RNS Institute of Technology

Department of MBA & Research Centre

Dr. Vishnuvardhan Road, Channasandra, Bengaluru

LOGISTICS & SUPPLY CHAIN MANAGEMENT
22MBA31

RNSIT-MBA
Bengaluru

LOGISTICS & SUPPLY CHAIN MANAGMENT			
Course Code	22MBA31	CIE Marks	50
Teaching Hours/Week (L:T:P)	4:0:0	SEE Marks	50
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	03

Course Objectives

1. To understand the basic concepts of logistics and supply chain management
2. To provide insights for establishing efficient, effective and sustainable supply chains.
3. To comprehend the role of Information Technology in warehousing, transportation and Inventory management in SCM
4. To gain knowledge about international logistics and environment

Module 1 **7 Hours**

Introduction to Logistics Management: Meaning of Logistics, Definition of Logistics, Objectives of Logistics, Types of Logistics, Need for Logistics Management, Evolution of logistics toward Supply chain Management, Logistics Industry in India. Logistical Activities, Logistics Costs, Expected cost of stock outs. Logistical Informational Requirements.

Module 2 **9 Hours**

Introduction to Supply chain Concepts, significance and key challenges. Scope of SCM-historical perspective, essential features, Drivers of SCM, decision phases–process view, supply chain frame work, key issues in SCM and benefits. Managing uncertainty in Supply Chain, (Bullwhip Effect), Impact of uncertainties, forecasting in Supply Chain, Innovations in Supply Chain. Sourcing Decisions in Global SCM, Key issues in Global sourcing, Outsourcing. Network design in the Supply Chain

Module 3 **9 Hours**

Strategic Logistic plan, Operating objectives of logistics planning, Flow of logistics planning, Developing Logistic strategy, Logistics System Design and Administration, logistic environment assessment, Pricing in logistics, Warehousing– scope, primary functions. Efficient Warehouse Management System, Types of Warehouses.

Module 4 **7 Hours**

Introduction to Inventory Concepts: various costs associated with inventory, EOQ, buffer stock, lead time reduction, reorder point / re-order level fixation, ABC analysis, SDE/VED Analysis. Goals, need, impact of inventory management on business performance. Types of Inventory, Alternative approach for classification of inventories, components of inventory decisions, inventory cost management, business response to stock out, replenishment of inventory, material requirements planning.

Module 5 **9 Hours**

Introduction to Distribution Management: Designing the distribution network, role of distribution, factors influencing distribution, design options, distribution networks in practice. Hub & Spoke v/s Distributed Warehouses. Mode of transportation and criteria of decision. Transportation Infrastructure .Factors impacting road transport cost, Packaging Issues in Transportation, role of containerization, Hazards in transportation, State of Ocean Transport, global alliances.

Module 6 **9 Hours**

Introduction IT in SCM: Role of computer/ IT in supply chain management, Benchmarking concept, features and implementation. Vendor Managed Inventory,

CPFRP, and Customer Service Logistics and Environment, Methods and tools facilitating International Logistics, challenges, Integrated Supply Chain and Logistics.

Course outcomes:

At the end of the course the student will be able to:

1. Demonstrate knowledge of the functions of logistics and supply chain management.
2. Relate concepts and activities of the supply chain to actual organizations
3. Analyse the role of technology in logistics and supply chain management
4. Evaluate cases for effective supply chain management and its implementation

Practical Components:

- Students are expected to choose any four Indian Organizations and study their supply chain in terms of drivers of the Supply chain and submit a report.
- Students should visit different logistics companies and understand the services provided by them and submit a report.
- Students should identify any product/service and study the type of distribution system used and understand the reason for using that particular type and present it in the class.
- Students should identify the various types of IT applications employed by Indian Organizations in their Supply chain.

Question Paper Pattern:

The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.

- The question paper will have 8 full questions carrying equal marks.
- Each full question is for 20 marks.
- Each full question will have sub question covering all the topics under a Module.
- The students will have to answer five full questions; selecting four full question from question number one to seven and question number eight is compulsory.
- 100 percent theory in the SEE.

