

LOGISTICS AND INVENTORY MANAGEMENT

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PART 3

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OVERVIEW OF LOGISTICS MANAGEMENT

Logistics is the process of strategically managing both the movement and storage of goods and materials from the source to the point of ultimate consumption and the associated information flow. It involves integration of information, transportation, inventory, warehousing, material handling and packaging.

Logistics management can be defined as supply chain management component that is used to meet customer demands through the planning, control and implementation of the effective movement and storage of related information, goods and services from origin to destination. It includes the design and administration of systems to control the flow of materials, work in process and finished inventory to support business unit strategy.

The overall goal of logistics is to achieve a targeted level of customer service at the lowest possible total cost. World class logistics firms create a competitive edge by providing customers with superior service/ information systems to monitor logistics performance on real time basis, identifying potential operational breakdowns and taking corrective action prior to customer service failure. In a nutshell Logistics management tries to have the “*right product*”, in the “*right quantity*”, at the “*right place*”, at the “*right time*”, with the “*right cost*”.

Inbound logistics - This is a primary activity in the value chain. It covers the movement of materials and other related activities from suppliers to the organization. Inbound activities include: receiving, storing, materials handling, warehousing, inventory control, vehicle scheduling and returns to suppliers.

- **Receiving:** This involves receipt, authentication, inspection and recording of stock upon the arrival at the premise.
- **Storing:** This involve physical holding of the stocks or supplies in store awaiting issue or transport to customers.
- **Material handling:** Involve coordination of the function of planning and controlling of materials flow including physical handling by forklifts clines etc.
- **Vehicle scheduling:** This is assigning vehicles the routes and the consignment. It entails timing and assignment of the required man-power.

- **Returns to suppliers:** This involves arrangement to return damaged, sub-standard excess and those supplies that don't meet the specifications of the buyer.

Outbound logistics - This is the process related to the storage and movement of the final product and the related information flows from the end of the production line to the end user. The primary activities in line with outbound logistics include: warehousing, sales and marketing, delivery of the finished goods and most importantly after sales service.

Reverse logistics - This is the process of planning, implementing and controlling the efficient, cost-effective flow of raw materials, in process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal.

The two principal drivers of interest in reverse logistics have been the increased importance attached to the environmental aspects of waste disposal and recognition of the potential returns that can be obtained from the reuse of products or parts or the recycling of materials. Reverse logistics may also apply to goods sent to distributors on a sale or return basis unused materials to be returned to stores from contracts or project sites or from subcontractors.

The main activities of reverse logistics include collection of returnable items, their inspection and separation and the application of a range of disposition options, including repair, reconditioning, upgrading, remanufacture, demanufacture (parts reclamation) and recycling. Disposition logic also includes channel or routing logic- that is the returned items and components can be sent back to the customer, routed to a warehouse or production or sold in secondary markets.

Concepts in logistics management

i. Systems concept

It is based on all functions of an organisation working together in order to maximise benefit. This concept sometimes requires certain components of the organisation to operate sub optimally in order to achieve maximum goals of the organisation.

ii. Total cost concept

Logistics focuses on coordination of inbound logistics and material management as well as cost efficient distribution while supporting the customer service goals. All of these activities are connected in many different ways and often logistics managers use the total cost approach to find the most cost effective solution.

The main objective is to find the lowest cost options that will still provide the support for the customer service goals.

iii. Total distribution concept

It is a recognition that the interrelationship between different elements e.g. delivery transport and storage need to be considered within the context of the broader supply chain. It is the art of directing the flow of materials and supply of products to the user. It includes the total flow of raw materials, user products, supply and information flows that helps to control materials movement. Total distribution costs are costs incurred in moving goods from point of production to point of consumption.

iv. After tax concept

A variation of the total cost concept that is aimed to determine the after tax profit.

v. Trade off concept

This concept links the system together in a way that is very efficient but can have tradeoffs that might be inefficient. The advantages of such high efficiency must be weighed against the risks involved.

