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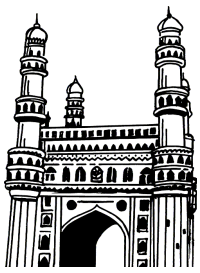

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IV Semester

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SUPPLY CHAIN MANAGEMENT

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SUPPLY CHAIN MANAGEMENT

CONTENTS

STUDY MANUAL

SOLVED PREVIOUS QUESTION PAPERS

SOLVED MODEL PAPER

SYLLABUS

UNIT - I

Introduction to Supply Chain Management

Introduction to Supply Chain Management-Concept, Objectives and function of SCM, conceptual framework of SCM, supply chain strategy- Global Supply Chain Management, Value chain and value delivery systems for SCM, Bull-whip effect.

UNIT - II

Supply Chain Structure and Inventory in SC

Logistics Management, Intergrated logistics Management, Inbound and Outbound Logistics, Logistics Planning and strategy, Reverse Logistics. Inventory management and its role in customer service.

UNIT - III

Role of Transportation in Supply Chain

Transportation in Supply Chain, Transportation formats, and factors influencing their choice, Multi Modal transport, Warehousing – Types of warehouses, Warehousing operations, Warehouse Management Systems. Third Party warehousing, Role and Importance of handling systems.

UNIT - IV

Information Technology in SCM

Information and Communication Technology in SCM, Role of IT in SCM. Current IT trends in SCM, RFID, Bar coding . Retail SCM – problems and prospects, Role of Packaging.

UNIT - V

Key Operation Aspects in Supply Chain

Supply chain Network Design, Distribution network in Supply Chains, Channel design, Factors influence design, role and importance of Distributors in SCM, Role of Human Resources in SCM. Issues in Workforce Management and Relationship Management with suppliers, Customers and employees, linkage between HRM and SCM.

Contents

Frequently Asked & Important Questions

UNIT - I

1. Discuss the objectives and functions of supply chain management.

Ans : **(May -19, June-17)**

Refer Unit-I, Q.No. 5, 7

---

2. Explain the conceptual frame work of SCM.

Ans : **(May -18, June-16)**

Refer Unit-I, Q.No. 10

---

3. Explain the significance of global supply chain management.

Ans : **(Imp.)**

Refer Unit-I, Q.No. 16

---

4. Explain the concept of value chain and value delivery system for SCM.

Ans : **(Imp.)**

Refer Unit-I, Q.No. 20

---

5. Explain the different Marketing Stra-tegies in global supply chain management.

Ans : **(May-19)**

Refer Unit-I, Q.No. 17

UNIT - II

1. What is integrated logistics management? How to develop integrated logistics strategy?

Ans : **(June-18)**

Refer Unit-II, Q.No. 10

---

2. What is integrated logistics strategy? Discuss the process involved in developing integrated logistics strategy.

Ans : **(Imp.)**

Refer Unit-II, Q.No. 15

3. Discuss the role of inventory management in effective supply chain management.

Ans : **(Imp.)**

Refer Unit-II, Q.No. 23

4. Discuss about gaining competitive advantage through logistics

Ans : **(Imp.)**

Refer Unit-II, Q.No. 8

5. Explain briefly about Integrated Logistics Management.Explain the advantages of integrated logistics Management.

Ans : **(June-19, June-18, Imp.)**

Refer Unit-II, Q.No. 10,11

6. Explain the role of Inventory Manage- ment in Customer Service.

Ans : **(Imp.)**

Refer Unit-II, Q.No. 26

UNIT - III

1. List and discuss the various modes of transport in SCM.

Ans : **(Oct.-20, Imp.)**

Refer Unit-III, Q.No. 3

2. Explain about the factors affecting the transportation performance in SCM.

Ans : **(Imp.)**

Refer Unit-III, Q.No. 7

3. Discuss in detail about types of warehouses and warehousing operations.

Ans : **(Oct.-20, June-19, Imp.)**

Refer Unit-III, Q.No. 11, 12

4. Explain the role of handling systems in SCM.

Ans : **(June-19)**

Refer Unit-III, Q.No. 18

5. Describe the role of transportation in supply chain management ?

Ans : **(June-18)**

Refer Unit-III, Q.No. 1

UNIT - IV

1. Critically examine the role of IT in supply chain management.

Ans : **(Oct-20, June-18, Imp.)**

Refer Unit-IV, Q.No. 4

2. Discuss the role of ICT in development of SCM in India.

Ans : **(June-19, June-18, Imp.)**

Refer Unit-IV, Q.No. 1

3. Explain about Retail Supply Chain Management

Ans : **(Imp.)**

Refer Unit-IV, Q.No. 10

4. What is the role of packing in SCM

Ans : **(June-19, Imp.)**

Refer Unit-IV, Q.No. 16

5. What are the problems / and Prospects issues of retail SCM ?

Ans : **(June-18)**

Refer Unit-IV, Q.No. 15

UNIT - V

1. What is channel management? What are the factors influencing channel design?

Ans : **(Oct.-20)**

Refer Unit-V, Q.No. 8

2. Explain the role and importance of distributors in SCM.

Ans : **(Oct.-20, June-18, Imp.)**

Refer Unit-V, Q.No. 9, 10

3. "Human resources play a great role in SCM". Discuss with reference to retailing.

Ans : **(Oct.-20, Imp.)**

Refer Unit-V, Q.No. 11

4. Explain the needs and importance of relationship management in SCM.

Ans : **(Imp.)**

Refer Unit-V, Q.No. 14, 15

5. Explain the linkage between HRM and SCM.

Ans : **(June-19)**

Refer Unit-V, Q.No. 12

6. What is work force management? Explain the various issues in work force management.

Ans : **(June-18)**

Refer Unit-V, Q.No. 13

UNIT I

Introduction to Supply Chain Management: Introduction to Supply Chain Management-Concept, Objectives and function of SCM, conceptual framework of SCM, supply chain strategy- Global Supply Chain Management, Value chain and value delivery systems for SCM, Bull-whip effect.

1.1 Introduction to Supply Chain Management

Q1. Define Supply chain management.

Ans : **(Oct.-20)**

Introduction

Supply chain management (SCM) is the active management of supply chain activities to maximize customer value and achieve a sustainable competitive advantage. It represents a conscious effort by the supply chain firms to develop and run supply chains in the most effective & efficient ways possible. Supply chain activities cover everything from product development, sourcing, production, and logistics, as well as the information systems needed to coordinate these activities.

A supply chain is the process of moving goods from the customer order through the raw materials stage, supply, production and distribution of products to the customer. All organizations have supply chains of varying degrees, depending upon the size of the organization and the type of product manufactured.

The Institute for Supply Chain Management (ISM), founded in 1915 in USA, serves about 50,000 member professionals. Its mission is "to educate, develop and advance the purchasing and supply management profession."

Meaning of Supply Chain Management (SCM)

Supply Chain Management is the systematic, strategic co-ordination of the traditional business functions and the tactics across these business functions within a particular company and across business within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.

Supply chain management is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers.

SCM deals with design, planning, execution, control, and monitoring of supply chain activities with the objective of creating the value

Definitions of Supply Chain Management

i) **According to Jones and Riley,** "Supply chain management deals with the total flow of material from supplier through end user".

ii) **According to Cooper and Ellram,** "Supply chain management is an integrative philosophy to manage the total flow of distribution channel front the supplier to the ultimate user".

iii) **According to Marty Weil,** "Supply chain management is the ability to get closer to the customer".

iv) **According to Professor Douglas M. Lambert,** "Supply chain management as the integration of business process from the end user through original suppliers who provide products, services, and information that adds value for the customer".

v) **According to Handfield and Nichols,** "Supply chain management is the integration and management of supply chain organizations and activities through co-operative organizational relationships,

effective business processes, and high levels of information sharing to create high-performing value systems that provide member organizations a sustainable competitive advantage".

According to **Christopher,** "SCM is the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole".

Supply chain management is a systems approach to managing the entire flow of information, materials, and services from raw materials suppliers through factories and warehouses to the end customer. SCM is different from supply management, which emphasizes only the buyer-supplier relationship.

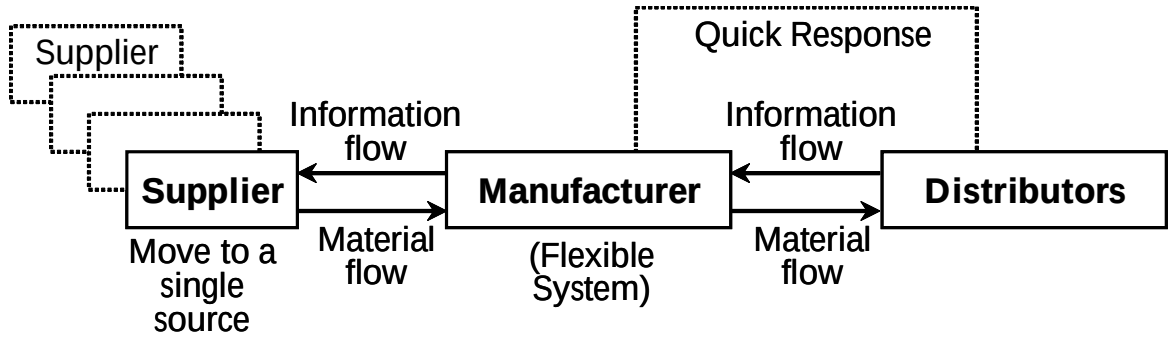


Fig. : Concept of Supply Chain Management

Supply chain management has emerged as the new key to productivity and competitiveness of manufacturing and service enterprises. The importance of this area is shown by a significant spurt in research in the last five years and also proliferation of supply chain solutions and supply chain companies.

Q2. Explain the historical perspective of Supply chain management.

(or)

Elucidate the evolution of Supply Chain Management.

Ans :

Supply chain management, as we understand it today, represents the confluence of at least three main streams of knowledge and practical experience of the business world spanning almost 60 years. The fusion of these streams into one powerful movement, supply chain management, that is sweeping across the present day industrial world has been brought about by intense competition characteristic of the contemporary markets. It is, therefore, appropriate that a discussion on supply chain management is preceded by a brief understanding of contributing disciplines.

These streams include business processes and managerial practices, which have evolved somewhat unconnectedly, if not entirely independently, in the fields of operations management, industrial engineering, and physical distribution. In the course of their development, these processes and practices have absorbed several allied and subsidiary functions as well as activities and adopted some successful business innovations.

These three principal streams are:

i) Sourcing, procurement, and supply management

ii) Materials management

iii) Logistics and distribution

i) Sourcing, Procurement, and Supply Management

Commonly, though quite mistakenly referred to as supply chain management, these functions arose in the area of purchasing which-came to occupy a predominant position in businesses because of the impact these had on cash flow and contribution they made to the company profitability. Businesses realized that efforts required to increase profits through increasing sales were far greater than those involved in generating equivalent returns through reduction in procurement prices. Major purchases came to be handled by the top management who in turn depended upon purchase specialists for advice. Economic buying was seen to be a strategic function, with major contribution to bottom-line. The responsibilities of the purchase function, however, ended with the procurement where more mundane functions of materials management took over. We may, thus, regard it as the set of activities, functions, and processes concerned with economic procurement and inflow of inputs into the enterprise and an efficient control over flow of funds out of the company.

In the context of supply chain management, these processes fall under sourcing, supply side management, inbound logistics, and supplier relationship management together with materials, information, and cash flows connected therewith.

ii) Materials Management

Classic materials management included the functions of forecasting, inventory management, stores management, warehousing, stock keeping, and scheduling till it came to include production planning and production control to evolve into extended materials management. With subsequent inclusion of order processing in its fold, it came to be known as integrated materials management. Since materials constitute almost 60 percent of the cost of most manufactured products, at least in the Indian context, the importance of efficient management of materials came to be recognized by businesses during the 1970s as the route to cost reduction and thereby to profitability. The merger of purchasing, which presented opportunities for reduction in the cost of material inputs, with materials management, thus became an obvious business compulsion. Some of the most innovative techniques focusing on reducing total cost of inventories to the lowest possible levels without compromising on service levels owe their origin and growth to this stream of knowledge and experience. In relation to supply chain management, it may be regarded as the management of flow of material into, through, and out of an enterprise, adding in the process, value for the customers both internal and external to the organization.

iii) Logistics and Distribution

Derived from military parlance, wherein it covered all functions related to movement and maintenance of armies, the logistics function in its business application came to be recognized as time and space related placement of goods to provide improved customer service. According to the Council of Logistics Management, it is that part of the supply chain management process that plans, implements, and controls the efficient, effective, forward, and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements. The distribution function, which Peter Drucker identified as the "Today's Frontier", is, in that sense, synonymous with Logistics.

Since transportation, which is the backbone of logistics, accounts for up to 50 percent of total logistics costs, the efficient management of this function became an important preoccupation of management leading to the development of transportation-related best practices involving all modes in general and multimodal transport in particular as evidenced by revolutionary development and exponential growth of containerized cargo handling and movement worldwide.

Realization, on the part of businesses, that there was an obvious trade-off between transportation choices and inventory policies led to integration and logistics emerged as a cross-functional approach that integrates all materials functions of purchasing, inventory management production Control, inbound traffic, warehousing, and store keening as well as incoming quality control with the objective of ensuring efficient operations. In this shape, business logistics may be regarded as the early avatar of supply chain management.

Q3. What are the features of Supply chain management ?

Ans :

Supply chain management has following features:

1. Integrated Behavior

SCM incorporates integration of stakeholders from suppliers to customers.

2. Mutually Sharing Information

For effective SCM mutually sharing information among channel members is required, especially for planning and monitoring processes.

3. **Mutually Sharing Channel Risks and Rewards**

Effective SCM also requires mutually sharing channel risks and rewards that yield a competitive advantage. Risk and reward sharing should happen over the long-term. Risk and reward sharing is important for long-term focus and cooperation among the supply chain members.

4. **Co-operation**

Co-operation among the channel members is required for effective SCM. Co-operation refers to similar or complementary coordinated activities performed by firms in a business relationship to produce superior mutual outcomes or singular outcomes that are mutually expected over time. According to Cooper and Ellram, co-operation is not limited to the needs of the current transaction and happens at several management levels (for example, both top and operational managers), involving cross-functional coordination across the channel members.

5. **Focus on Serving Customers**

Supply chain succeeds if all the members of the supply chain have the same goal and the same focus of serving customers. Establishing the same goal and the same focus among supply chain members is a form of policy integration.

6. **Integration of Processes**

The implementation of SCM needs the integration of processes from sourcing, to manufacturing and to distribution across the supply chain. The integration can be accomplished through cross-functional teams, in-plant supplier personnel and third-party service providers.

7. **Partners to Build and Maintain Long-term Relationships**

Successful relation-ships aim to integrate channel policy to avoid redundancy and overlap while seeking a level of co-operation that allows participants to be more effective at lower cost levels. Policy integration is possible if there are compatible cultures and management techniques among the chain members.

Q4. Discuss the Components of Supply Chain Management.

Ans :

Supply chain management (SCM) is a business practice that aims to improve the way a business sources its raw materials, and delivers it to end users. For any product or service offered by any business, there are usually a number of different business entities involved in the various stages of the supply chain, including manufacturers, wholesalers, distributors and retailers; the last group in a supply chain is consumers. SCM is important for modern businesses because it coordinates and synchronizes activities of partner businesses, giving higher efficiency. The principles of supply chain management are derived from five basic components.

1. Plan

Planning is the first and most important strategic function in SCM. The planning process lays down the strategy for managing and handling all resources that are used in providing the service or product that the company is involved in. Planning involves developing a set of metrics that enables the company to maximize efficiency by monitoring the flow of materials through the supply chain.

2. Source

Sourcing is the next component that managers consider in SCM. Sourcing involves studying supplier competencies and selecting one, based on one or more criteria. When a supplier is chosen, they must be prepared to deliver goods and services that the businesses need to create their products. Managers in SCM develop policies for pricing, delivery and payment with each supplier, and monitor and improve relationships by using metrics.