Recommended Text Books

SL. No.	Title of the Book	Name of the Authors	Publisher Name	Edition and Year
1	A Logistic approach to Supply Chain Management	Coyle, Bardi, Longley	Cengage Learning	Latest Edition
2	Supply Chain Management- Strategy, Planning and Operation	Sunil Chopra, Peter Meindl, D.V. Kalr	Pearson	Latest Edition
3	Supply chain Logistics Management	Donald J Bowersox	Mc Graw Hill	4/e

MODULE – 1
INTRODUCTION TO LOGISTICS MANAGEMENT

Structure

- Meaning of Logistics
- Definition of Logistics
- Objectives of Logistics
- Types of Logistics
- Need for Logistics Management
- Evolution of Logistics towards Supply Chain Management
- Logistics Industry in India
- Logistical Activities
- Logistics Costs
- Expected Cost of Stock Outs
- Logistical Informational Requirements

MEANING OF LOGISTICS

Logistics management is the part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption to meet customer requirements.

Logistics is the designing and managing of a system in order to control the flow of material throughout a corporation. This is a very important part of an international company because of geographical barriers. Logistics of an international company includes movement of raw materials, coordinating flows into and out of different countries, choices of transportation, cost of the transportation, packaging the product for shipment, storing the product, and managing the entire process.

Logistics is involved at various stages of a supply chain; from supplier to plants, from plants to distribution centres, from distributions centres to stores, from stores to customers, or any of these combinations.

DEFINITION OF LOGISTICS

According to Council of Logistics Management: "*Logistics is 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 the customer requirement*".

"*Logistics management is a part of supply chain management that plans, implements, and controls the efficient flow and storage of goods, services, and related information in order to meet the customers' requirements*".

"*Logistics is defined as a business planning framework for the management of material, service, information and capital flows. It includes an increasingly complex information, communication and control systems required in today's business environment*".

"*Logistics is the process of planning, implementing, and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods and related information from the point of origin to the point of consumption for the purpose of meeting customer requirements*".

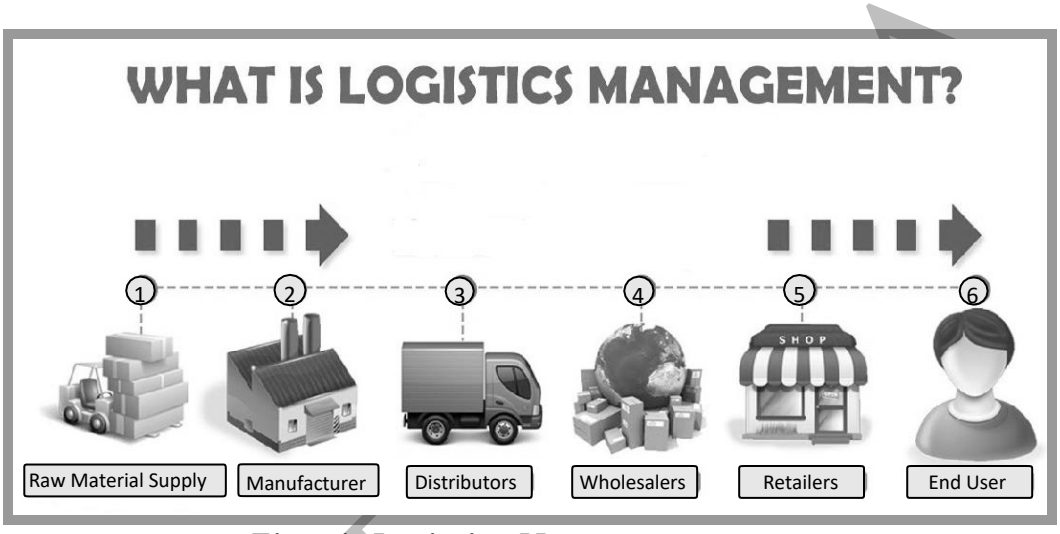

Fig – 1: Logistics Management

OBJECTIVES OF LOGISTICS

The primary objective of logistics management is to maintain a smooth flow of materials in a supply chain effectively so as to fulfil the customers' desired level of satisfaction. Logistics management is also involved with providing products and services as and when they are required. The objective of logistics management is to maintain the goals of the organization by keeping the cost at minimum as possible.