Objectives of logistics management

In terms of logistical systems, design and administration, each organisation must simultaneously achieve at least 6 operational objectives. These include:

1. Rapid response

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It is concerned with affirms ability to satisfy customers service requirement in a timely manner. Information technology has increased the capability to postpone logistical operations to the latest possible time and then accomplish rapid delivery of required inventory.

Rapid response capability shifts operational emphasis from an anticipatory posture based on customer requirements on shipment to shipment basis.

2. Minimum variance

Variance is any unexpected event that disrupts system performance and may result system performance and may result from any aspect of logistical operations.

Delays in expected times of customer order receipt and unexpected disruption in manufacturing, goods arriving damaged at a customer's location or delivery to an incorrect location or result in a time disruption in operations that must be resolved. Potential reduction of variance relates to both internal and external operations.

In traditional solutions to accommodating variance is to establish safety stock or high cost, premium transportation to the extent that logistical variances are minimized, productivity improves as a result of economic operations.

3. Minimum Inventory

Total commitment is the financial value of inventory deployed through the logistical system.

Turn velocity involves the rate of inventory usage over time. High turn rates coupled with inventory availability means that assets devolved to inventory are being effectively utilised, the objective would be to reduce inventory deployment.

While the goals of eliminating all inventory is attractive, it's important to remember that inventory can and does facilitate some important benefits in a logistical system. The objective is to reduce and manage inventory to the lowest level while achieving operational objectives.

4. Movement consolidation

One of the most significant logistical costs is transportation. Transportation cost is directly related to the type of product, size for shipment and distance. To reduce transportation costs, it is desirable to achieve movement consolidation. As a general rule, the larger the overall shipment and the longer the distance it's transported, the lower the transportation cost per unit.

5. Quality improvement

Total Quality Management has become a major commitment throughout all facets of industry. If a product becomes defective, service promises are not kept. Little if any value is added by the logistics.

Logistics itself must perform to demanding quality standards. The quality challenge is magnified by:

- Logistical operations must be performed across vast geographic area
- Logistical operations must be performed out of a supervisors vision

E.g. reworking a customer's order as a result of incorrect shipment or in transit damage is far more costly than performing it right the first time.

6. 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 competency resulting from increasingly rigid quality standards, product expiration dating and responsibility for hazardous consequences. The most significant aspect of reverse logistical operations is the need for maximum control when a potential liability exists. Lifecycle support in modern terms means cradle to cradle support.

Principles of logistics

The fundamental principles guiding logistics management and operations are:

1. Economy of scale

It refers to the characteristics that transportation cost per unit of weight decreases when the size of shipment increases e.g. truck load shipment or full container load shipment. It is also generally true that larger capacity transportation vehicles such as rail or water are less expensive per unit of weight than smaller capacity vehicles.

Logistics economies of scale exist because fixed expenses associated with moving a load can be spread over the load weights.

Fixed expenses include:

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- administrative cost of taking orders
- invoicing
- equipment cost
- time for positioning vehicles for loading/ unloading

2. Economy of distance

It refers to the characteristics that transportation cost per unit of distance decreases as distance increases. Transportation economy of distance is also referred to as the *tapering principle* since rate or charges taper (reduce) with distance. The rationale of distance economies is similar to that of economies of scale.

Scope of logistics management

The scope of logistics management is very wide. It is not confined to manufacturing operations alone. It is pervasive in all types of organizations whether government or private, wholesalers or retailers.

In a manufacturing organization having an integrated structure, activities such as purchasing, production planning and control, warehousing and inventory control are centralized under materials management/logistics department and distribution of finished goods is done by marketing department.

Considerable amount of cross-functional co-ordination is required.

For example:

- Marketing department does the demand forecasting and incoming order processing.
- Production planning and control uses this information to plan work schedules and priorities.
- Again the information regarding production capacity is utilized by the marketing department to realize and process the delivery of incoming orders.
- The receipt of the material bought from the supplier and finished goods sold to the customers have to be informed to the accounts department for making payment to the supplier and billing the customers.