3. Manufacture

The next component involves the actual manufacturing process. SCM managers schedule activities for manufacturing, quality testing, packaging and shipping by coordinating the actions of each and every entity involved in the various related processes.

4. Deliver

After the manufacturing process comes delivery. SCM managers in the delivery process must synchronize activities of partner businesses involved in the transportation of goods. Sometimes referred to as logistics, delivery is an involved stage requiring large amounts of data from customer orders, warehouses and carriers.

5. Return

Often the trickiest component in SCM is establishing an efficient system for returns of defective goods. Setting up a responsive and flexible network is a very important aspect of SCM because excess and defective goods should ideally be received by the company as quickly as possible. Defects and excesses are causes for concern for a business's consumers and clients, and as such, accepting goods back ensures future business relation ships.

1.1.1 Objectives of Supply chain management

Q5. What are the objectives of Supply chain management ?

Ans : **(June-19)**

The objectives of supply chain integration are to supply superior quality goods faster, with efficient processes and in essence be more responsive to the perceptions of the marketplace and be able to change directions at will. Some of the consequences of supply chain integration result in.

1. Supply chain planning

Planning sets directions for the enterprise

2. Procurement

Establishing what needs to be purchased, selecting suppliers & managing relations with them, reducing costs, improving possibly raw material.

3. Inventory management

Managing levels of inventory in order to satisfy internal and external customers demand.

4. Packaging

Ensuring correct package design in order to encourage the recycling of packaging and reducing packages costs.

5. Facility design

This includes insuring the best design that suits the internal or external customers. Here we are concerned with the issue such as : Size, Lightning, facilities, equipment , safety and security.

6. Warehousing

This includes stock management, efficient facility operations, layouts for effective transportation, safety, storage methods and equipment.

7. Transportation

This includes transportation modes, costs, transportation management, terminal utilization, and in-transit care of goods.

8. Reverse logistics

The reduction where possible of product errors so that reverse logistics may be reduced.

9. Logistics Systems

This includes decision support systems, technology and software

10. Customer service and marketing

This includes customer relationships, customer solicitation and retention and issues pertaining to the marketing mix variables.

Q6. What are the Factors influencing Supply chain management?

Ans :

Various business and economic forces influence the effectiveness of a supply chain. They include consumer demand, globalization, competition, information and communication, regulation and environmental concerns.

1. Consumer Demand

The key focus of an organization is to find a balance between cost and quality, and customization and availability without compromising on any one of them. Customers' expectations with regard to quality, speed of service, choice, and price have increased significantly. So, organizations have to make the products or services cheaper, better and available within the minimum possible time. The objective of supply chain management is to keep the customers satisfied by providing them with what they want, when they want it and at a price they can afford.

2. Globalization

Organizations are realizing the importance of benefiting from the competitive advantages of other economies. For example, American and European companies have realized the cost benefits of outsourcing operations to Asian or Latin American. In these economics they are able to find skilled labors for fraction of price they have to otherwise pay in developed countries. Supply chain globalization is also the result of companies planning to lake advantage of untapped foreign market.

3. Competition

Competition in every business has increased significantly over the last decade. It has increased due to advancements in technology, increased globalization, easy access to information, creative business designs, etc. These factors have dislodged many market leaders. Earlier, market share was a good measure of profitability, but now organizations are redefining their competitive space. For example, having a significant market share in the mainframe and minicomputer market cannot ensure the profitability of a company because of the change in the competitive space. Now, the market for PCs and workstations is much bigger than that for mainframes and minicomputers. Improvement in information flow and transportation has given even the small companies the competence to operate in international market with other big players.

4. Information and Communication

The improvements in information flow and communications systems are key forces providing support for supply chain decisions. The Internet is an application, which is redefining the way products are purchased, sold and distributed. It has given the customer access to information regarding every aspect of the product. Now, customers can evaluate and compare different products and then make a purchase decision. Many companies are purchasing and distributing products without distributors or resellers. The information explosion is facilitating the expansion of supply chain activities to different parts of the world.

5. Government Regulation

Governments have played a significant role in the evolution of the supply chain. The scope of supply chain activities is no longer restricted by national boundaries. An organization's supply chains decisions have to take into account the

regulations and policies of other countries as well. Trade barriers, duties and other such trade related decisions are in the hands of governments of various countries. These rules and regulations directly affect the functioning of supply chain entities. With the formation of international trade organizations like the WTO, and other regional trade agreements, governments around the world are trying to bring in consistent regulations in all member countries.

6. Environment

Growing concern for the environment has made an impact on supply chain design. Many European countries have regulations regarding the usage of packaging material. Many organizations are designing products that can be recycled completely when their operational life is over. Government regulations to protect the environment also affect supply chain decisions.

1.1.2 Functions of Supply chain management

Q7. State the functions of Supply chain management ?

Ans : **(Oct.-20, June-18)**

1. Minimizing Uncertainty

Supply uncertainty due to unreliability of vendors, process planning information and joint attention to transport arrangements. Process uncertainty is due to machine breakdowns, uncertain yields and absenteeism, which can be addressed through good maintenance practices, better technology, etc. Demand uncertainty can be reduced to some extent by forecasting techniques and by better communication with customers.

2. Reducing Lead Times

Lead times at the stages of procurement, conversion and distribution can be cut down by faster modes of transport, better planning practices and process technologies.

3. Minimizing the Number of Stages

In general, the number of stages that goods and services flow through adds to the complexity of SCM. Unification of tasks and reducing the number of stages make the coordination of decisions easier. This is the essence of another management concept, namely Business Process Re-engineering.

4. Improving Flexibility

Reducing set - up or change overtimes in various processes and the use of flexible manufacturing and assembly techniques improves the flexibility of response. In transport, the use of smaller vehicles provides flexibility in making dispatches at short notice without being constrained by batching economies. As an extended principle, wherever possible, batch processes should be made continuous processes.

5. Improving Process Quality

A prerequisite to effective SCM in the light of reducing inventories and wastage is to do things right, the first time. This is deal for improving process quality. The techniques for this include statistical process control, root cause analysis of poor quality and improvement of process capability.

6. Minimizing Variety

Variety is one of the major causes for inventory in the downstream part of supply chains. One response appropriate promotion and branding. This will enable a better control of the supply chain, right from demand generation.

7. Delaying Differentiation

The value addition through product differentiation should be postponed as far as possible, so that precise customer needs can be met without holding committed stocks in the entire chain. There are numerous examples of how this can be done, such as shipping of component level goods to major points and assembling according to customer needs, postponing, finishing operations like grinding and mixing of additives to cement till near the final point of consumption, etc.

8. Kitting of Supplies

In assembly systems, a major source of delay is the staging delay where some components for assembly have to wait since matching components are not available. Vendors or internal facilities that supply components can be arranged so that all components required for an assembly (or major sub assembly) are manufactured or supplied to one stage where they are kitted into sets of matching components, ready for assembly and further operations. This could involve some restructuring of vendors or internal activities and some vertical integration.

9. Focusing on 'A' Category

This is a well – known idea from classical economies and inventory theory, where items that account for a large part of the value, or which are critical, and / or customers who are significant, and / or territories that are important, receive special attention.

10. Planning for Multiple Supply Chains

doing better SCM would often require different supply chains for different customer segments based on response requirements. The tendency to club supply chains in the interest of efficiency can be counter – productive for effectiveness.

11. Modifying Performance Measures

These need to move from being single – actor focused to multi – actor focused in the supply chain. For example, in the context of a warehouse, instead of warehouse space utilization as the primary measure of warehouse performance the retrieval time would be more in tune with SCM, since this focuses on both the warehouse and the downstream actor. Similarly, a transporter like the railways would focus more on time taken for delivering a wagon / rake to a customer from the time the indent is placed, rather than wagon utilization / turnaround.

12. Competing on Service

The big opportunity in SCM for long – term competitive advantage is on the service aspects of value delivery to the customer. Product quality and features can only be short – term advantages.

13. Moving from Functions to Processes

Improving supply chain practices will require integrated process orientation rather than functional organization. Job rotation, flatter and lean organizations will help.

14. Taking Initiatives at an Industry Level

This is very essential, especially in dealing with poor infrastructure. Industry – level (rather than firm - level) initiatives in specific product categories can focus on say transport and / or warehousing inadequacies and help to develop appropriate service providers. There is a big opportunity for third party logistics services here.

Q8. What are the key benefits of Supply chain management?

Ans :

The key benefits of supply chain management are as follows:

- Develops better customer relationship and service.
- Creates better delivery mechanisms for products and services in demand with minimum delay

Improvises productivity and business functions

- Minimizes warehouse and transportation costs
- Minimizes direct and indirect costs
- Assists in achieving shipping of right products to the right place at the right time.
- Enhances inventory management, supporting the successful execution of just-intimae stock models.
- Assists companies in adapting to the challenges of globalization, economic upheaval, expanding consumer expectations, and related differences.

Assists companies in minimizing waste, driving out costs, and achieving efficiencies throughout the supply chain process.

Q9. Explain the various goals of Supply chain management .

Ans :

Every firm strives to match supply with demand in a timely fashion with the most efficient use of resources. Here are some of the important goals of supply chain management:

1. Supply chain partners work collaboratively at different levels to maximize resource productivity, construct standardized processes, remove duplicate efforts and minimize inventory levels.
2. Minimization of supply chain expenses is very essential, especially when there are economic uncertainties in companies regarding their wish to conserve capital
3. Cost efficient and cheap products are necessary, but supply chain managers need to concentrate on value creation for their customers.
4. Exceeding the customers' expectations on a regular basis is the best way to satisfy them.
5. Increased expectations of clients for higher product variety, customized goods, off-season availability of inventory and rapid fulfillment at a cost comparable to in-store offerings should be matched.
6. To meet consumer expectations, merchants need to leverage inventory as a shared resource and utilize the distributed order management technology to complete orders from the optimal node in the supply chain.

1.2 CONCEPTUAL FRAME WORK OF SUPPLY CHAIN MANAGEMENT

Q10. Explain the Concepetual Frame work of Supply chain management.

Ans : **(June-18, Imp.)**

The conceptual framework of SCM is mainly used for designing and managing an effective supply chain process in an organization. this framework is a combination of three strutural elements which are as follows.

1. The supply chain network structure
2. The supply chain business process and
3. The SCM components

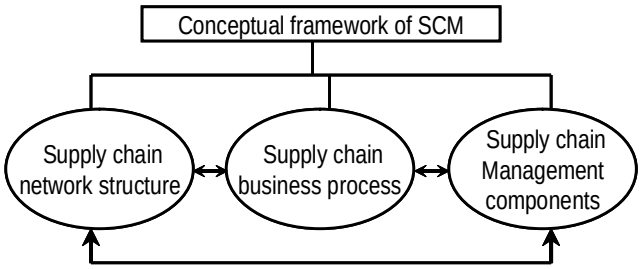


Figure : Conceptual Framework of SCM

1. The Supply Chain Network Structure

As the name indicates, it is a network of operating firms, consumers and all other parties responsible for the conversion of raw materials into finished goods.

Normally, firms have to maintain more than one supply chain because they have to deal with different parties of the chain during their operations. Hence, firms must focus on maintaining effective

relationships with these parties depending on the level of their importance. Before designing a network structure, firms must be aware of the following three primary aspects of network structure,

a) Supply chain members

b) Structural dimensions of supply chain/ network

c) Different process links.

2. The Supply Chain Business Process

Traditionally, supply chain activities (upstream and downstream activities) were treated as separate entities but in recent times, all such activities have been combined to form an effective supply chain process.

In those days, marketing executives were responsible for identifying the demand for a product, based on this the purchase department places an order and satisfies its customers.

Integrated supply chain becomes functional only if it has all the relevant information required for its proper functioning. Customer centered system can be achieved by processing accurate information and in a timely manner. However, it is not easy to process the information accurately as, SCM has to face various issues related to the uncertainty of customer demand, manufacturing processes and performance of suppliers etc.

The members of Global Supply Chain Forum identified the following key supply chain processes,

i) Customer relationship management

ii) Customer service management

iii) Demand management

iv) Customer order fulfillment

v) Manufacturing flow management

vi) Procurement

vii) Product development and commercialization

viii) Returns.

3. The Management Components of SCM

It is the third element of SCM framework. The level of integration among the business process links is highly dependent on the number of management components.

Nine management components are identified based on the interviews conducted with eighty managers, which are as follows,

i) Planing and control

ii) Work structures

iii) Structures product flows

iv) Management methods

v) The power and leadership structure

vi) Reward and risk structures

vii) Organization structures

viii) Channels of information flows

ix) Culture and attitude.

Hence, for the successful implementation of SCM frameworks all these components need to be integrated strongly which results in the formation of an effective supply chain.

Integrating Framework of SCM

A number of elements are brought together in order to construct the framework of Supply Chain Management (SCM).

These are :

1. Generic Activities
2. Objectives of the Supply Chain
3. Architecture of the Supply Chain

1. Generic Activities :

The concept of 'process control' lies at the heart of the SCM framework. By process is meant "a group of related tasks that together create a value for a customer". The value, which could be in the form of a product or service, is the output of some action.

On the supply chain, there are some 'generic activities', cutting across functional lines, which contribute to the value experienced at the end of the chain. To understand what

these activities are; we visit the conventional definition of supply chain :

Flow of materials through procurement, manufacture, distribution, sales and disposal (consumption). If we look at what actually happens in a supply chain, we could capture it in the following string:

Supplier P ->M ->D -> S -> Consumer

Essentially, value is delivered on the supply chain through the following 'generic activities' that are strung together

a) Store

b) Transform

c) Move

The direction of movement of these activities is from left to right, i.e., upstream to downstream. However, these generic activities are triggered by information flow from right to left, hence a fourth value adding generic activity can be included, i.e.

a) Store

b) Transform

c) Move

d) Communicate

2. Objectives of Supply Chain :

The strategic objectives of a business by adopting the following performance objectives :

– Reduced costs (C)

– Shorter lead time (T)

– Best quality (Q)

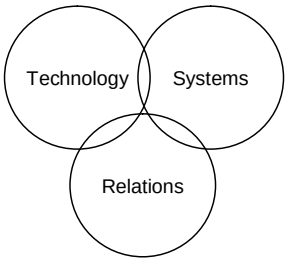
– Flexibility (F)

– Enhanced service (S)

– Better product availability and reliability (R)

3. Architecture of Supply Chain :

The Architecture of the chain must include the following three elements :



a) **System :** Linking of events and processes.

b) **Technology :** The means for enhancing processes.

c) **Relations :** Bringing alive the chain with a commonality of purpose through mutuality of Trust

The three elements have to be inter – meshed and lie at the base of an effective supply chain for achieving the desired results :

Built on the architecture of technology, systems and relationship, the supply chain should deliver the desired value through the generic activities for storing moving, transforming and communicating.

The framework is captured dramatically in figure. At the base is the architecture. Through the architecture, the supply chain is activated and the generic activities come alive. This is shown on the X-axis. The desired value from the supply chain, which is obtained through the generic activities, is shown on Y-axis.