The objectives of logistics management are as follows:

- To ensure all the requirements of the customers are met on time
- To coordinate with third-party logistics (3PLs)
- To ensure times dispatch of the products
- To devise policies and procedures for successful implementation of logistics system
- To synchronize business goals with logistics system
- To create and maintain customer support
- To have stable integration among the vendors, service providers and transport carriers
- To provide a competitive edge to an organization through increased sales and better customer service
- To ensure cost reduction and maximize return from products/services

TYPES OF LOGISTICS

The main types of logistics may be listed as follows:

Procurement Logistics: It refers to the type of logistics that includes activities such as planning requirements, conducting market research, evaluating purchase decisions, managing suppliers and placing orders. The objective of procurement logistics is to maximise efficiency and minimise costs. It helps retail enterprises in sourcing merchandises from suppliers and transporting the merchandises to the retail stores. The logistics in Walmart, which procures merchandise from different suppliers from a number of geographical locations, is an example of procurement logistics.

Production Logistics: It refers to the type of logistics that includes production of goods. It acts as a bridge connecting procurement to distribution logistics. The objective of production logistics is to utilise the available production capacities for producing the goods required in distribution logistics. The process involves planning the layout and production and controlling it. Production logistics helps goods manufacturers to efficiently utilise their production capacity. The logistics system within a production facility that consists of tools such as conveyor belts and robots for moving materials, is an example of production logistics.

Distribution Logistics: It refers to the type of logistics that delivers the finished products to the customer. The process involves order processing, warehousing and transportation. Distribution logistics is important because quantities of production vary with time and demand. It involves sending the produced merchandise to the retail stores through distributors and wholesalers. The logistics system of Pepsi that delivers the foods and beverages of the company to the retailers is an example of distribution logistics.

After-Sales Logistics: It deals with reverse delivery of damaged products from customers to the retailers, delivery of spare parts to the customers and delivery of products after repair. At times, retailers take back any damaged merchandise sold to the customers or send the defective merchandise to the service centre through after-sales logistics.

Disposal Logistics: It removes and recycles the waste produced during the operation of a business. The objective of disposal logistics is to reduce the cost of logistics and enhance the service levels. The logistics system that helps in collecting, carrying and disposing waste materials of a manufacturing plant is an example of disposal logistics.

Reverse Logistics: It refers to the type of logistics that helps in reusing products and materials. It also entails the management and sale of excess products as along with the products returned by the customers. For example, companies such as

Pepsi and Coca Cola collect empty bottles of their products from retailers for refiling.

Global Logistics: This type of logistics governs the logistic flow of products across countries. For example, global logistics helps online retailers, such as Amazon. com, in sourcing and delivering merchandises to different locations throughout the world.

Domestic Logistics: It deals primarily with the flow of goods within one country, but may extend across multiple states. For example, Indian retailer, such as Big Bazaar, sources most of its merchandise from domestic suppliers.

NEED FOR LOGISTICS MANAGEMENT

The logistics involve moving goods from the point of origin to the point of consumption to cater to customer needs. Logistics management is a paramount reason for the success of any organisation and bears an impact on the profitability.

Logistics management is important for satisfying customer needs and providing top-notch service. It is crucial for every organisation to have a strong knowledge of logistics systems for yielding high profits and be able to deliver customers the most positive experience of the product.

The need for logistics management for an organisation is as follows:
Quality Products: Robust logistics management enables organisations to deliver quality products and services to their customers. Right application of logistics management enables organisations to strive for quality and offer customers improved service in future. When an organisation provides better quality products and services, customers are naturally be inclined to purchase products of that particular organisation. Quality products and services even enable organisations to carve a niche for themselves in the industry.

Increases Transparency: Logistics management enables organisations to get an insight into every stage of the product. It provides a scope on the aspect on which the product can improve. Logistics management even provides both historical and real-time data pertaining to the product. The customers' response towards the product can be gauged and if modification to the product is required that may be done within the stipulated time frame. Logistics management also keeps a track of the products while they are en route to delivery from the point of origin. By overlooking the products during their transit acts of thefts, pilferage, spoilage, etc., can be avoided.

Increases Revenue: By the use of logistics management, an organisation can identify the weak links either during production phase or in the finished product. An organisation persistently strives to make its product stand out from other

products. Logistics management helps an organisation to find out the problem plaguing the product. By making necessary improvements to the product or the production process, the product eventually turns out to be a better one. The product which is complete in all regards will definitely be preferred by the customers. In return, the sale of the product will also spurt and higher revenues will flow in.

Enhances Goodwill: When an organisation provides a high-quality product, the customers' first preference will be that product. As the product of that organisation will be preferred over other the brand, the value of the product will also increase. Thus, the goodwill of the organisation will increase in tandem with the sale of the product. The product will create a brand value that will provide the organisation an advantage over competitors. At times, even an ordinary product has a higher demand as the brand it has been associated with.