Thus logistics management includes all these cross functional coordination activities of material management, production planning and control and physical distribution management including raw material, semi-finished, finished goods warehousing, inventory and transportation. Binding to these entire cross functional and coordination activities requires an efficient information system.

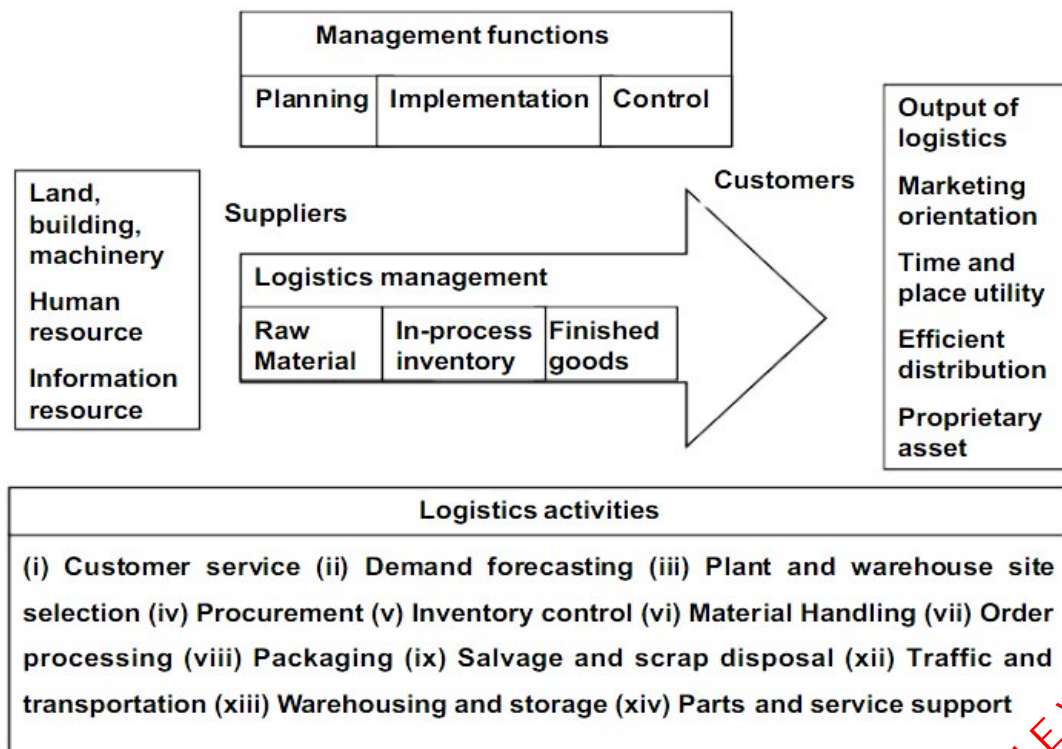
Logistics management adds value when inventory is correctly maintained to facilitate sales to meet the customer demand.

Costs of logistics

- Logistics expenditure accounts for 13% (2001) of the GNP.
- Expenditure of individual firms ranges from 5 to 35% of sales.

Therefore, logistics though vital to business is quite expensive.

Components of logistics management



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The diagram above illustrates the holistic activities included within logistics management. Inputs to the logistics process include natural, human, financial and information resources. Logistics practitioners plan, implement and control these inputs in various forms including raw materials (e.g. subassemblies, parts packaging materials, basic commodities); in- process inventory (i.e. products partially completed and not yet ready for sale); and finished goods (i.e. completed products ready for sale to intermediate or final customers). The outputs of the logistics system include competitive advantage for the organization resulting from a marketing orientation and operational efficiencies and effectiveness, time and place utility and efficient movement to the customer. Another output occurs when the logistics service mix is such that logistics becomes a proprietary asset of the organization. The outputs are made possible by the effective and efficient performance of the logistics activities shown at the bottom of the diagram.

Logistics functions

1. Customer service

Customer service acts as the binding and unifying force for all of the logistics management activities. Each component of the logistics system can affect whether a customer receives the right product at the right place, in the right condition, for the right cost at the right time.