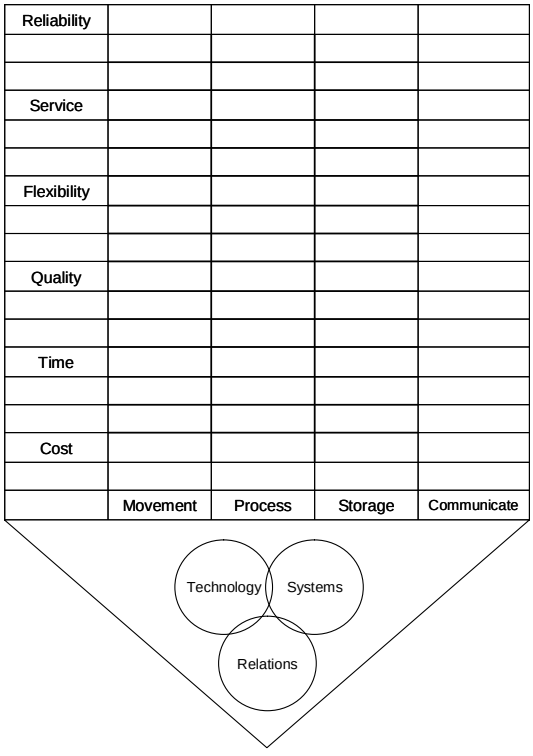


Fig.: Supply Chain Management Framework

The way to use this framework is to identify all the existing philosophies, concepts and techniques in the grid of activities vs desired value. Then, when seeking enhancement or improvement in any desired value, the technique to be used and the activity that is affected can be identified, irrespective of which functional area is affected.

This allows a fuller scope for seeking these improvements in any part of the chain. At the same time, the effect of changes in one activity on the others can also be identified, so that a pay-off exercise can be carried out for the intended improvement.

1.3 Supply Chain Strategy

Q11. Define Supply Chain Strategy? Explain the development of Supply Chain Strategy.

Ans :

Supply chain Strategy is a broader term which mainly focuses on the methods of operations of supply chain in order to achieve competitive edge over competitors. Supply chain strategy is a continous process, in which operational components are continuously analyzed to assess their cost-benefit trade-offs. Supply chain strategy is mainly responsible for creating value for both the company as well as for its stakeholders. An effective supply chain strategy along with innovative technologies not only help in meeting the demands of the market but also help the firm to reach the highest level of customer satisfaction.

Development of Supply Chain Strategy

The following are the points to be considered in the development of integrated logistics supply chain strategy,

1. Acknowledge the Business Strategy

The initial step in the development of a supply chain strategy is to understand the methods adopted by the firm to gain competitive advantage. A well executed supply chain strategy acts as a key driver for business strategy. Every firm must consider its core competencies, resources, goals and differentiation methods before implementing a business strategy.

2. Evaluation of an Extended Supply Chain

The next step is to carry out a detailed analysis required for the determination of capabilities of both firm and extended supply chain partners. In this step, analysis has to be done by an unbiased external party who may

appropriately assist the firms in determining their core strengths and opportunities. After identifying them, establish benchmarks both external and internal to its industry which helps in leveraging its core competencies. Once analysis is done, team must be assembled which is responsible for receiving and prioritizing recommendations, identifying opportunities and risks and finally, assisting the firms for certain implementations. If there exists a disparity between supply chain strategy and operations of assets, firm needs to make further investment or it can even formulate a new strategy from a scratch.

3. Develop an Implementation Plan

Implementation plan of a supply chain strategy must be developed by incorporating activities, tasks, roles, responsibilities, a corresponding timeline and performance metrics. During implementation process, sub-team must be established for its execution by providing project management responsibility which helps them in resolving issues.

4. Development Considerations

i) Establishes Cooperation and Collaboration among Supply Chain Partners

Effective implementation of a supply chain strategy involves the cooperation and collaboration among the supply chain partners. It must be noted that, only general information regarding the operations heed to be communicated to/with its partners while highly confidential information need not be disclosed to anyone.

Example

Collaboration with technical partner who is using innovative technology not only helps in reducing operational cost and R and D cost but also makes them aware about the new product concepts which cannot be possible while working as a single entity without any collaboration.

ii) Outsourcing

Development of a supply chain strategy includes the identification of certain activities that need outsourcing which plays an important role not only in reducing costs but also in the optimal utilization of competent resources for the development of core competencies where an organization performs better than the outsourcing firm.

Q12. Explain the importance and execution of Supply Chain Strategy.

Ans :

Importance of Supply Chain Strategy.

The importance of supply chain strategy can be understood from the following points,

1. It helps in the operations of the firm and provides support to strengthen business strategy.
2. It reduces the cost of operations and maximizes the total efficiency of the firm.
3. It directs the firms towards goals achievement.
4. It provides the guidelines as to how the firms must operates with its suppliers, customers, distributors, shareholders etc.
5. A well executed strategy enables the firm to create total value for the firm.

Execution of Supply Chain Strategy

The strategies of supply chain are executed as follows,

1. Performance Management

Execution of a supply chain strategy involves the close examination of implementation plan by establishing project governance. The first step in execution of supply chain strategy is to closely track the performance measures adopted for the realization of goals. Effectiveness (output/ inputs) can be achieved if the individuals are motivated which can be done by rewarding them for their performances.

2. Cost-benefit Analysis

Firms must reexamine its supply chain strategy depending on the changes taking place in today's competitive environment. It must assess whether the business goals are met? Is there any change in the need of supply chain partners? How the industry has changed? (in terms of competitors, structures, business practices, products, technology). It also involves the identification of all those new opportunities that may lead the organization towards the path of success.

3. Channelizing Communication among Partners

As it is essential to relate supply chain strategy with the business strategy, it is equally essential to execute supply chain strategy with different types of entities (both external and internal to the firm). Supply chain strategy can be synchronized with its partners by communicating the goals of focal firm to/with its partners, so that there may be a proper alignment between the focal firm and supply chain partners, which is an important prerequisite for the successful execution of a supply chain strategy.

Q13. What are the components of supply chain strategy ?

Ans :

Strategic supply chain management is directly related and draws strength from the business strategy of an organization. As a matter of fact, the supply chain strategy is developed from business strategy.

Components of Supply Chain Strategy

1. Sourcing strategy
2. Distribution strategy
3. Inventory strategy
4. Customer service strategy
5. Strategy of integration

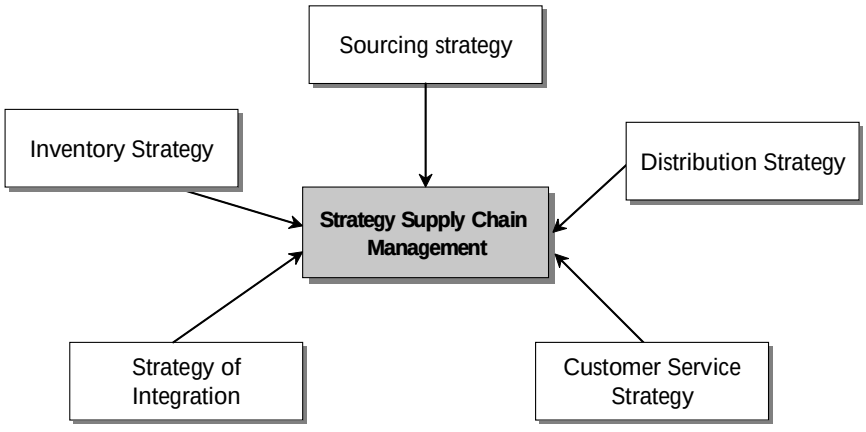


Fig.: Components of Strategic Supply Chain Management

1. Sourcing Strategy

Some in house manufacturing companies, they rely on sourcing and developing vendors with elaborate system to check and control quality.

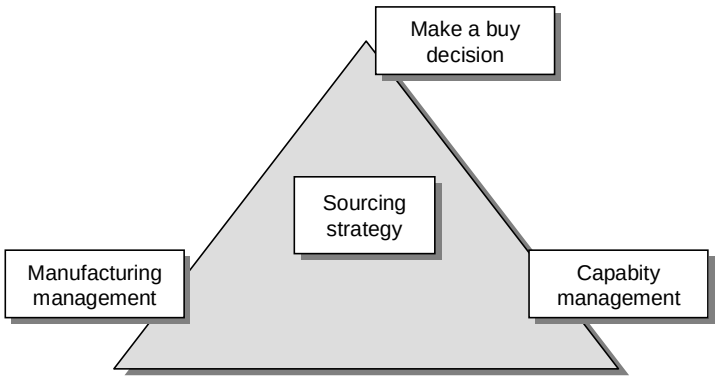


Fig.: Major elements of sourcing strategy

a) Manufacturing Management

the functional area's decides such issues as to how production should be organized and managed. Traditionally, the production planning & control system have been designed to maximize efficiency of labour and utilization of machines. Always the production process has to optimize balance between customer satisfaction and efficiency.

b) Make of Buy Decisions

Traditional approaches on make or buy decisions have considered such factors such as cost of in house manufacturing, cost sourced suppliers, labour cost changes, recovery of overheads, under utilized capacity in plant and machinery, transportations etc.

It now also calls for considerations of faster deliveries, easy access for service, repairs and replacements and customer preferences

c) Capacity Management

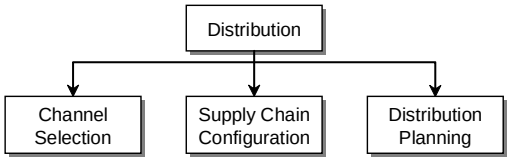
This calls for decisions to locate plants for in house processing and suppliers and to fix capacities for both plant & suppliers. Traditionally, the decisions on location of plant were taken based on considerations such as cost of land, Govt. subsidies cost of power, availability of labour and other manpower, Govt. concessions on taxes, industrial relation etc.

But more important considerations have emerged proximity to customers, cost of decisions, supply channel infrastructure availability, access to service facilities, access to various modes of transport network, access to IT are the new emerging considerations.

2. Distribution Strategy

The distribution strategy decision is not only important as it involves consideration of distribution costs, this decision is involved on total marketing costs, but it also calls for a long term commitment to certain type of casts associated with a channel of distribution.

Factors of distribution strategy :



i) Channel selection

Now a day's number of channels is available. These include dealers, retailers, stockiest, wholesalers, distributions and currently World Wide Web etc.

Channel selection depends on the products or services, coverage of areas, business policy etc., and Supply chain has a number of participants, sources of suppliers, storage or stocking stations, and distribution channels some of the major participant's decisions on alternatives such as the number of participants and their efficiency of supply chain system and the business results of organization.

ii) Supply Chain Configuration

A supply chain has a number of participants. Sources of supplies, storage or stocking stations, distribution channels till the supplies reach the end customer constitute some of the major participants. Decisions on alternatives such as the number of participants and their locations have an important bearing on the efficacy of the supply chain system and the business results of the organization. Supply Chain configuration calls for determining numbers and location of each of the participants.

The answers to these questions will take into account factors such as the volume of supplies, number of customers and their geographic locations, cost of transportation, distribution costs and the level of customer satisfaction.

iii) Distribution planning

The supplies can be carried through wide variety transportation choices. The transportation helps to achieve a higher level of customer satisfaction, and to increase the sales by business opportunities. So many corporations tend to own transport vehicles. Transportation costs also constitute as an important and major factor in supply chain system. This factor seeks to establish the transport mode capacity, location, routing, the schedules of distribution so that, supplies reach the destination on time.

3. Inventory Strategy :

This constitutes the core of SCM. The major cost of the supply chain, the level of customer satisfaction, business growth/fall is largely influenced by the inventory strategy. Inventory strategy can be considered to comprise of three elements :

i) Demand fore casting

ii) Inventory planning

iii) Planning for stock facilities

i) Demand Forecasting

This call for determination of the demand of the products for period considered many products in the product have a seasonal demand.

Demand planning is needed to organize the sourcing strategy & stock policies. A number of forecasting methods are available to carry out demand planning in a systematic manner.

ii) Inventory Planning

Once the demand is forecast, the organization s to determine levels of production to develop an inventory policy. This includes maximum stock, maximum levels of stocks, reorder levels, lead time for procurement, order level quantity etc., Inventory planning also includes setting up of a procedure and fixing time schedules for monitoring the inventories and exercising controls. Inventory planning is required to be carried at all the channels of supply chain system. So proper inventory management reduce the costs while raising the levels of customer satisfaction.

iii) Planning of Stock Facilities : Adequate stocking facilities are needed for keeping stocks at each of the channel stock stations. The strong facilities should be sufficient to carry the inventory in safe

conditions, storage facilities, and this plan is used for to minimize the cost of transportation.

4. Customer Services Strategy :

Customer can be defined as an end user. As Evans and Danks define, a corporation finally has to draw up a strategy defining methods and means to respond to the needs and expectations of its customers in a manner that maximizes profitably.

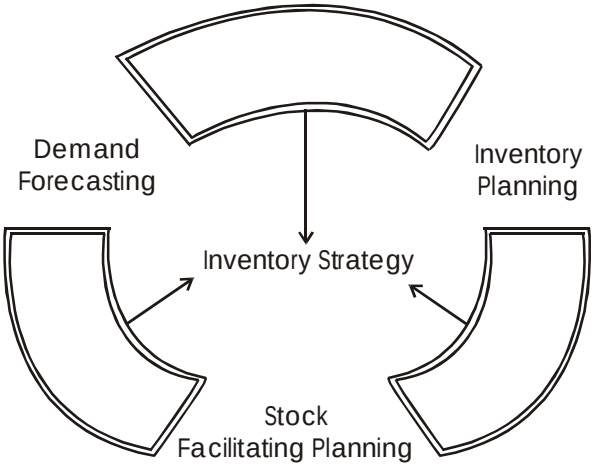
Inputs for customer service strategy,

i) Service Needs

ii) Service Cost

iii) Revenue Management

Customer service strategy is developed from three factors :



Many companies have discovered the importance of servicing the customers. These companies no longer refer to sales as selling of their products but as selling of relationships, support and care.

Customer service is being offered in many forms post warranty support, fast repairs, qualified, component and customer friendly technicians are some of the apparent services.

Now a days many companies are taking different strategies.

a) Segmentation of customers

b) Product service strategy

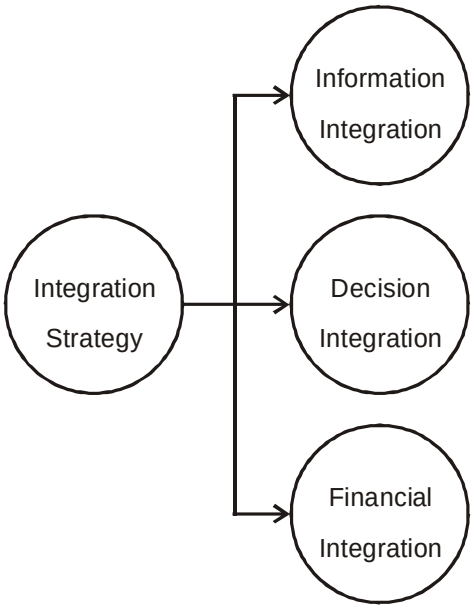
c) Geographic location strategy

d) Service cost (including delivery cost)

5. Integration Strategy

In traditional supply systems, suppliers have very little information on what manufacturers need until they receive orders from manufacturers. Similarly, manufacturers do not know what materials are available with suppliers until they place an order and get a corresponding response.

In an efficient SCM, manufacturers, suppliers, distribution channels and customers are linked in the form of a chain to develop and deliver products as a single organization of pooled skills and resources. Higher the integration process, greater is the success of a supply chain system. The integration can have three forms, as shown in the Figure :



A) Information Integration

Information plays the most crucial role in integration. The participants share confidential and critical information. In a well implemented system the participants are aware of the stocks, demands and the availability of supplies at all times. The supplier knows what the manufacturer needs

and the manufacturer knows the stock and needs of the distribution channels. Information Technology is playing an important role in linking. Real breakthrough comes from advanced computer software such as:

- Electronic Data Interchange (EDI)
- Enterprise (level) Resource Planning (ERP)
- Planning Engine Applications (PEA)

Example

ERP organizes and interconnects most day-to-day tasks, such as entering orders, tracking product shipments, scheduling production and updating sales forecasts and balance sheets. Planning and implementation of information systems can also help to analyze product flows, order patterns, inventories, obsolescence, levels of production and supply costs.

B) Decision Integration

If the various participants of the supply chain system operate as one congruent whole, demands of integration call for a joint decision-making exercise. The participants are expected to meet at frequent intervals to take a joint decision on issues such as:

- Inventories
- Distribution
- Trade-offs to strike a balance between contradictions and even pricing policies

The decision-integration implies that a participant will have a right to exercise controls on operational activities of the other participants and raise voice of discontent in case the operations are contrary to decisions already made.