Customer Satisfaction: The key to higher revenue and enhanced goodwill is to ensure customer satisfaction. When customers are satisfied, they will be inclined to buy the product of that particular organisation. If the organisation is able to maintain the quality of the product, then it can retain the customer for a longer time period. Moreover, a satisfied customer is an asset to the organisation. When the satisfaction level of the customer is high, the customer will further create a word of mouth for the organisation and would promote the product of the organisation.

On-time Delivery: Logistics management deals with making the product reach the target market so as to meet the customers' demand. Unless the product is not availed by the customer and the advantages of product are not reaped by the customer, there is no use of the product. No matter of how high quality a product is if it is not available at the right time and at the right place, the product is of little value. Logistics management undertakes the responsibility of transporting the product from the point of origin to the point of consumption so that the product can be availed by the customer. Timely delivery of product is an important factor while considering the planning for distribution and availability of product which is taken care by logistics management.

Communication: Logistics management also deals with disseminating information not only about demand and supply, but also volumes, inventory, prices and movements. Therefore, logistics management has become more involved in sharing requisite information with the organisation system so that the product reaches its destination in its stipulated time. Logistics management also forms as a link between various departments that work in tandem to create the product. Without proper communication channel, the departments will lack harmony in activities and the organisation will be in a state of haywire.

EVOLUTION OF LOGISTICS TOWARDS SUPPLY CHAIN MANAGEMENT

1810 – "Logistics" word used for the first time A famous publication, 'The Scots Magazine and Edinburgh Literary for January 1810' included an article saying that Dr. Wilheim Muller was going to write a book on the elements of science of war which comprised of the "logistics" of soldier movements, this was the first time the word was used in the English language. Around 100 years after this incident, 'The Independent' newspaper had an article describing "Supply Chain", which was in relation to the war activities.

1913 – The invention of the 'Assembly line' The famous car manufacturer Ford installed their first moving assembly line which enabled them to produce the vehicles at a faster rate, thereby ensuring economies of scale.

1940 – Pallets and lift mechanization In the period of 1940s to 1950s, the main aim of the logistics field was to find out methods to increase the efficiency of keeping stock in the warehouse, the use of racking and finally the best possible design for a warehouse. The concept of using pallets gained a lot of publicity during this time.

1950 - The birth of 'Transport Management' The use of intermodal containers along with ships, trains and trucks to send items wherever they needed to be saw the birth of 'Transport Management' and made the way for the globalization of supply Chain Management.

1952 - Barcode was patented.

1960 - The discovery was made that computer systems had the capability to transfer the documents from one computer to another.

1961- IBM develops the earliest version of Material Requirement Planning (MRP)

1971 - The concept of Reverse logistics started in which the consumer played the role of a seller, who distributed his waste materials where there is a demand.

1985 - Fed Ex invented a new computerized tracking system to track the packages in real time.

1988 - The term "Lean Manufacturing" was established. 2003-Walmart announces mandatory RFID tag norms

2010 - Emergence of smart factory In a smart factory, there is extensive use of sensors, Internet of things, big data, machine learning and artificial intelligence which combine to help the manufacturers increase the performance and supply chains are able to track parts and do maintenance when it needs to be done.

LOGISTICS INDUSTRY IN INDIA

Logistics in India is an integral part of any economy as it helps in the effective movement of goods and services from one place to another. In India, the logistics sector has played a crucial role in the growth and development of the country's economy. The logistics sector in India has grown rapidly in the last decade, and it is estimated to be worth $215 billion by 2020.

The contribution of the logistics sector to India's GDP has been significant in recent years. In 2019, the logistics sector contributed 13.5% to India's GDP, which is expected to grow to 15% by 2025.

The logistics sector is also a major contributor to foreign trade as it enables the smooth movement of goods across borders. India's logistics sector is responsible for handling around 95% of India's total trade by volume and 70% by value.

The logistics sector is also a significant employment generator in India. It employs around 22 million people, which is expected to grow to 40 million by 2030. The logistics sector is not only creating direct job opportunities but also providing indirect employment opportunities, particularly in the transport and warehousing sectors.

LOGISTICAL ACTIVITIES

The logistics activities are listed below:

1. Order Processing

The logistics activities begin with order processing, which may be handled by a company's commercial department. The commercial department is in charge of ensuring that payment and delivery terms are met before processing the order within the organization.