Customer service involves successful implementation of the integrated logistics management concept in order to provide the necessary level of customer satisfaction at the lowest possible cost.

2. Order processing:

The starting point of physical distribution activities is the processing of customers' orders. In order to provide quicker customer service, the orders received from customers should be processed within the least possible time.

Order processing includes receiving the order, recording the order, filling the order, and assembling all such orders for transportation, etc. the company and the customers benefit when these steps are carried out quickly and accurately.

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The error committed at this stage at times can prove to be very costly. For example, if a wrong product or the same product with different specifications is supplied to the customer, it may lead to cancellation of the original order (apart from loss in the credibility of the firm).

Similarly, if the order is not executed within a reasonable time, it may lead serious consequences. High speed data processing techniques are now available which allow for rapid processing of the orders like EDI.

3. Warehousing:

Warehousing refers to the storing and assorting products in order to create time utility.

The basic purpose of the warehousing activity is to arrange placement of goods, provide storage facility to store them, consolidate them with other similar products, divide them into smaller quantities and build up assortment of products.

Generally, the larger the number of warehouses a firm has the lesser would be the time taken in serving customers at different locations, but the greater would be the cost of warehousing.

Thus, the firm has to strike a balance between the cost of warehousing and the level of customer service.

4. Inventory Control and Management:

Linked to warehousing decisions are the inventory decisions which hold the key to success of physical distribution especially where the inventory costs may be as high as 30-40 per cent (e.g., steel and automobiles).

Thus, the new concept of Just-in-Time-Inventory decision is increasingly becoming popular with a number of companies.

The decision regarding level of inventory involves estimate of demand for the product. A correct estimate of the demand helps to hold proper inventory level and control the inventory costs.

This is not only helps the firm in terms of the cost of inventory and supply to customers in time but also to maintain production at a consistent level.

The major factors determining the inventory levels are:

-The firm's policy regarding the customer service level, degree of accuracy of the sales forecasts,

-Responsiveness of the distribution system i.e., ability of the system to transmit inventory needs to the factory and get the products in the market.

-The cost inventory consists of holding cost (such as cost of warehousing, tied up capital and obsolescence) and replenishment cost (including the manufacturing cost).

5. Transportation:

Transportation seeks to move goods from points of production and sale to points of consumption in the quantities required at times needed and at a reasonable cost.

The transportation system adds time and place utilities to the goods handled and thus, increase their economic value.

To achieve these goals, transportation facilities must be adequate, regular, dependable and equitable in terms of costs and benefits of the facilities and service provided.

6. Information monitoring:

The physical distribution managers continuously need up-to-date information about inventory, transportation and warehousing.

For example, in respect on inventory, information about present stock position at each location, future commitment and replenishment capabilities are constantly required.

Similarly, before choosing a carrier, information about the availability of various modes of transport, their costs, services and suitability for a particular product is needed.

About warehousing, information with respect to space utilization, work schedules, etc., is required.

In order to receive all the information stated above, an efficient management information system would be of immense use in controlling costs, improving services and determining the overall effectiveness of distribution.

Of course, it is difficult to correctly assess the cost of physical distribution operations. But if correct information is available it can be analyzed systematically and a great deal of saving can be ensured.

7. Facilities:

Typical logistics facilities are manufacturing plants, warehouses, cross-dock operations and retail stores.

Whether facilities are owned, leased or rented, the location of plant and warehouse (storage facilities) is extremely important. The strategic placement of plants and warehouse can assist firms in improving customer service levels. Proper facility location can also allow volume related transportation rates in moving product from plant to warehouse, plant to plant, or warehouse to customers.

8. Forwarding and clearing

Freight forwarders typically purchase transportation capacity from carriers in bulk and sell it to their network of shipping clients, earning a fee based on the spread between the purchased transportation cost and the price sold to a shipping client. A freight forwarder is a classic example of a non-asset based third-party logistics provider which thus by definition does not own the logistics assets and instead contracts out to execute client's logistics needs.

