the distribution system. The manufacturer carries out quality monitoring, but often the receiver may also require independent testing. Some products require compliance testing—a quality-monitoring procedure to ensure that procurement specifications are being followed. One simpler quality assurance technique is to check labeling and packaging for arriving shipments.

**Between Inventory and Customers:** While products are being stored and distributed before sending to customers, it is important to monitor their quality during storage so that the products in the right condition are available for customers.

**Between Customers and Product Selection:** After distribution of products to customers, monitoring of quality is needed to get the feedback from the customers about the quality of the products and whether the customers are satisfied with the service they received. The results of monitoring customer satisfaction can be used to inform decision makers about the selection of the products to select in the next procurement cycle.

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## 4.6 LOGISTICS ENVIRONMENT

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There are several factors that impact logistics environment. These include:

**Globalisation:** The impact of globalisation is immense with flow of private capital, market economy, entry of multinational corporations, developments in information technology, rapid urbanisation and so on. These impact the logistics cycle on several fronts.

**Policies:** Government regulations and procedures affect all elements of the logistics system. Many governments have established policies on the selection of certain products, procurement of items, their distribution, storage, and the quantities customers receive (often called dispensing protocols). Logistics managers can influence these policies but may not be able to change them. Logistics managers need to keep themselves updated on current policies and implement them as specified. There is a move on the part of government of India to come up with a logistics policy.

**Adaptability:** This is the logistics system's ability to successfully obtain the internal or external resources necessary to address changes in demand. Logistics managers often depend on a larger system, such as the government, to provide inputs. Where managers do not control the inputs, adaptability becomes more challenging. Finance is one of the most important resources in logistics. For example, as demand increases, the logistics system needs more money to pay for fuel for extra deliveries, hire new warehouse workers, and train logistics personnel. Adaptability is the ability to meet these needs that will have an impact on the logistics system.

### Check Your Progress Exercise 2

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

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

- 1) Describe the essential components of logistics management information system.

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- 2) What are the factors that impact logistics?

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## 4.7 CONCLUSION

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Logistics management cycle includes key activities such as product selection, quantification and procurement, inventory management, storage, and distribution. Other activities that help drive the logistics cycle and are also at the heart of logistics are organisation and staffing, budget, supervision, and evaluation. A logistics system organisation needs to have an appropriate logistics unit having adequate resources and authority. This enables to bring about necessary changes and ensures effective implementation of the activities of the logistics cycle. It maintains effective supervision and quality at all levels with written policies and procedures.

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## 4.8 GLOSSARY

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**Lead Time:** It is the time between the initiation and completion of production process.

**Time Series Model:** It is model that attempts to predict future values based on previously observed values.

**Associative Model:** It involves using past data to generate a number, set of numbers or scenario that corresponds to future occurrence.

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## 4.9 REFERENCES

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## 4.10 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

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### Check Your Progress Exercise 1

- 1) Your answer should include the following points:
  - Serving Customers
  - Product Selection
  - Forecasting, Quantification and Procurement
  - Inventory Management Storage and Distribution
- 2) Your answer should include the following points:
  - Maximum-Minimum Inventory Control System
  - Maximum Stock level/ Maximum Quantity
  - Minimum Stock level/Minimum Quantity
  - Review Period Stock
  - Safety Stock Level
  - Lead-time Stock level
  - Emergency Order Point

### Check Your Progress Exercise 2

- 1) Your answer should include the following points:

The essential components of logistics management information system:

  - Generation of Data
  - Maintenance of Logistics records
  - Reporting
- 2) Your answer should include the following points:
  - Globalisation
  - Logistics Policies
  - Adaptability