Essentially, the commercial team approves the customer's order and sends it to the warehouse. If the consumer has paid, a commercial team enters the information into the system and informs the warehouse that the customer has placed a 10-unit order, and the warehouse must deliver 10 pieces.

In many organizations, the commercial entry deducts the warehouse inventory as well. So, if the commercial team approves a buy order for ten units, the available inventory will be reduced by ten pieces to avoid double ordering. This is a critical phase in logistics because any errors here (incorrect quantity, delivery address, etc.) can disrupt the entire logistics process.

2. Materials Handling

The movement of products within a warehouse is known as material handling. It entails handling the goods in a way that allows the warehouse to handle orders

quickly. Although it may appear to be a mundane operation, it is a vital one that must be done regularly in any warehouse.

It is relatively simple to shift one thing from one location to another in a small shop with 100 products. However, if this little shop does not know where the products are stored, the shopkeeper will have to look for the order and the product every time he receives it. He'll have to look for it in all of his 100 products, then move the others out of the way so that he can deliver the desired item to the customer.

Multiply this scenario by a factor of 100. Large corporations' warehouses can be half a mile or more in length. Consider how much material is kept in the warehouse. If the warehouse manager doesn't know where the stuff is kept or how he'll get it to the warehouse's dispatch center, he'll be in huge trouble, and his productivity and efficiency will suffer. As a result, materials handling is a crucial logistical function.

In logistics management, effectively arranging material within the warehouse to enable smooth transportation and distribution is a crucial task. As the warehouse expands in size, this becomes increasingly vital. For material handling, Amazon, for example, employs a mix of robotics, artificial intelligence, and humans. Amazon is projected to dispatch 16 lakh packages per day. This translates to 70,000 packets each hour. Consider the chaos that would ensue if Amazon did not use the greatest material handling equipment and procedures.

3. Warehousing

Take, for example, LG or Samsung, both of which are consumer durables corporations with operations in various countries. Their manufacture may be concentrated in one location, but their distribution is global. As a result, warehousing plays a significant role and is a key Logistics activity.

The main thing to remember about storage is that it should be close to the dealer or distributor's location and allow for easy delivery of goods. If a branded product takes a week to arrive but is unbranded, it may not sell as well.

As a result, it makes sense for the branded company to have a nearby warehouse so that the goods can be delivered quickly. When a brand establishes itself in a new region, the first thing it does is lease a new warehouse to be closer to the territory and end clients.

The positioning of warehouses also helps to relieve stress on the mother warehouse (large warehouses which stock most of the products). These warehouses can take the load of deliveries and become interdependent to ensure that goods are delivered to consumers whether demand is high or production is low.

4. Inventory Control

If a company has 100 units of a product in stock but only needs 10 units, the company has wasted money by investing in 90 units. This is money that can be utilized as working capital, and it is money that banks charge interest on.

Another company, on the other hand, had a demand of 500 units but only created 200, assuming that demand would be lower. They've now lost the orders, which is a missed opportunity. The ideal company will have produced 100 units, anticipates a need of 50 units, and is prepared to meet that demand even if demand doubles. However, they are constantly monitoring demand and are prepared to meet it without having to spend heavily on manufacturing.

With the preceding example, we can see how important inventory control is in logistics. Inventory management has become one of the most significant roles of logistics, particularly with the introduction of various production strategies such as Just-in-Time manufacturing, lean manufacturing, and other manufacturing procedures that have reduced the cost of inventory management.

5. Transportation

Now we'll look at one of the most important logistical activities, which is also one of the most resource-intensive and revenue-intensive segments of the industry. Transportation is expensive for a simple reason: fuel. Fuel is expensive, whether it's petrol, diesel, or gas, and it's usually used in transportation. This is why corporations spend tens of thousands of dollars to keep transportation costs under control, as it is one of the most variable expenses for any business.

The physical conveyance of goods from the manufacturer to the distributor or dealer, as well as from the dealer to the ultimate client, is referred to as transportation. In most cases, firms are only involved until the distributor or dealer receives the product. The distributor is then in charge of delivering the product to the final customer. However, transportation is a cost to the dealer as well, reducing his profit – forcing the corporation to give the dealer more profits to offset his expenditures.