C) Financial Integration

Financial integration implies that each of the participants has a financial stake in operations of other participants.

Example :

Suppliers can be equity holders in the venture of the manufacturers and manufac-turers extend their financial participation to the distribution channels.

With this arrangement the participants become a part of one set-up and tend to work towards achievement of objectives which become common goals.

Failure of one participant brings an immediate response from other participants to correct the situation. Fear of failure binds the participants and keeps them together.

Q14. Describe the structural framework of supply chain strategy.

Ans :

The framework of supply chain strategy mainly includes the following strategies,

(a) Collaborative strategy

(b) Demand flow strategy

(c) Customer service strategy

(d) Technology integration strategy,

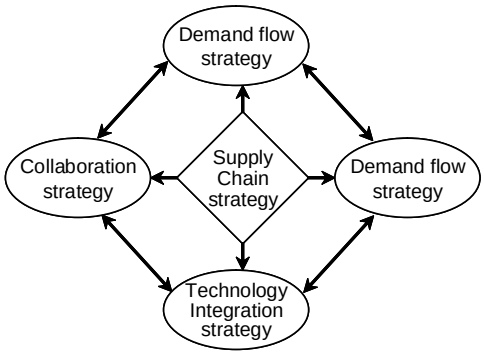


Fig.: Structural Framework of Supply Chain Strategy

a) Collaborative Strategy

Organizations role in supply chain differ from one organization to other and it effects the capacity of an organization to grab the chances to collaborate with the partners in

the industry. The collaborations among the business partners mostly benefits the manufacture in gaining competitive edge over competitors collaborator are basically of 3 types.

i) Manufacturer-supplier Collaboration

Forming/making collaborations between manufacturers and suppliers is beneficial to manufacturers with respect to product development, order fulfillment and effective planning of plant capacity and so on.

ii) Manufacturer-customer Collabo ration.

Forming/making collaboration between manufacturer and customers would benefit the manufacturers in demand forecasting and in planning inventory requirements. It also helps them in gaining higher levels of customer satisfaction through identifying the customers changing needs and expectations.

iii) Collaborations with Logistics Providers.

Collaboration of manufacturers with (3P) third party logistics providers facilitates helps the firms in planning the logistics activities combinedly and also adds value to the firm by providing better packaging facilities in order to attract the customers.

Collaboration of manufacturer with 4 PL providers would benefit both the outsourcing and insourcing of supply chain operations.

b) Demand Flow Strategy

Traditional supply chain management basically emphasizes greatly on the movement of goods from suppliers to end users via the manufacturers and distributors. Similarly, demand flow is from end users to suppliers through distributors and manufacturers along the supply chain. But in a contemporary supply chain management demand flow strategy facilitates the organization in formulating an effective supply chain strategy by reducing the complexities in their operations.

c) Customer Service Strategy

Designing a customer service strategy would help the firm in formulating effective supply chain strategy in order to gain higher levels of customer satisfaction. While crafting a customer service strategy firm should consider the following three aspects.

i) Customer Segmentation

It is necessary for a firm to decide their target segment of customers for manufacturing a particular product or service.

ii) Cost to Serve

Firm should assess the feasibility of the firm in producing the product for meeting the customers expectations. It also assess the costs for production and distribution of products to end users and the support provided by the suppliers and other parties involved in supply chain.

iii) Revenue Management

Firm should ascertain the customers needs and expectations and select an appropriate alternative method which would helps in maximizing the firms profitability and minimizes the costs.

d) Technology Integration Strategy

Recent developments and changes in information technology plays an important role in designing supply chain strategy. It can integrate all the information systems of a firm vertically and horizontally with the help of various tools and techniques. The information

provided by the information systems helps the management in taking proper decisions with respect to the supply chain operations.

Q15. Explain briefly about the various challenges faced by the firm in efficient management of supply chain.

Ans :

While developing and sustaining an efficient supply chain, the firms have to tackle various challenges/issues. Some of them are,

1. Supply Chain Networks

Due to the rapid changes occurring in the marketing environment, the firms need to have a capable and flexible network system which can be suitable under any circumstance both in short as well as in long run. However, in real-based situation, implementation of such networks is a very difficult task.

2. Complexity

In today's competitive era, every firm is expanding its scale of operations by penetrating the global/overseas market. But these globalized operations make the network of supply chain more complex by including a wide range of individuals. Furthermore, customer/supplier locations, transportation requirements, trade regulations, taxes, Stock Keeping Units (SKUs) increase complexity in SCM. The rapid expansion of SKUs can be hindered by rationalizing them based on their extent of contributions to the overall profitability such that slow movers or Unnecessary intermediate items which do not have impact on profitability can be eliminated. In the same manner, locations and suppliers/vendors need to be rationalized to reduce high operating costs. Even though development of complexity in supply chain is a usual phenomena but what organizations need to do is to evaluate these complexities on a regular basis, so that they can be reduced to a large extent.

3. Inventory Deployment

In supply chains, duplication of inventory along the supply chain leads to 'Bull whip effect', which can be reduced by maintaining effective coordination or integration between supply chain activities. Hence, inventory needs to be effectively deployed as it helps in reducing cost and increasing efficiency of operations.

4. Information

Firms are using technology and communication systems for the collection of information. However, this collected data is useless, unless it is effectively used in making decisions regarding inventory, customer service, locations, transportations etc. In this aspect, the major challenge faced by the firms is to accurately share the collected data among all the parties of supply chain and to integrate such data in an efficient manner, so as to make them available to all the parties of supply chain.

5. Cost/Value

It is one of the major problems faced by the firm in global SCM, where firms are competing with each other by producing quality or value-added products at low cost than their competitor's offerings.

6. Organizational Relationships

As SCM is an integrated network of activities performed by producers, suppliers, customers, transportation agents, distributors, retailers etc. Collaboration is very much important for its operations. Both internal and external cooperation is facilitated by effective process of communication across the supply chain.

7. Performance Measurement

Most of the organizations set performance targets or metrics which helps them in analyzing their progress over different time frames. Sometimes, these measures act as performance objectives which firms need to achieve. The biggest challenge in this aspect is that firms need to recognize the lower level metrics that help them to achieve increased performance levels in the supply chains.

8. Technology

In today's competitive era, every organization wants to become an industry leader which forces them to spend huge amount on technology which helps in producing desirable product at low cost. Now, the challenge for any firm is to appropriately select, evaluate and successfully implement that particular technology which brings desirable improvements to the firm.

9. Transportation Management

The main objective of a firm's supply chain is to deliver the right product, at the right time, in the right quantity and quality, at the right cost and to the right destination. In order to realize this objective, transportation plays an important role.

10. Supply Chain Security

Traditionally, safe and on-time delivery of products to customers was the main function of supply chain, but it acts as a major issue in the present scenario due to increased risk of interruptions or shutdowns of supply chains. Even terrorist attack is an unexpected threat for any organization which establishes the need of scenario analysis, through which possible threats and environmental situations can be identified. Based on the results of scenario analysis, a firm plans for suitable alternatives.

1.4 GLOBAL SUPPLY CHAIN MANAGEMENT

Q16. Define global supply chain management. How to manage global supply chain management?

Ans : **(Imp.)**

In today's business era, "globalization is found to be offering many opportunities and challenges for both logistics and supply chain operations. Firms are expanding globally with an intention of minimizing costs. In such a competitive environment, success can be achieved by identifying opportunities with the help of two vectors namely, cost-led productivity vector and customer-led/market-led vector.

These opportunities include market expansion, product differentiations, and human and material resources advantages. However. It should be noted that some regions of the world enable the firm to achieve significant economies of scale due to their competitive wage scales, while other requires expertise due to significant flexibility in those regions.

Managing the Global Supply Chain Strategy

A global supply chain strategy acts as an effective tool in expanding the business by combining the objectives of various firms located in different countries, thereby helps in reducing the risk and increasing the profitability of firms. Managing the Global Supply Chain

A firm can adopt any one of the following methods for overseas/ global expansion,

(a) Exporting as an Entry Option

It provide opportunities for the firms who wish to expand their scale of operations without investing heavily on fixed and current assets. Growth rate maturity volumes are the driving forces for the implementation of an effective supply chain system. Exporting strategy may be direct or indirect.

Indirect exporting strategy is characterized by low investment requirement where domestic-based intermediaries can be used for selling the firm's products, as they possess knowledge and expertise required to operate in such markets.

Example

One such marketing intermediary which offers such type of services to major brand manufacturers throughout the globe. Contrarily, direct exporting is a method which requires infrastructural facilities to work with market-based intermediaries. Direct exporting involves close working relationships between the focal company and intermediary which requires huge amount of working capital.

The supply chain management issues can be resolved by offering reliable service to the ultimate customers.

(b) Company Owned Sales Subsidiary

In this method, company manages the sales operations by assuming the roles of the distributor which involves stocking of products, selling them and assumes payment risk, as it is associated with huge capital that has to be invested to finance capital and customer credit. Company makes use of third party for both storage and transportation activities.

Advantages

1. Service requirements of the customers can be met efficiently by establishing subsidiaries in different countries.
2. As subsidiaries are established in different regions, local knowledge can be easily acquired by them.
3. It ensures that suitable service is delivered to the customers at low cost which helps in increasing customer satisfaction.

(c) Licensing

A number of companies who want to explore the global market segments make use of licensing operations, where a local firm gives permission to a subsidiary or other company to use its operations in return of a specific amount without investing much in current or fixed assets.

Even though, licensing provides various advantages to the licensor, it is also disadvantageous, as licensee may become its competitor in the near future, lacks control on products and services may result in quality distortions leading to bad reputation to the licensor. Such possibilities can be controlled by stipulating a licensing period within which, no license is allowed to produce/practice the same products/processes as that of licensor.

(d) Franchising

Franchising is a special type of licensing, wherein franchiser is not only responsible for providing marketing and operations management programmes, but also provides inputs of the processes so that a franchiser must have a "bird's eye approach" on the entire operating mechanism of a franchisee.

Example

Mc Donald's became an integral part of an extended supply chain management task to ensure that quality service is delivered which is as per their requirements.

(e) Local Manufacturing

Local manufacturing provides marketing opportunities for foreign companies who are engaged in producing and marketing their own products in overseas market.

Advantages

1. Reduces labour costs and raw materials.
2. Due to reduced transportation cost they can easily transport the finished products to overseas market.

   Local manufacturing provides different manufacturing alternatives.

Some important alternatives are,

i) Contract Manufacturing

In this alternative, even though focal firm delimits its production operations with the local companies to meet specific volume requirements, the marketing function rests with the principal firm.

Contract manufacturing is applicable for the countries who have low-volume require ments with high tariff rates which does not require any initial investment for building and operating a manufacturing outlet.

Contract manufacturing plays a significant role in the efficient management of supply chains. It mainly requires efficient inventory management programme for the markets which have to be serviced by the manufacturing base. However, a perfect blend of such service programmes along with the effective transportation mode enables the firm to maximize its 'economies of scale'.

ii) Assembly Operations

This type of alternative is found to be applicable where the whole manufacturing process is a costly affair. It usually helps in reducing the burden of initial capital

investment of the focai firm. It provides cost advantages from labour savings by achieving economies of scale and experience.

This efficiency can be enhanced by transporting products required for assembly in the form of kits. This is a useful operation approach for automobile manufacturers.

iii) Fully Integrated Production

It is associated with initial capital investment and commitment to the regional markets. All such decisions mainly depends on market potential and market support infrastructure.

Reasons

1. Establishes local operations to exploit new business opportunities.
2. Existing business can be safeguarded by establishing foreign operations.
3. Saves manufacturing cost by operating globally.
4. Provides service to the established customer groups.

Logistics manager needs to have thorough awareness regarding corporates and customer markets. Even, he must also have full knowledge of the availability of logistics and service providers, situated locally which are facilitated by the manufacturing unit.

Q17. Explain the different Marketing Strategies in global supply chain management.

Ans : **(June-19)**

Following are the various marketing strategies adopted by the firm while operating globally,

a) Export Marketing

It includes all those activities of a firm responsible for producing and transporting the products beyond its domestic boundaries.

b) International Marketing

It includes all those activities that enables the firm to get involved in the local marketing environment. It provides wider scope than export marketing. In different markets, firm designs different strategies that are highly specific by blending the cultural, economic and political values of the countries in which the firm is operating.

c) Multinational Marketing

In this strategy, firm establishes subsidiaries in host countries where each market is managed and operated by their own human resources. These subsidiaries function as local firms with specific strategies and some degree of localization. Sometimes, it may lead to resource duplication, consequently reduce optimal effectiveness which is a costly affair.

d) Multi-regional Marketing

It provides an opportunity to gain economies of scope by developing regional and integrated strategies. Due to the development in European Union, North American Free Trade Area (NAFTA) and the Pacific rim countries, the firm is forced to operate in a single region rather than operating in group of countries.

e) Global Marketing Strategy

A global marketing strategy is a unique strategy that differs from other strategies by their ability to formulate a single strategy for a product/ service which can be applied to all customer segments and under all market situations. In case of a global marketing strategy, the exporting company can manufacture and distribute from its domestic base while others design separate manufacturing and logistics facilities for separate territories.

Q18. Explain the risks associated with global supply chain management.

Ans :

As global SCM involves the different individuals, belonging to different regions, they differ from each other in culture, core values, policies, political norms and government regulations which may act as obstacles in the operations of global supply chain. Hence, these factors need to be regulated in an effective manner for the

implementation of global supply chain strategy. Some of the important risks involved in global SCM are as follows,

1. Political Environment

Due to dynamic political philosophy and stability, potential risk emerges. Certain philosophies of a host country may be extreme from business point-of-view. Government regulations of home country may be different from host country.

Certain policies which may act as regulatory frameworks in home country can become illegal practices in host country. Such factors need critical analysis for the success of business operating globally, as these political ideologies have an influence on the supply chain infrastructure.

2. Host Government Regulations

Certain government regulations ire found to be favorable for the establishment of an overseas supply chain. Government regulations are changing depending on the changes in external environment, out of which some of them are favorable for the guest country while others act as inhibiting factors.

Following are some of the government actions undertaken by the host countries.

(a) Buy Local Restrictions

"Buy local" restrictions are imposed by the government of host country. According to which, ail guest firms must make use of significant proportion of inputs from local suppliers in their manufacturing processes, which is a costly process as firms are unaware about the quality and texture of inputs supplied by the local suppliers. Even, sometimes the entire business process may go in vain if the inputs are not of desirable quality.

(b) Non-tariff Barriers

Non-tariff barriers are restrictive trade practices adopted by the host firms on the free flow of goods and services across their political boundaries. These barriers have a drastic impact on the production and sales of the firms.

Example : Trade quotas.

(c) Subsidies

Establishment of subsidies may hold both positive and negative impact for the foreign companies. Positive subsidies increases employment opportunities and facilitates foreign exchange, which increases the GNP of the host country. On contrary to this, negative subsidies inhibit guest company from its expansion by protecting the local companies from the competition of MNC's.

(d) Operating Conditions

Host government holds control on the operating conditions of the firms which involves control on working hours of labours, promotional and sales activities etc.,

However, if such controls are equally applicable to both domestic and international firms then such threats can be reduced. On the other hand, if unequal restrictions are practised for both the firms then international firms have to suffer losses due to operating inefficiencies.

(e) Ownership Conditions

As most of the countries impose restrictions on the incoming businesses, ownership conditions vary dramatically. Certain countries require complete local control over the operations of guest firms, while others consider it to be a difficult process to operate the business of guest company. Under such circumstances, firms operate in those countries until such regulations have been established.

(f) Takeovers

Takeovers are the usual practices wherein the host country government

carries all the operations of an international firm by adopting the following practices,

(i) Expropriation

It is a method of acquiring the operations of the firm by paying certain amount as "compensation", but payment of compensation is not a mandatory require ment.