The cost advantage of using a freight forwarder is particularly compelling for a shipper aiming to initiate or accelerate international activity.

9. Salvage, scrap disposal and return goods handling

Salvage and scrap disposal together with return goods handling is often referred to as reverse logistics. It is an element increasingly receiving management attention, particularly as the concern for recycling and reusable packaging grows, and considering the complexity and high cost of return goods handling.

With regard to salvage and scrap disposal, logistics is involved in the removal and disposal of waste materials left over from the production, distribution, or packaging processes. This could involve temporary storage followed by transportation to disposal, reuse, reprocessing, or recycling locations.

Returns may take place, for example, because of a problem with the performance of the product. Return goods handling is complex and expensive due to the movement of mostly small quantities of goods, from the customer to the company, the opposite movement to which its systems are best suited.

10. Parts and service support

Parts and service support, or after-sale service support, provides repairs, spares and parts to dealers, and ensures the collection of defective or malfunctioning products from customers, and responding quickly to demands for repairs.

The parts and service support activity is very important to industrial customers for whom downtime, as a result of production stoppages or delays caused by awaiting repairs, can be extremely costly. Customer relationship management (CRM) and the use of company or outsourced call centres can play an important role in parts and service support for the company's customers.

11. Packaging

Packaging provides advertising, marketing, protection and storage for goods. Packaging performs two basic functions, viz. marketing and logistics. In a marketing sense the package acts as a form of promotion or advertising, attracting customers to and informing them about the product. From a logistics perspective, packaging serves two purposes: it must protect the product from damage while it is being stored or transported, and can also make it easier to store and move products by reducing handling and therefore materials handling costs.

12. Procurement

Procurement, or purchasing and supply management, is the purchase of materials and services from outside organisations to support the company's operations from production to marketing, sales and logistics. Procurement includes activities such as supplier/provider selection, negotiation of price, terms and quantities, and quality assessment. As organisations form longer-term relationships with fewer key suppliers/providers, procurement continues to grow in its importance and contribution to the organisation.

The cost of purchased materials and supplies is a significant part of total costs of most organisations. The procurement function also provides the opportunity for leveraging the capabilities and competencies of suppliers through closer integration of the buyers' and suppliers' logistics processes. Procurement is therefore playing an increasingly critical role in creating and sustaining competitive advantage as part of an integrated logistics process. Leading organisations include these supply side issues in their strategic planning.

Manufacturing must also link into a strategy and plan for procurement. There needs to be unity within the business between marketing, distribution, production and procurement through the tasks of integrated logistics management.

Logistics strategy

Logistics strategy is the set of guiding principles, driving forces and ingrained attitudes that help to coordinate goals, plans and policies and which are enforced through conscious and subconscious behaviours within and between partners across a network.

Companies implement a logistics strategy because the supply chain constantly changes and that affects the organization. To adapt to the flexibility of the supply chain, companies should develop and implement a formal logistics strategy. This will allow a company to identify the impact of imminent changes and make organizational or functional changes to ensure service levels are not reduced.

Logistics strategy facilitates gaining a competitive edge to support emerging technologies.

As a service function logistics involves the four basic features:

- **Reliability:** Influences the degree of trust, which a supplier can have, in a company's capability for honoring commitments. The supplier has to be perceived as reliable and for this the supplier needs to exhibit certain service characteristics. A high degree of reliability in terms of inventory and material delivery is expected from the supplier end. Thus a key objective of the logistical system needs to be reliability in meeting the needs of the customer, according to the resource planning.
- **Responsiveness:** The speed with which customer demands are being responded. Responsiveness is expected at all levels of the supply chain. Response to pre-sales enquiry by using latest available information and communication technologies is an important strategy. Supplying material as per customer needs, and frequent deliveries in fewer lot sizes are important. Deliveries can also be made at the various assembly centers, which are in proximity to the markets. A firm will gain a winning edge in competitive markets through a responsive strategy.