The lower a company's transportation costs are, the better their storage and inventory management are. The cost-effectiveness of transportation is heavily influenced by economies of scale. FMCG companies used the "splitting the bulk" strategy to cut shipping costs and improve overall logistical functions.

6. Packaging

There are two types of packaging: one that a customer sees on the shelf of a supermarket or hypermarket, where the package appears appealing and prompts the customer to purchase the package; and the other that a customer sees on the shelf of a supermarket or hypermarket, where the package appears appealing and prompts the customer to purchase the package. The other is transport packing, in

which products are packed in bulk to reduce breakage or spillage while yet allowing them to safely carry large volumes of product from one location to another.

The logistics team is responsible for packaging the product since otherwise, the product would arrive damaged to the end client, resulting in a significant expense to the organization. This is why, especially in export markets, a significant amount of money is spent on product packaging. The packaging may only cost 1-2 percent of the product's worth, but if it fails during shipping, it will result in a 100 percent cost due to product damage and loss.

All of the functions of logistics and logistics activities that must be handled in any significant corporation are listed above. Logistics are viewed by management in two ways.

LOGISTICS COSTS

The basic principle of logistics costing is to identify the different costs that result from servicing customers with particular product mixes.

The main costs which are involved in logistics function are:

1. Customer Service Level Costs

The cost associated with alternative customer service levels is the cost of lost sales (not only the margin lost by not meeting current sales demand, but the present value of all future contributions to profit forfeited when a customer is lost due to poor availability, long lead times, or other service failures).

By comparing total logistics system costs, management can make knowledgeable judgement about the likelihood of recovering, through increased sales, the increase in total system costs brought about by an increase in customer service levels. Management can also reduce spending in some other to component of the marketing mix promotion, for example in order to maintain profits with a similar sales volume. Likewise, with decrease in customer service levels, management can improve profitability or increase expenditures for other components of the marketing mix in an effort to maintain or improve market position. At the end, the goal is to determine the least total cost method of logistics while keeping customer service objectives in mind.

2. Transportation Costs

Costs associate with the transportation function can be identified in total and be segments (i.e., inbound, outbound, by vendor, by customer, by mode, by carrier, by product, or by channel). This detail is necessary to determine the incremental costs associated with changes in the logistics system. If transportation costs are not currently available in any other form, management can determine them at a relatively low cost by sampling product flows and auditing freight bills (for common carriers) or corporate accounting records (for private fleets).

3. Warehousing Costs

Warehouse costs are all the expenses that can be eliminated or that must be increased as a result of a change in the number of warehousing facilities. Warehousing costs should be separated into two distinct categories:

- **Throughput Costs:** these costs are associated with selling product in a given market by moving it into and out of a warehouse in that market, and the fixed costs associated with it. Example is charges that public warehouses assess for moving product into and out other their facilities, and the costs of leased and owned facilities for the movement of the goods.
- **Storage Costs:** Warehousing costs related to inventory storage should be included in inventory carrying costs. These warehousing costs change with the level of inventory held in a specific warehouse and tend to be negligible in a company – owned or leased.

4. Order Processing and Information Costs

Order processing and information costs include the cost of order transmittal, order entry, order processing, related handling costs, and associated internal and external communication costs. When establishing these costs management should remember to include in the analysis only those costs that will change with decision being made.

5. Lot Quantity Costs

Lot quantify costs are those production related or purchasing/acquisition costs that will change as a result of a change in the logistics system. Generally, it consists of production preparation costs, capacity lost due to changeover, materials handling, scheduling and expediting. The lot quantity costs associated with purchasing are the costs of buying in various quantities.

6. Inventory Carrying Costs

Inventory carrying costs should include only those costs that vary with the level of inventory stored and that can be categorized into four costs:

i. Capital costs
ii. Inventory service costs
iii. Storage space costs
iv. Inventory risk costs.

EXPECTED COST OF STOCK OUTPUTS

One of the worst things that can happen to a business is to have a stockout. This means that with no inventory of a certain item, production has to be stopped or a customer order will not be fulfilled. For a warehouse or inventory manager it is a scenario that they most dread and with it comes a significant cost to the company. An optimized supply chain will help you supply your customers with what they want, when they want it - and prevent stockout situations.