(ii) Confiscation

It is a special type of expropriation where acquisition of firms occur without compensations.

(iii) Domestication

It is a type of restrictive mechanism adopted by the government of host country, where specific activities of supply chains are confined to the domestic firms.

3. Substantial Geographic Distances

As global supply chain operates with different individuals situated distantly from each other, it is associated with high lead times for transportation, risk of missing of components during shipments, high cost of inventories, production delays due to non-availability of raw materials etc., this all leads to a drastic issue known as "bull-whip effect".

4. Inaccurate Forecasting

Increased geographical distances leads to forecasting difficulties. This occurs due to long geographical distances, and also due to communication barriers existing between the individuals of host and home countries, such that different languages, mentalities and culture of different people leads to different judgment which in turn influences demand forecastings.

5. Fluctuations of Exchange Rates

As global supply chain involve operations in different country any change in the exchange rate of a single firm may lead to the overall change in the profitability of a business. Effective risk management is required for global SCM.

6. Infrastructural Inadequacies

Developing countries are incapable of providing infrastructural facilities which makes it difficult for the firms to carryout their operations in such countries. Lack of skilled workers, absence of desirable suppliers, quality deficiencies in transportation and telecommunications infrastructure also inhibits global operations of SCM.

Thus, firm must have effective forecasting methods which enables them to predict the problem/issues encountered by them while operating globally on a large scale, such that they can formulate suitable strategies to reduce the effect of such issues.

Q19. Compare and contrast global supply chain management and domestic supply chain management.

Ans :

1. Performance Cycle Structure

It is a major differentiator between domestic and global SCM. In domestic SCM, performance cycles are extended from 1-5 days to 2-10 days time duration, while this length is extended to weeks or even months in global SCM. The reasons behind the longer time duration of performance cycle may be due to communication delays, financial requirements, ocean freight scheduling, slow transit times and customer clearance processes. All these reasons increase the complexity and flexibility of global SCM than domestic SCM. Elaborated performance cycle in turn influences the asset commitment due to transit inventories, which moves from one place to another depending on their requirements.

2. Transportation

Global SCM differs from domestic SCM depending on the mode of transportation. In case of international operations firm uses following three different strategies,

(a) Intermodal Ownership and Operation

Traditionally, transportation of goods was facilitated by few steamship lines which makes the international operations a complex task as the international operations require multiple modes to perform a single freight movement. Services provided by the foreign- owned carriers are determined by the government. Marketing and establishment of strategic alliances among different partners belonging to different countries which helps in improving the transportation flexibility.

(b) Privatization

In domestic firms, government-owned carriers are used to promote trade and to provide national security, which is found to be an unfavourable mode of transportation for global firms as it is associated with high cost and low efficiencies. Hence, carrier privatization has been adopted to increase the efficiency of operations beyond the geographical boundaries.

3. Operational Considerations

Global environment is characterized by unique set of operational considerations, which are as follows,

(i) Domestic environment/operations involve single language for both product description and documentation, whereas global SCM needs to deal with multiple languages where product description must be done in local language, which increases the time and efforts for international operations due to the translation of complex documents into local language. Such complexities can be reduced by using standardized electronic transactions.

(ii) Certain features such as performance features, technical characteristics, environ- mental considerations and safety requirements are unique for the global firms.

(iii) Third operating consideration involves variability of documentation used for international operations, whereas domestic operations are documented by using invoice and bill of lading.

(iv) High incidence of counter trade and duty drawback is mostly seen in international operations, while such operations are not seen in domestic SCM.

4. Integration of Information Systems

Global SCM involves the integration of two types of information systems while they are absent in domestic SCM. The two information systems include,

(i) Global transaction or ERP system (Enterprise Resource Planning system) and

(ii) Global planning system.

ERP system provides common and consistent data to all global suppliers, customers and producers irrespective of their geographic locations, whereas global planning system plays an important role in maximizing the overall efficiency of manufacturing process required for achieving higher customer satisfaction.

1.5 VALUE CHAIN AND VALUE DELIVERY ANALYSIS FOR SCM

Q20. Explain the concept of value chain in the achivement of supply chain management objective.

Ans : **(Imp.)**

Value Chain Analysis

The value chain is a type of supply chain wherein the relationships and interdependencies between the suppliers, buyers, intermediaries and customers can be identified. The main purpose of value chain

analysis is to identify the 'value' that has to be created for customers which acts as a major source of achieving competitive advantage. 'Value' is the networth of disposable income spent by the individuals in acquiring firm's goods/services.

'Value' may be exemplified by the form of selling core or undifferentiated product at a price generally less than the competitors's price. Value may also be referred to a form of unique benefits acquired by the customers in return of premium pricing.

The "value chain analysis" may be defined as the way of analyzing the activities of not only focal firms but also their counterparties within an overall supply chain, so as to ensure that value has been delivered to the customers. Such value may be in the form of quality goods/services, low price, products with desirable features, durability, flexibility etc.

Usually, value may be defined as quality, exclusivity, convenience or service response of customers. Total cost associated with a product or service is shown in the figure,

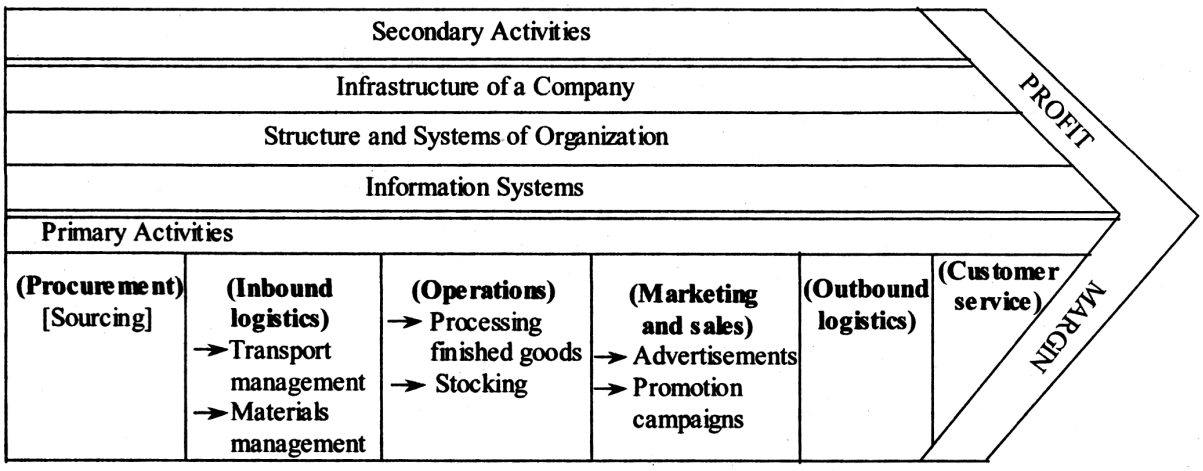


Fig. A logistic View of the Value Chain

The "total customer cost" is an aggregate of cost of the products along with additional costs which the firm has to incur in delivering them to the ultimate customers. These additional costs may be transportation cost, logistic cost, cost of holding stocks etc. While deriving the total cost of a product, all the associated costs along with the total benefits or value acquired from the products/services need to be considered.

The concept of value chain can be extended to a "value delivery system" by emphasizing the expectations of customers regarding the value of products or services.

Value delivered to a customer is a function of three feature.

1. Width, depth and availability of products
2. The order administration and delivery process
3. A customer service process.

These three functional elements are described in the following figure,

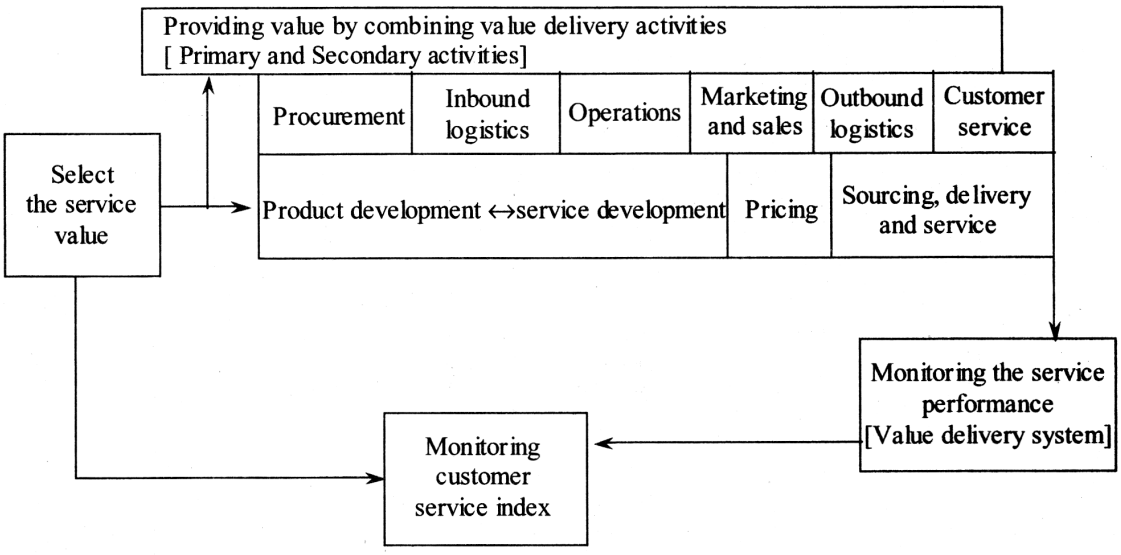


Fig: Combining Value Chain with Value Delivery System

Functioning of an Integrated Concept

The primary activities of value chain are combined to form various combinations of products/ services that are helpful in fulfilling the demands of both individual customers and customer segments. After producing goods, the next step is packaging which involves two important tasks of pricing and sourcing. 'Pricing' represents the total value for both suppliers and customers, while sourcing refers to all those activities involved in producing tangible products and intangible services that differentiates the core tangible elements (inputs) from the final value-added products/services.

Even, latest information systems, like EDI (Electronic Data Interchange) plays a very important role in adding value to the inputs of supply chain. EDI provides the following advantages to,

1. Improvement in the productivity of logistics
2. Rapid and accurate flow of informations
3. Improved cash flows
4. Reduced forecasting errors
5. Improved leading linkages.

In order to perform efficiently, EDI requires accurate EPOS (Electronic Point Of Sale) data, which enables it for the effective management of production operations and inventory allocations.

Benefits of value chain analysis

Following are the benefits of value chain in supply chain,

1. It helps in the identification of all those roles and activities that needs to be performed for achieving customer satisfaction.
2. Through value-chain analysis, critical activities can be determined which helps the firm in reducing the overall cost by eliminating the intermediaries that are responsible for increasing the overall cost of supply chain.
3. Activity based costing is used to determine the accurate costs of the process.

Q21. What are the value delivery systems for SCM ?

Ans :

Business often refers to customer value and added value without providing corresponding definitions or understanding of what value is to the customer. Indeed "value for money" is probably the most frequent questions to appear on trade and consumer questionnaires.

- **Value :** Clearly from a logistics strategy view point a detailed understanding of value is necessary. Further more, there may well be a range of definitions as the customers expectations for, or of, value vary from one market segment to another segment.

  Thus values maybe, quality, exclusivity, convenience or possibly services response. The common denominator is cost to the customer.

- **Value delivery system :** This system also affect on supply chain management.

  The order administration and delivery process specified by the customer. A customer service process comprising communication access and problem resolution at a level of detail and at a time period response satisfactory to meet the customer's operational requirements.

  Clearly the 'Value' delivered to the customer is a function of all three items and the process is described in above figure.

  The primary activities of the company combine in specific product service combinations which meet the criteria specified by individual customers or criteria which although a little flexible do meet the needs of a specific customer segment.

  Pricing and sourcing and important elements in the package as they reflect specific aspects of the product pricing reflects a negotiated overall value (value for both customer and supplier) while sourcing reflects the tasks involved in producing both the tangible product and the intangible service package that differentiates and increase the value added to the tangible element of product package.

The new view of marketing is that it is responsible for designing and meaning a superior value delivery system to reach target customer segments. Today's marketing executive must think not only about selling today's products, but how to stimulate the development of improved company products, working actively with other determents in managing core business processes and building stronger external partnerships.

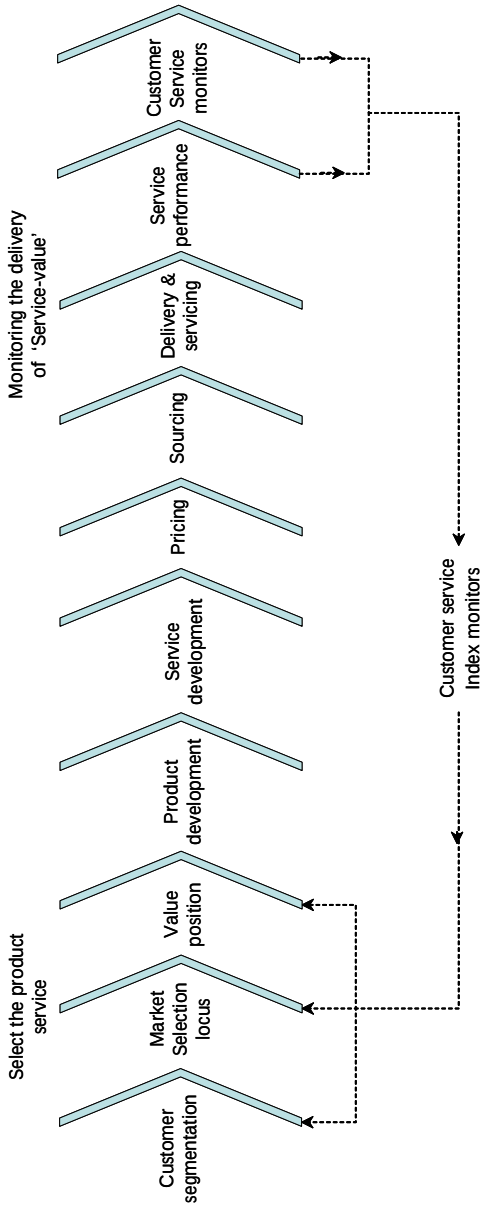


Fig.: A Value Delivery System

Q22 Compare and contrast Value Chain Analysis and Value Delivery System.

Ans :

(a) Value Chain Analysis

In order to better understand the activities leading to a competitive advantage, one can begin with the generic value chain and then identify the relevant firm-specific activities. Process flows can be mapped, and these flows used to isolate the individual value creating activities.

Once the discrete activities are defined, linkages between activities should be identified. A linkage exists if the performance or cost of one activity affects that of another. Competitive advantage may be obtained by optimizing and coordinating linked activities.

The value chain also is useful in outsourcing decisions. Understanding the linkages between activities can lead to more optimal make-or-buy decisions that can result in either a cost advantage or a differentiation advantage.

(b) The Value System

The firm's value chain links to the value chains of upstream suppliers and downstream buyers. The result is a larger stream of activities known as the value system. The development of a competitive advantage depends not only on the firm-specific value chain, but also on the value system of which the firm is a part.

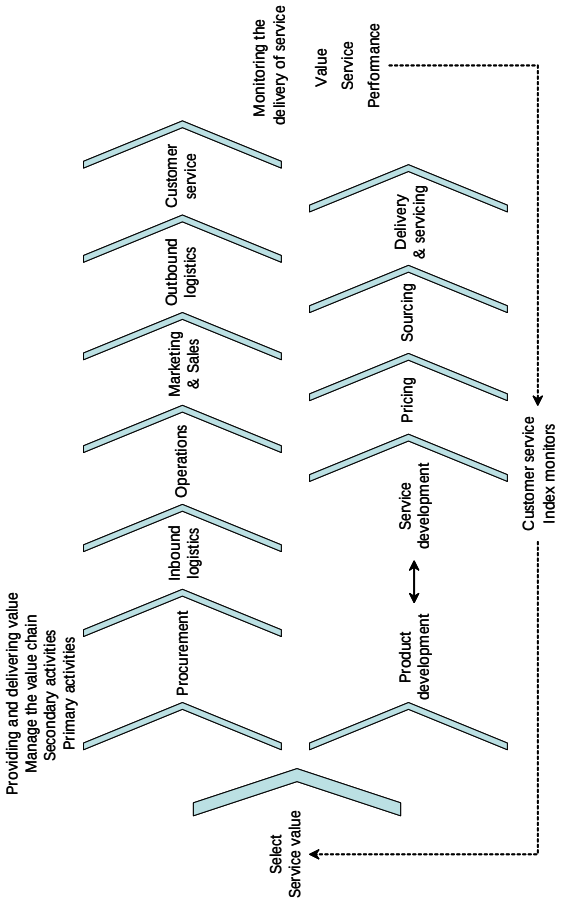


Fig.: Linking the value chain with value delivery

1.6 BULL-WHIP EFFECT

Q23. Explain the concept of Bull - Whip Effect in supply chain management.

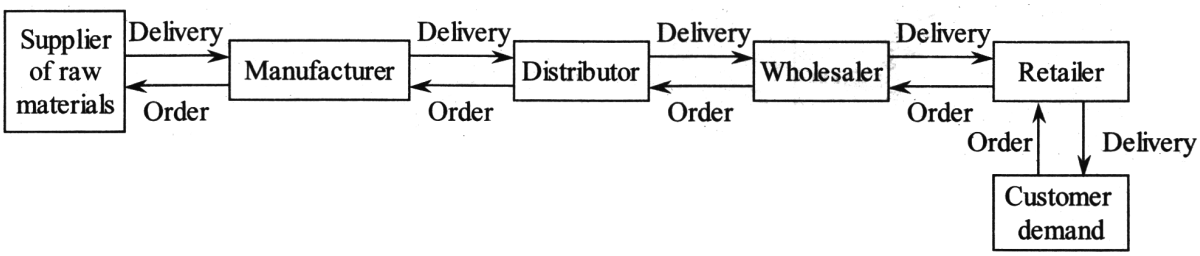
Ans :

The phenomenon of increase in the demand or order variability across the supply chain while moving upwards i.e., lfom customers to manufacturers is termed as "bull-whip effect".

In case of products with stable demand the retail sales will remain constant but there has been an increase in fluctuations in order quantities placed by distributors and wholesalers and manufacturers which resulted in increase in inventory and back order levels in a supply chain.

Example

Phenomenon of bull-whip effect can be better understood by studying the demand fluctuation for pampers of "proctor and gamble". These products, have stable demand and have high fluctuations in orders from distributors, wholesalers and manufacturers than retail sales.



In this supply chain, the retailer places an order to the wholesalers for the products based on the demand forecasts. Wholesaler then places an order to distributors who in turn receive goods from the manufacturer.

Factors influencing Bull-Whip Effect.

The following are the factors which are responsible for the increase in variability in supply chain or bull-whip effect,

(a) Demand forecasting

(b) Increased lead times

(c) Batch ordering

(d) Price fluctuations

(e) Inflated orders.

a) Demand Forecasting

The phenomenon of bull-whip effect is caused due to the use of traditional inventory management methods. Firm always use inventory control techniques mostly periodic review policy. In this policy warehouses need to ascertain the target inventory level, the base stock level by reviewing the inventory position periodically. On the basis of such reviews the warehouses can place an order for maintaining the base-stock level. The base stock level should be maintained equal to the demand required in leadtime and review period. Safety stock should also be maintained to reduce the bottlenecks in supply.

Base-stock level and safety stock can be determined by estimating average demand and demand variations across the supply chain using standard forecast smoothing techniques. These estimates

drives the warehouse manager to vary the order quantities which results in bull whip effect.

b) Lead Time

The demand variability increases with an increase in lead time, as the lead times has significant impact on the level of safety stock and base stock estimations.

Safety stock/Base stock level

$$= (L + r) \times \sigma_{cd} \times \sqrt{r + L}$$

where

L = Lead time

r = Review period

σ_{cd} = Standard deviation of consumer demand.

Any increase in lead time would result in the change in safety stock and base stock level, which further results in variations in order quantities. These variations ultimately results in the bull-whip effect.

c) Batch Ordering

Batch ordering has a significant impact on increase in variability in order quantities. If a retailer follow *(Q, R)* policy i.e., batch order policy then he would place a bulk order to the wholesalers and sees that he does not place any order for several periods. Again after sometime he would place a bulk order and so on. This pattern would result in significant fluctuations in the order quantities which are placed to the wholesalers.

Firms often make use of batch ordering because of the following reasons,

- To reduce the order costs
- To reduce the transportation costs
- To avail the discounts for making bulk purchases.

d) Price Fluctuations

Fluctuations in price also affects the demand variations. In order to sustain the price fluctuations most of the retailers place orders in bulk when the prices are low. Whereas in the normal times they will place standard orders only to that they do not incur much/ greater losses.'

e) Inflated Orders

Sometimes, retailers would go for the inflated orders for the products which are scarce in nature. After this period retailers will place standard orders. These changes in order quantities due to shortage of supply would lead to variations in demand estimates which further results in bull-whip effect.

Q24. What are the various methods through which impact of bull-whip effect can be reduced?

Ans :

The impact of bull-whip effect on firm's operations can be reduced to a great extent use by making anyone of the following methods as follows,

a) Minimizing uncertainty

b) Minimizing variability of consumer demand

c) Minimization of lead times

d) Strategic partnerships.

a) Minimizing Uncertainty

Firm can reduce the bull-whip effect by reducing uncertainty with the help of supply chain by centralizing the demand information among all the supply chain members or at any stage of supply chain. Therefore, the firms can reduce uncertainty with the help of centralizing the demand information. The centralized data helps in the use of single inventory policy. Single forecasting method, pricing strategies and so on, there still exists bull whip effect. Thus, it is clear that reducing uncertainty through centralization of information cannot eliminate the bull whip effect but can reduce it's impact greatly on the firm's operations.

b) Reducing Variability of Consumer Demand

Firm can reduce the bull-whip effect by reducing the variations in the consumer

demand process. Eventhough, the bull-whip effect reduces the variations in consumer demand it can also reduce the variations in demand at any stage of supply chain.

Example

A firm can reduce consumer demand variations using Every Day Low Price (EDLP) strategy i.e., maintaining low prices and reducing price promotions. This method can eliminate the variations in demand pattern which leads to maintaining consistent demand thereby reducing the bull whip effect.

c) Minimization of Lead Time

As mentioned earlier, lead time has a significant impact on demand estimation variability. Increase in lead time leads to significant increase in order quantity variability across the supply chain. Thus, firm should reduce the lead times in order to reduce the impact of bull-whip effect. Lead times can be reduced by managing it's components such as,

i) Order lead time for shipment can be managed or reduced through cross-docking.

ii) Information lead time for order processing can be reduced through electronic data interchange.

d) Strategic Partnerships

Strategic partnerships can reduce the impact of bull-whip effect on firm's operations. Strategic partnerships provide different ways of information sharing and inventory management across the supply chain which can reduce the demand variability.

Example

Firms by using Vendor Managed Inventory (VMI) can reduce the impact of bull-whip effect by managing the inventory based on their own estimates and demand forecasts but not on the retailer.

Short Question and Answers

1. Define Supply chain management.

Ans :

Introduction

Supply chain management (SCM) is the active management of supply chain activities to maximize customer value and achieve a sustainable competitive advantage. It represents a conscious effort by the supply chain firms to develop and run supply chains in the most effective & efficient ways possible. Supply chain activities cover everything from product development, sourcing, production, and logistics, as well as the information systems needed to coordinate these activities.

A supply chain is the process of moving goods from the customer order through the raw materials stage, supply, production and distribution of products to the customer. All organizations have supply chains of varying degrees, depending upon the size of the organization and the type of product manufactured.

The Institute for Supply Chain Management (ISM), founded in 1915 in USA, serves about 50,000 member professionals. Its mission is "to educate, develop and advance the purchasing and supply management profession."

Meaning of Supply Chain Management (SCM)

Supply Chain Management is the systematic, strategic co-ordination of the traditional business functions and the tactics across these business functions within a particular company and across business within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.

Supply chain management is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers.

SCM deals with design, planning, execution, control, and monitoring of supply chain activities with the objective of creating the value

Definitions of Supply Chain Management

i) **According to Jones and Riley,** "Supply chain management deals with the total flow of material from supplier through end user".

ii) **According to Cooper and Ellram,** "Supply chain management is an integrative philosophy to manage the total flow of distribution channel front the supplier to the ultimate user".

iii) **According to Marty Weil,** "Supply chain management is the ability to get closer to the customer".

iv) **According to Professor Douglas M. Lambert,** "Supply chain management as the integration of business process from the end user through original suppliers who provide products, services, and information that adds value for the customer".

2. Components of Supply Chain Management.

Ans :

1. Plan

Planning is the first and most important strategic function in SCM. The planning process lays down the strategy for managing and handling all resources that are used in providing the service or product that the company is involved in. Planning involves developing a set of metrics that enables the company to maximize efficiency by monitoring the flow of materials through the supply chain.

2. Source

Sourcing is the next component that managers consider in SCM. Sourcing involves

studying supplier competencies and selecting one, based on one or more criteria. When a supplier is chosen, they must be prepared to deliver goods and services that the businesses need to create their products. Managers in SCM develop policies for pricing, delivery and payment with each supplier, and monitor and improve relationships by using metrics.

3. Manufacture

The next component involves the actual manufacturing process. SCM managers schedule activities for manufacturing, quality testing, packaging and shipping by coordinating the actions of each and every entity involved in the various related processes.

4. Deliver

After the manufacturing process comes delivery. SCM managers in the delivery process must synchronize activities of partner businesses involved in the transportation of goods. Sometimes referred to as logistics, delivery is an involved stage requiring large amounts of data from customer orders, warehouses and carriers.

3. What are the key benefits of Supply chain management?

Ans :

- Minimizes warehouse and transportation costs
- Minimizes direct and indirect costs
- Assists in achieving shipping of right products to the right place at the right time.
- Enhances inventory management, supporting the successful execution of just-intimae stock models.
- Assists companies in adapting to the challenges of globalization, economic upheaval, expanding consumer expectations, and related differences.

Assists companies in minimizing waste, driving out costs, and achieving efficiencies throughout the supply chain process.

4. Define Supply Chain Strategy?

Ans :

Supply chain Strategy is a broader term which mainly focuses on the methods of operations of supply chain in order to achieve competitive edge over competitors. Supply chain strategy is a continous process, in which operational components are continuously analyzed to assess their cost-benefit trade-offs. Supply chain strategy is mainly responsible for creating value for both the company as well as for its stakeholders. An effective supply chain strategy along with innovative technologies not only help in meeting the demands of the market but also help the firm to reach the highest level of customer satisfaction.

5. Define global supply chain management.

Ans :

In today's business era, "globalization is found to be offering many opportunities and challenges for both logistics and supply chain operations. Firms are expanding globally with an intention of minimizing costs. In such a competitive environment, success can be achieved by identifying opportunities with the help of two vectors namely, cost-led productivity vector and customer-led/market-led vector.

These opportunities include market expansion, product differentiations, and human and material resources advantages. However. It should be noted that some regions of the world enable the firm to achieve significant economies of scale due to their competitive wage scales, while other requires expertise due to significant flexibility in those regions.

6. Value Chain Analysis.

Ans :

The value chain is a type of supply chain wherein the relationships and interdependencies between the suppliers, buyers, intermediaries and customers can be identified. The main purpose of value chain analysis is to identify the 'value' that has to be created for customers which acts as a major source of achieving competitive advantage.

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7. Benefits of value chain analysis.

Ans :

Following are the benefits of value chain in supply chain,

1. It helps in the identification of all those roles and activities that needs to be performed for achieving customer satisfaction.
2. Through value-chain analysis, critical activities can be determined which helps the firm in reducing the overall cost by eliminating the intermediaries that are responsible for increasing the overall cost of supply chain.
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8. Bull - Whip Effect .

Ans :

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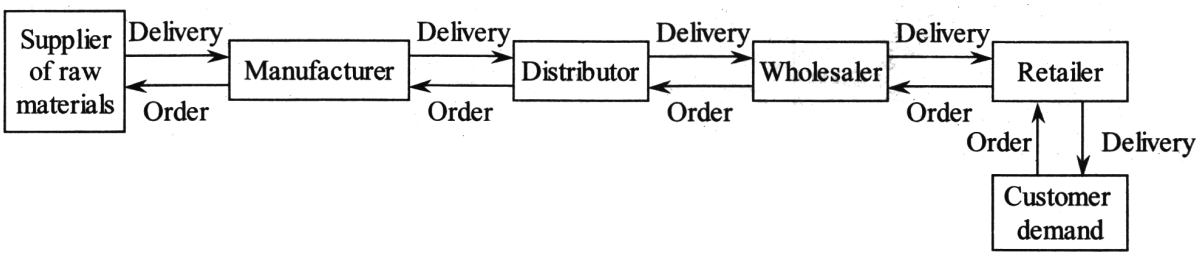


In this supply chain, the retailer places an order to the wholesalers for the products based on the demand forecasts. Wholesaler then places an order to distributors who in turn receive goods from the manufacturer.

Choose the Correct Answers

1. What are the functions of supply chain? [c]
   (a) Reducing uncertainty (b) Reducing lead time
   (c) Both (a) and (b) (d) None of the above
2. Function of SCM [d]
   (a) Improving flexibility (b) Reducing Lead Time
   (c) Improving Quality (d) All
3. Which factor affects the formulation of a supply chain strategy? [c]
   (a) Profitability (b) Flexibility
   (c) Consistency (d) All
4. Feature of SCM . [a]
   (a) Cooperation (b) Generic Activities
   (c) Deman flow Strategy (d) All
5. Which one of the following does not constitute internal factors affecting demand.? [d]
   (a) Product price (b) Sales planning Process
   (c) Promotional strategies (d) Global competetion
6. Objective of Supply chain [d]
   (a) Reduce Cost (b) Inhanced Services
   (c) Flexibility (d) All
7. How is complexity in supply chain managed? [d]
   (a) Using correct metrics
   (b) Alignment of supply chain and product development
   (c) Limit and prioritize products
   (d) All of the above
8. Advantage of Value Chain System. [a]
   (a) Cost Advantage (b) Quality Advantage
   (c) Lead Time (d) Batch Ordering
9. Supply chain strategy is a _____ process. [a]
   (a) Iteractive (b) Proactive
   (c) Reactive (d) All
10. _____ is a process that follows capacity planning and uses medium range forecasting. [b]
   (a) Aggregate scheduling (b) Aggregate planning
   (c) Demand planning (d) Production planning

Fill in the blanks

1. The scope of supply chain management includes _____ and _____.
2. The process of grouping of component parts of various stages of production is called as _____.
3. _____ activities improve the value of the product and deals with customer support, repair services etc.
4. _____ refers to distortion and uncertain in demand.
5. The linkages or acti vities in which raw materials and goods flow from supplier to the firm and from manufacturer to the end customer are _____ and _____
6. _____ is defined as the series of activities involving different facilities and functions that are used in the production of a product or service and then finally it is delivered to the customers, who are located in different geographical areas.
7. The primary and support activities were given by _____.
8. The reason for complexity in supply chain is mainly due to _____.
9. A process in which damaged or defective products are returned by the consumer are again processed is called as _____.
10. A firm can manage supply by managing _____ and _____ to meet predictable variability.

ANSWERS

1. Functional scope and organizational scope
2. "Kitting of Supplies"
3. Service
4. "Bull whip effect"
5. Upstream and downstream linkages
6. Global supply chain
7. Michael Porter
8. Product proliferation
9. Reverse supply chain
10. Capacity and inventory levels

UNIT II

Supply Chain Structure and Inventory in SC: Logistics Management, Intergrated logistics Management, Inbound and Outbound Logistics, Logistics Planning and strategy, Reverse Logistics. Inventory management and its role in customer service.