Effects of a Stock Out

The basic scenario for a stockout is when an item that is to be used for a customer's order or for a production order is not in stock when required. If an item is not available for manufacturing, then it may be possible to change the production schedule, although there is a significant cost in this due to the changes in a machine, teardown costs, resource changes, plus the time involved in carrying out all the changes. If an item is not available for a customer order, then four possible effects can occur:

i. ***Customer agrees to wait for the item*** - If the item is vital to the customer, then they may be prepared to wait. Despite the goodwill of the customer, there may be significant damage to the customer's satisfaction level. •

ii. ***Customer backorders the item*** - Not as ideal as when the customer agrees to wait for the order to be complete, but the order is still being fulfilled. Nevertheless, the customer's satisfaction level is still significantly reduced. •

iii. ***Customer cancels the order*** - If the customer is able to obtain the item from another vendor or does not need the item immediately, then the customer can cancel the order. It is still possible that the customer will order from you in the future, but their customer satisfaction level has been damaged. •

iv. ***Customer cancels the order and is no longer a customer*** - This is the worst-case scenario of a stockout. However, if a customer is unhappy with the communication or information supplied by the vendor then they may be willing to cut all ties and work with another vendor.

Cost of Back Ordering:

If a customer is unwilling to wait for their order to be fulfilled, then they could backorder the item. This will mean that the vendor will incur some costs due to the stockout.

There are increased order processing costs as the customer service staff amends the order to create a new suitable delivery date. In addition, there may be additional shipping charges if the order was part of a larger delivery, then the backorder will require special transportation.

As a means of stimulating some much-needed customer satisfaction, the vendor can also agree to expedite shipping at their expense or offer the customer free shipping or a discount on the order.

Cost of Cancelled Orders:

If a customer decides to cancel their order due to the stockout then they have probably found an alternate vendor for the item. Many companies will ensure that they have more than one source of supply for their key items; therefore, it may be easier to order from the alternate than to wait for the order to be completed.

For the vendor, a cancelled order can be costly, not only in lost profit but in the purchase of raw materials or parts that were brought in or on order for the

customer's order. Obsolete, slowmoving or unusable inventory costs money - not just due to its purchase price, but also in inventory carrying costs.

There is also the cost involved in trying to minimize customer dissatisfaction, either by offering incentives for them to order from the vendor again or in marketing to reduce any negative posts that may have been made on social media.

Cost of Losing a Customer:

Losing a customer to a stockout is the worst outcome and comes with it the highest cost to the vendor. By a customer no longer placing any order with a vendor, every order is a cost that has to be considered. If a customer was a major purchaser of goods, then the cost could be severe and put the vendor in financial difficulty. There is also the cost of trying to find new customers to replace the order that would have been placed.

LOGISTICAL INFORMATIONAL REQUIREMENTS

There are three types of information systems that serve different organisational levels. These are operational level systems, management-level systems, and strategic level systems. Converting logistics data to information, representing it in a manner useful for decision making and interfacing the information with decision-assisting methods are at the core of LIS.

There are certain requirements which are:

i. **Organisation decisions:** It relates to the decisions to be made at each level of organisation. While designing information system, it must be ensured that the concerned person is entitled to get required information needed for decision making.

ii. **System requirement:** After arriving at the decision on collecting information, next requirement is identification of source of information, the volume and quality of information. A suitable channel of communication will have to be designed to satisfy various requirements.

iii. **Control requirements:** Based on guidelines given by the management, Logistics Information System should be able to aid in decision making, minimising delays, and increasing efficiency. Control is required to ensure that no errors are made.

iv. **System input and output data:** To satisfy the demand of a customer, several activities are undertaken by organisation which need proper coordination. Action reports are made for the purpose of undertaking activities based on generated information.

Key Components of Logistics Information System

LIS is designed to manage the flow of materials and information within and between organisations and their business environment. Globally information technology is a critical enabler of the logistics supply chain networks that businesses use to acquire, produce, and deliver goods and services. The key components include:

a) Logistics Information Portal
b) Logistics Computing and Simulation
c) Decision Support System
d) Database
e) E-Logistics and E-Commerce
f) Software applications relating to Customer Relations Management (CRM), Enterprise Resource Planning (ERP), Radio Frequency Identification (RFID) Tags, Transport Management System (TMS), and Warehouse Management System (WMS)

Questions (3 Marks):

1. Define Logistics.
2. List out the objectives of Logistics.
3. List out the types of Logistics.
4. Define Competitive advantage.
5. Explain the need for Logistics.
6. List out the different Logistical activities.
7. Mention the main costs involved in logistics function.

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