2.1 LOGISTICS MANAGEMENT

Q1. Define the term logistics and logistic management.

Ans :

Logistics

The word, 'Logistics' is derived from French word 'Loger', which means art of war pertaining to movement and supply of armies.

1. A military concept
2. Fighting a war requires:
   (i) Setting an objective
   (ii) Meticulous planning to achieve the objective
   (iii) Proper deployment of troops
   (iv) Supply lines consisting of weaponry, food, etc
3. Logistics plan should be such that there is minimum loss of men and material.

Logistics Activities

1. Customers service
2. Demand forecasting
3. Distribution
4. Inventory control
5. Material handling
6. Order processing
7. Part and service support
8. Plant and warehouse side selection
9. Procurement
10. Packaging
11. Return goods handling
12. Salvage and scrap disposal
13. Traffic and transportation
14. Warehousing and storage

Logistics is the one of the most important segment of the phenomenon of marketing in business. It is a subset of Supply Chain Management. In the business functioning, the trader gets order for supply of his goods or services through his marketing executives or directly from customers and then to execute the order to the satisfaction of the customer, the trader or his supplier company prepares the Logistics i.e., procures the product or services, puts labels on them, or gives some identification trademark name to them, makes necessary packing and packaging so as to save them from damage of any kind during loading, unloading, handling, transportation etc., till is supplied to the end customer. More simply, it is a bundle of goods finally ready to be supplied to the customer.

Logistics Management

Logistics management is a wide term, applicable to both private and non profit public sectors. In 1960's, the concept of logistics management was appeared in business literature as "Physical distribution management", which was mainly responsible for the management of external environment of logistics system. But in modern era. the term has been changed to "logistics" as it mainly deals with all the activities that have an impact on making goods and services easily available to the customers.

Definitions of Logistics Management

a) According to Council of Logistics Management (CLM)

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

b) According to Robert A. Novack

"Logistics is an activity involving the creation of time, place, form and procession of utilities within and among firms and individuals through strategic management with the goal of creating products/services that satisfy customer through attainment of value".

Q2. What are the Objectives of Logistics Management.

Ans :

1. Rapid Response

Rapid response is concerned with a firm's ability to satisfy customer's requirement in a timely manner. Instead of stocking the goods and supplying on demand, orders are executed on shipment-to-shipment basis. Here IT helps to postpone the logistical operations to the latest possible time and then execute rapid delivery as when needed by customer.

2. Minimum Variance

Variance is any unexpected event that disrupts system. Logistical operations are disrupted by events like delays in order receipt, disruption in manufacturing, goods damaged at customer's location and delivery to an incorrect location etc. Traditional solution to deal with variance was to keep safety stock or use high cost transportation. Such practices were expensive and risky and thus have been replaced by information technology to achieve positive logistics control.

3. Minimum Inventory

The objective of minimum inventory involves asset commitment and inventory turnover. Asset commitment is the financial value of inventory developed throughout the logical system and inventory turnover is the rate of inventory usage over time. The objective is to reduce the inventory without sacrificing customer satisfaction.

4. Movement Consolidation

One of the most significant logistical costs is transportation. Transportation cost depends on type of product, size of shipment and distance. Movement consolidation means grouping small shipments together in order to reduce transportation cost.

5. Quality Improvement

Logistics is a prime part of developing and maintaining continuous TQM improvement. If the quality of product fails, logistics will have to ship the product out of customer's premises and repeat the logistical function again. This adds to cost and customer dissatisfaction.

6. Life-Cycle Support

Life cycle support is also called cradle-to-cradle logistical support. It means going beyond reverse logistics and recycling to include the possibility of after sale services, product recalls and product disposal. This means that firms must consider how to make a product and its package (cradle) and the how to remake and reuse them (to cradle). E.g. Cold drink industries use their glass bottle again and again whereas the cans are reused in making of paper dishes.

Q3. Explain different types of Logistics Costs.

Ans :

Logistics costs are created by logistics activities such as customer service, transportation, warehousing, order processing and information, lot quantity and inventory carrying, which are discussed in the following paragraphs :

i. Customer Service Level

The key cost trade-off resulting from varying levels of customer service is the cost of lost sales. Expenses for customer service support includes the costs of order fulfillment, parts and service support and costs of return goods handling.

ii. Transportation Costs

These costs are determined by the activity of transporting goods. Costs vary considerably with volume of shipment, weight of shipment, distance between point of origin and destination and also with the mode of transportation chosen (land, ocean or air).

iii. Warehousing Costs

These costs are due to warehousing and storage activities and also due to warehouse and plant location selection process.

iv. Order Processing/Information Systems Costs

These costs are related to activities such as order processing, distribution communications and demand forecasting. Order processing costs include costs of order transmittal, order entry, order processing etc.

v. Lot Quantity Costs

These costs are due to procurement and production lot quantities. Lot quantity costs are related to purchasing or production and these costs vary with changes in order size or frequency. They include: (a) setup costs, (b) capacity lost due to down time during change over of production' set ups or change over to a new supplier, (c) material handling, scheduling, expediting, (d) price differentials due to buying in different lot sizes and (e) order costs associated with order placement and follow up.

vi. Inventory Carrying Costs

Logistics activities that cause inventory carrying costs include inventory control, packaging and salvage and scrap disposal.

The inventory costs are made up of :

a) Capital cost ox opportunity costs,

b) Inventory service cost (insurance and taxes on inventory),

c) Storage space cost and

d) Inventory risk cost including obsolescence, pilferage, and damage.

Q4. Describe the various models of Logistics Management.

Ans :

Various quantitative models can be used to address the decision areas in logistics. Some of these models are explained as under.)

1. Forecasting Models

These models allow prediction of demand based on past data or other parameters that are independently available. They enable better planning, given the lead-time necessary for response.

2. Mathematical Programming Models

i) Location Models

These models help in planning the optimal location of plants or warehouses, considering the inbound and outbound transportation costs and infrastructure costs at the location. Such models can be solved as an integer programme or sometimes as a linear programme.

ii) Allocation Models

These models help in optimally allocating commodities from sources to destinations in a multi-source, multi-destination environment. For example, a product that is manufactured in 15 plants and distributed through 30 warehouses could use such a model for optimal allocation. The costs considered for optimization are production costs. Transportations costs and warehousing costs. The constraints considered can be due to demand, capacity, route restrictions, etc.

iii) Distribution Network Design Models

These models are usually comprehensive in nature, deciding between a two, three or even four stage distribution network, location of warehouses and break bulk points, and sometimes even the transportation mode choice. The models optimize total distribution costs including transportation, warehousing and handling and inventory.

3. Inventory Models

Inventory plays a very key role in logistics management. The inventories that are directly affected due to outbound logistics are:

i) Buffers stocks to take care of uncertainties at finished goods, warehouse and retail,

ii) Shipment and batching inventories at finished goods, warehouse and retail,

iii) Pipeline inventory (Primary and secondary transportation).

Similar inventories could be listed for inbound logistics.

The typical cost trade-offs between inventory and other decisions in logistics would be:

i) Inventory *Vs.* Transportation Costs

ii) Inventory Vs. Stock Out Costs

iii) Inventory *Vs.* Spoilage and Material Handling Costs

Issues like (i) shipment size, (ii) supplying to one or many points in one shipment, (iii) single location vs. multiple location stocking directly relate to inventory and transportations costs. A number of models like the Economic Order Quantity, Economic Batch Quantity, other lot sizing models, newsboy models and variants for optimal stocking levels under uncertainty, etc., are available.

4. Routing Models

These models allow optimal routing on a transportation network from a given source to a destination. The simplest model is called the Shortest Path Problem. When deliveries or collections have to be made form multiple points, the model to use is the Traveling Salesman Problem 01 the Vehicle Routing Problem. Decision Support Systems that interactively use the expertise of the decision maker by providing graphical support through a map (for example, using a Geographical Information System) are also very useful in such decisions.

5. Scheduling Models

These models enable allocation of resources to particular activities. Depending on the criteria of interest and number of resources, the models help evaluate appropriate rules for allocation.

6. Alternatives Analysis

This model simply proposes the identification of alternatives, criteria for decision-making and analysis of the alternatives across the criteria to arrive at the best choice. Formalized approaches like analytic hierarchical process and simulation could be used in assessing the implications on the criteria.

Q5. Elucidate the Scope and Importance of Logistics Management.

Ans :

Outlined below are the key activities required to facilitate the flow of a product from point of origin to point of consumption. All of these activities, listed alphabetically below, may be considered part of the overall logistics process.

1) Customer service

Customer service has been defined as "a customer-oriented philosophy which integrates and manages all elements of the customer interlace within a predetermined optimum cost-service mix. Customer service is the output of the logistics system. It involves getting the right product to the right customer at the right place, in the right condition and at the right time, at the lowest total cost possible, Good customer service supports

customer satisfaction, which is the output of the entire marketing process.

2) Demand forecasting/planning

There are many types of demand forecasts. Marketing forecasts customer demand based on promotions, pricing, competition, and so on. Manufacturing forecasts production requirements based on marketing's sales demand forecasts and current inventory levels. Logistics usually becomes involved in forecasting in terms of how much should be ordered from its suppliers (through purchasing), and how much of finished product should be transported or held in each market that the organization serves. In some organizations, logistics may even plan production. Thus, logistics needs to be linked to both marketing and manufacturing forecasting and planning.

3) Inventory management

Inventory management involves trading off the level of inventory held to achieve high customer service levels with the cost of holding inventory, including capital tied up in inventory, variable storage costs, and obsolescence. These costs can range from 14 to over 50 percent of the value of inventory on an annual basis! With high costs for items such as high-tech merchandise, automobiles, and seasonal items that rapidly be come/ obsolete, many organizations, including Hewlett Packard. Xerox, and Sears, are giving inventory management much more attention.

4) Logistics communications

Communications are becoming increasingly automated, complex, and rapid. Logistics interfaces with a wide array of functions and organizations in its communication processes. Communication must occur between:

1. The organization and its suppliers and customers.
2. The major functions within the organization, such as logistics, engineering, accounting, marketing, and production.
3. The various logistics activities listed previously.
4. The various aspects of each logistics activity, such as coordinating warehousing of material, work in process, and finished goods.
5. Various members of the supply chain, such as intermediaries and secondary customers or suppliers who may not be directly linked to the firm.

Communication is key to the efficient functioning of any system, whether it be the distribution system of an organization or the wider supply chain.

5) Material handling

Materials handling is a broad area that encompasses virtually all aspects of all movements of raw materials, work in process, or finished goods within a plant or warehouse. Because an organization incurs costs without adding value each time an item moves or is handled, a primary objective of materials management is to eliminate handling wherever possible. That includes minimizing travel distance, bottlenecks, inventory levels, and loss due to waste, mishandling, pilferage, and damage. Thus, by carefully analyzing material flows, materials management can save the organization significant amounts of money.

6) Order processing

Order processing entails the systems that an organization has for getting orders from customers, checking on the status of orders and communicating to customers about them, and actually filling the order and making it available lo the customer. Part of the order processing includes checking inventory status, customer credit, invoicing, and accounts receivable. Thus, order processing is a broad, highly automated area. Because the order processing cycle is a key area of customer interface with the organization, it can have a big impact on a customer's perception of service and therefore, satisfaction.

7) Packaging

Packaging is valuable both as a form of advertising/marketing, and for protection and storage from a logistical perspective. Packaging can convey important information to inform the consumer. Aesthetically pleasing packaging also can attract the consumer's attention. Logistically, packaging provides protection during storage and transport. This is especially important for long distances over multiple transportation modes such as international shipping.

Packaging can ease movement and storage by being properly designed for the warehouse configuration and materials handling equipment.

8) Parts and service support

In addition to supporting production through the movement of materials, work in process and finished goods, logistics also is responsible for providing after-sale service support. This may include delivery of repair parts to dealers, stocking adequate spares, picking up defective or malfunctioning products from customers, and responding quickly to demands for repairs.

9) Traffic and transportation

A key logistics activity is to actually provide for the movement of materials and goods from point of origin to point of consumption, and perhaps to its ultimate point of disposal as well. Transportation involves selection of the mode (e.g., air, rail, water, truck, or pipeline), the routing of the shipment, assuring of compliance with regulations in the region of the country where shipment is occurring, and selection of the carrier. It is frequently the largest single cost among logistics activities.

Q6. What are the Elements of Logistics Management?

Ans :

The following are the important elements of logistics management which are usually referred to as "wings of logistics".

1. Transportation

It is one of the most important activities of logistics which involves the physical distribution of goods with the help of a network. This network is formed by a group of different transportation organizations who are engaged in providing valuee-added service to the firms, that are responsible for the physical movement of goods. The logistics manager must select those modes of transportation that brings reduced cost and increased profitability to the firm while moving raw materials, components and finished goods to the customers.

Customer Service

Two important aspects of customer service that are found to be crucial from the perspective of logistics management is that,

i) Process of direct interaction with customers during order retrievals

ii) Levels of service offered by the organization to its customers.

From an order-taking perspective, logistics ensure that adequate inventory is available with the organizations to fulfill the needs of customers in a timely manner. While on contrary to this, second dimension of customer service deals with the responsibility of logistics management to ensure that the customers get the right product at the right time in the right quantity.

2. Facility Location

This dimension of logistics, plays a key role in changing the relationships between facilities and markets or between supply areas and facilities, which in turn, influences transportation costs, customer service and inventory requirements which put forwards the need for a logistics manager to take all the decisions regarding facility locations.

Q7. Elucidate the Achievements of Logistics Management.

Ans :

Logistical organization structures vary significantly depending on specific mission, type of business, and available human resources. The goal

in creating logistical sensitivity is to stimulate all managers within an enterprise to think and act in terms of integrated capabilities and economies.

Logistical competency is achieved by coordinating

1. Network Design

Classical economies neglected the importance of facility location and overall network design., the number, size, and geographical relationship of facilities used to perform logistical operations directly affect customer service capabilities and cost.

Network design is a primary responsibility of logistical management since a firm's facility structure is used to provide products and materials to customers.

The network design requirement is to determine the number and location of all types of facilities required to perform logistics work. It is also necessary to determine the quantum inventory and how much to stock at each facility and where to assign customer orders for shipment. The network of facilities forms a structure from which logistical operations are performed.

2. Information

The importance of information to logistical performance has historically not been highlighted. This neglect resulted from the lack of suitable technology to generate desired information. Managements also lacked full appreciation and in-depth understanding of how fast and accurate communication could improve logistical performance. Both these historical deficiencies have been eliminated. Current technology is capable of handling the most demanding information requirements. If desired, information can be obtained on a real-time basis. Managers are learning how to use such information technology to devise new and unique logistical solutions.

However, the technology is only as good as the quality of information. Deficiencies in the quality of information can create countless operational problems.

3. Transportation

Given a facility network and information capability, transportation is the operational area of logistics that geographically positions inventory. Because of its fundamental importance and visible cost, transportation has received considerable of managerial attention over the years. Almost all enterprises, big and small, have managers responsible for transportation.

4. Inventory

The inventory requirements of a firm depend on the network structure and the desired level of customer service. Theoretically, a firm could stock every item sold in a facility dedicated to service each customer. Few business operations could afford such a luxurious inventory commitment because the risk and total cost would be prohibitive. The objective is to achieve the desired customer service with the minimum inventory commitment, consistent with lowest total cost.

5. Warehousing, Material Handling, and Packaging

Four of the functional areas of logistics – network design, information, transportation, and inventory – can be engineered into a variety of different operational arrangements. Each arrangement will have the potential to achieve a level of customer service at an associated total cost. In essence, these four functions combine to create a system solution for integrated logistics

The final function of logistics – warehousing, material handling, and packaging – also represents an integral part of a operating solution. Warehousing, material handling, and packaging are an integral part of other logistics areas. Transportation vehicles require material handling for efficient loading and unloading. Finally, the individual products are most efficiently handled when packaged together into shipping cartons or other types of containers.

When warehouses are required in a logistical system, a firm can between obtaining the

services of a specialist or operating its own facility. The decision is broader than simply selecting a facility to store inventory, since many activities essential to the overall logistical process are typically performed while products are warehoused.

When effectively integrated into an enterprise's logistical operations, ware housing, material handling and packaging facilitate the speed and overall ease of product flow throughout the logistical system. In fact, several firms have engineered devices to move, broad product assortments from manufacturing plants directly to retail stores without intermediate handling.

2.1.1 Gaining Competitive Advantage through Logistics

Q8. How logistics management help an organization to achieve competitive advantage?

Ans : **(Imp.)**

A central theme of effective logistics and supply chain management can provide a major source of competitive advantage - in other words a position of enduring superiority over competitors in terms of customer preference may be achieved through better management of logistics and the supply chain.

The foundations for success in the marketplace are numerous, but a simple model is based around the triangular linkage of the company, its customers and its competitors – the 'Three Cs'. Figure illustrates the three-way relationship.

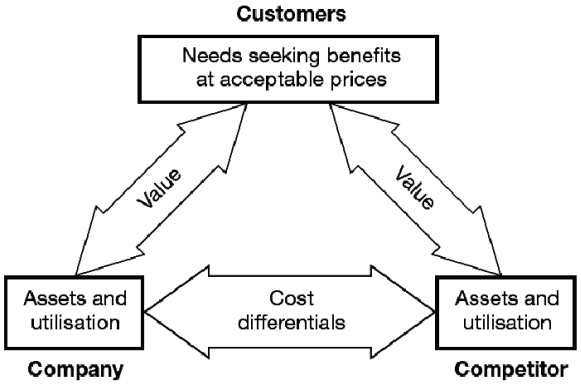


Fig.: Competitive advantage and the 'Three Cs'

The source of competitive advantage is found firstly in the ability of the organization to differentiate itself, in the eyes of the customer, from its competition, and secondly by operating at a lower cost and hence at greater profit.

Seeking a sustainable and defensible competitive advantage has become the concern of every manager who is alert to the realities of the marketplace. It is no longer acceptable to assume that good products will sell themselves, neither is it advisable to imagine that success today will carry forward into tomorrow.

Let us consider the bases of success in any competitive context. At its most elemental, commercial success derives from either a cost advantage or a value advantage or, ideally, both. It is as simple as that – the most profitable competitor in any industry sector tends to be the lowest-cost producer or the supplier providing a product with the greatest perceived differentiated values.

Put very simply, successful companies either have a cost advantage or they have a value advantage, or – even better – a combination of the two. Cost advantage gives a lower cost profile and the value advantage gives the product or offering a differential 'plus' over competitive offerings.

Let us briefly examine these two vectors of strategic direction.

1. Cost advantage

In many industries there will typically be one competitor who will be the low-cost producer and often that competitor will have the greatest sales volume in the sector. There is substantial evidence to suggest that 'big is beautiful' when it comes to cost advantage. This is partly due to economies of scale, which enable fixed costs to be spread over a greater volume, but more particularly to the impact of the 'experience curve'.

The experience curve is a phenomenon with its roots in the earlier notion of the 'learning curve'. Researchers in the Second World War discovered that it was possible to identify and predict improvements in the rate of output of workers as they became more skilled in the processes and tasks on which they were working. Subsequent work by Boston

Consulting Group, extended this concept by demonstrating that all costs, not just production costs, would decline at a given rate as volume increased (see Figure). In fact, to be precise, the relationship that the experience curve describes is between real unit costs and cumulative volume.

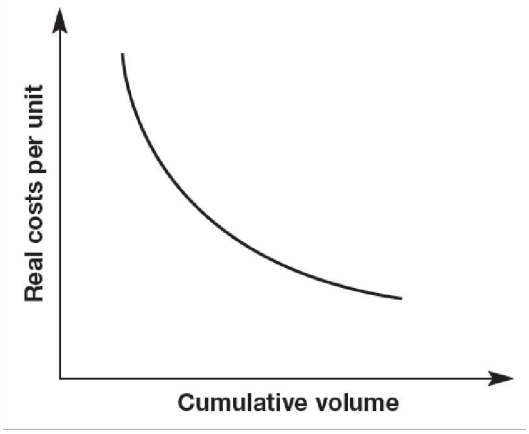


Fig.: The experience curve

Traditionally it has been suggested that the main route to cost reduction was through the achievement of greater sales volume and in particular by improving market share. However, the blind pursuit of economies of scale through volume increases may not always lead to improved profitability – the reason being that in today's world much of the cost of a product lies outside the four walls of the business in the wider supply chain. Hence it can be argued that it is increasingly through better logistics and supply chain management that efficiency and productivity can be achieved leading to significantly reduced unit costs.

2. Value advantage

It has long been an axiom in marketing that 'customers don't buy products, they buy benefits'. Put another way, the product is purchased not for itself but for the promise of what it will 'deliver'. These benefits may be intangible, i.e. they relate not to specific product features but rather to such things as image or service. In addition, the delivered offering may be seen to outperform its rivals in some functional aspect.

Unless the product or service we offer can be distinguished in some way from its competitors there is a strong likelihood that the marketplace will view it as a 'commodity' and so the sale will tend to go to the cheapest supplier. Hence the importance of seeking to add additional values to our offering to mark it out from the competition.

Seeking the high ground

In practice what we find is that the successful companies will often seek to achieve a position based upon both a cost advantage and a value advantage. A useful way of examining the available options is to present them as a simple matrix. Let us consider these options in turn.

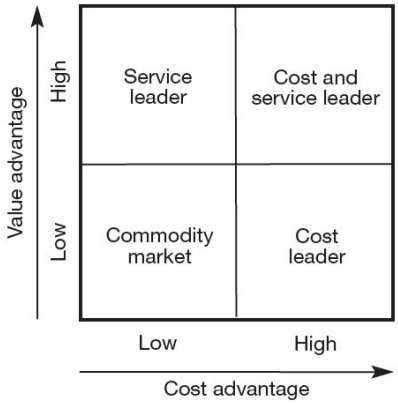


Fig.: Logistics and competitive advantage

For companies who find themselves in the bottom left-hand corner of our matrix (Figure) the world is an uncomfortable place. Their products are indistinguishable from their competitors' offerings and they have no cost advantage. These are typical commodity market situations and ultimately the only strategy is either to move to the right of the matrix, i.e. to cost leadership, or upwards towards service leadership. Often the cost leadership route is simply not available. This particularly will be the case in a mature market where substantial market share gains are difficult to achieve. new technology may sometimes provide a window of opportunity for cost reduction but in such situations the same technology is often available to competitors.

Cost leadership strategies have traditionally been based upon the economies of scale gained through sales volume. This is why market share is

considered to be so important in many industries. However, if volume is to be the basis for cost leadership then it is preferable for that volume to be gained early in the market life cycle. The 'experience curve' concept, briefly described earlier, demonstrates the value of early market share gains – the higher your share relative to your competitors the lower your costs should be. This cost advantage can be used strategically to assume a position of price leader and, if appropriate, to make it impossible for higher-cost competitors to survive. Alternatively, price may be maintained, enabling above-average profit to be earned, which potentially is available to further develop the position of the product in the market.

However, an increasingly powerful route to achieving a cost advantage comes not necessarily through volume and the economies of scale but instead through logistics and supply chain management. In many industries, logistics costs represent such a significant proportion of total costs that it is possible to make major cost reductions through fundamentally re-engineering logistics processes. The means whereby this can be achieved will be returned to later in this book.

The other way out of the 'commodity' quadrant of the matrix is to seek a strategy of differentiation through service excellence. We have already commented on the fact that markets have become more 'service-sensitive'. Customers in all industries are seeking greater responsiveness and reliability from suppliers; they are looking for reduced lead times, just-in-time delivery and value-added services that enable them to do a better job of serving their customers.

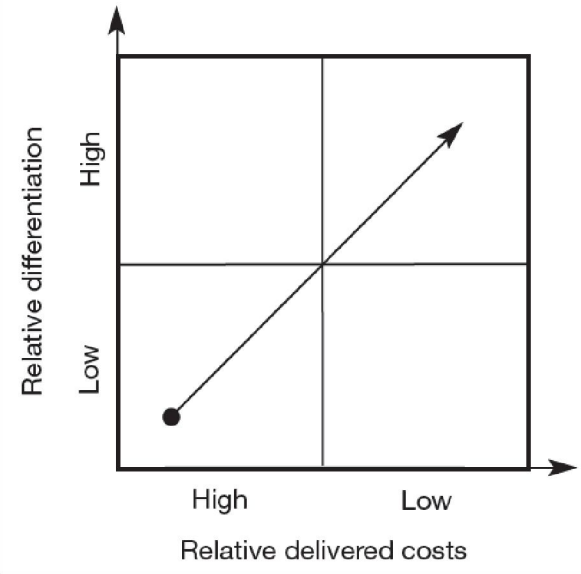


Fig. : The challenge to logistics and supply chain management

One thing is certain: there is no middle ground between cost leadership and service excellence. Indeed the challenge to management is to identify appropriate logistics and supply chain strategies to take the organization to the top right-hand corner of the matrix. Companies who occupy that position have offers that are distinctive in the value they deliver and are also cost competitive. Clearly it is a position of some strength, occupying 'high ground' that is extremely difficult for competitors to attack. Figure clearly presents the challenge: it is to seek out strategies that will take the business away from the 'commodity' end of the market towards a securer position of strength based upon differentiation and cost advantage.

Logistics management, it can be argued, has the potential to assist the organization in the achievement of both a cost advantage and a value advantage. As Figure suggests, in the first instance there are a number of important ways in which productivity can be enhanced through logistics and supply chain management.

Q9. What are the differences between logistics management and Supply Chain Management?

Ans :

Logistics Vs Supply Chain Management

S.No.	Criteria of Differentiation	Logistics Management	Supply Chain Management
1.	Definition	Logistics is a strategic process which involves the procurement of raw-materials, or component parts from suppliers to manufacturers and then the final delivery of products to the customers.	SCM is an integrated network of upstream and downstream activities that are engaged in delivering superior value to customer at low cost
2.	Origin	It emerges from the concepts of military planning.	It is an extension of logistics management.
3.	Nature of integration	It is usually formed by the internal integration of logistics functions with that of management functions.	It involves external integration of different roles associated with different parties of supply chain.
4.	Scope of operations	It has narrow scope as it involves outbound logistics, in-process inventory and inbound logistics.	It has wide scope as it involves different parties such as vendors, manufacturers, retailers, distributors and customers.
5.	Principal objective	Cost minimization by optimally allocating resources to different functional areas.	Corporate profitability by creating value for different members of supply chain.
6.	Focus	It is supply-driven as it is mainly concerned with taking the products to the end-users at low possible cost.	It is customer-focussed/demand-focussed as it is mainly concerned with satisfying the customer demands by delivering value-added service/products to them.

2.2 INTEGRATED LOGISTICS MANAGEMENT - INBOUND AND OUTBOUND LOGISTICS

Q10. Explain briefly about Integrated Logistics Management.

Ans : **(June-18)**

Integrated Logistics Management

Integrated logistics management is an approach to the distribution mission of the firm whereby two or more of the functions involved in moving goods from source to user are integrated and viewed as an inter-related system or sub-system for purposes of managerial planning, implementation and control.

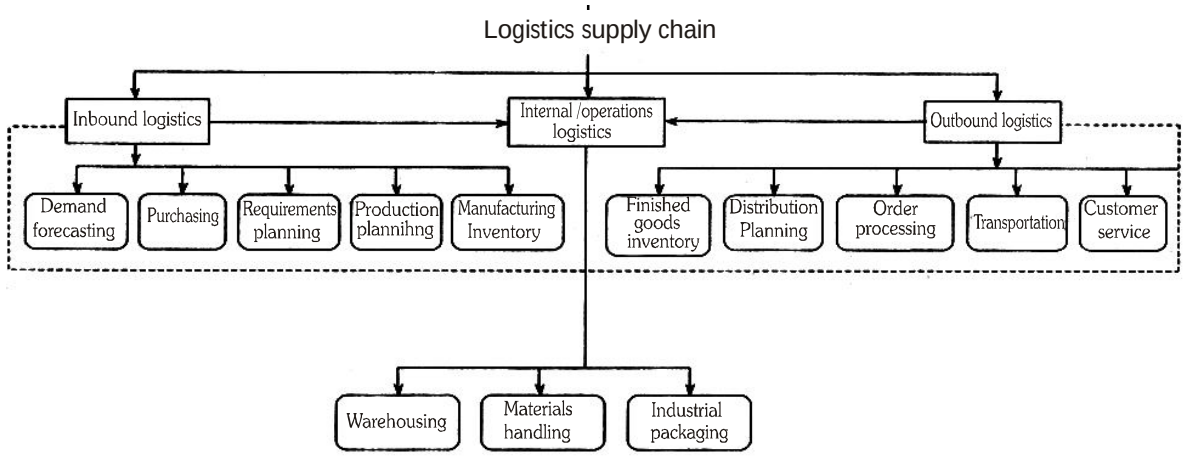


Fig. Integrated Logistics Management

SCM is an art of integrating products, information and financial resources along the entire supply chain from the supplier's supplier to the customer's, customer. Due to increased competition and global operations of the firm across the national boundaries, it has developed pressures on all the activities of logistics including both inbound and outbound activities.

Following are the activities involved in inbound logistics,

I) Inbound Logistics

The term 'inbound logistics' refers to all those activities that are found to be associated with the transfer of goods from the suppliers to the manufacturing plant, such that value-added goods can be delivered to the ultimate customers for their final consumption.

Inbound logistics is a cluster of the following activities,

1. Demand forecasting
2. Purchasing
3. Requirements planning
4. Production planning and
5. Manufacturing inventory.

1. Demand Forecasting

Demand forecasting is an important step in inbound logistics, wherein operating decisions are taken based on the forecasted results of demand for consumer's products. Through demand forecasting techniques, firms estimate both future and potential demand of their products, so as to ensure that sufficient quantity of goods must be available with the firm in order to meet consumer's demand.

2. Purchasing

It involves the process of procurement of goods, raw materials and others component parts from various suppliers depending on the consistent requirements of the firm. It integrates different members of supply chain and plays a key role in delivering quality products to the customers.

3. Requirements Planning

In this activity, logistics manager has to take various decisions regarding the selection of materials and equipments. Such type of decisions are mainly influenced by the nature of operations and also about the outputs constituting the firm's products. Firms must select only those materials that are of high quality and those which can be obtained at low cost.

4. Production Planning and Control

Production planning and control is mainly concerned with the proper alignment of product's demand with its supply i.e., it ensures that there is a proper supply of firm's products which helps in fulfilling the demands of customers. Firms can seize new opportunities of gaining profits only by maintaining a proper balance between firm's production and distribution activities.

5. Manufacturing inventory.

Manufacturing inventory control mainly deals with all those activities which are responsible for controlling the levels of inventory throughout the supply chain. Inventory needs to be available with the firm, so that it can process and fulfill the orders of customers on time.

II) Internal / Operations Logistics

It includes the following components,

(a) Warehousing

Storage forms a trade-off relationship with transportation. Storage involves two different activities,

(i) Inventory management and

(ii) Warehousing.

There exists direct relationship between transportation and inventory levels and also the number of warehouses required, i.e., if slow transportation mode is selected, firm must maintain high levels of inventory which in turn requires more warehouse space.

(b) Materials handling

Efficiency of warehouse operations and designs are usually influenced by materials handling mechanisms. Logistics manager is held responsible for the movement of goods into warehouse, their placements in storage and their final movement to order picking and dock areas, so that they can be transferred to different location through various transportation modes. Mechanical equipments e.g., conveyors, forklift trucks, overhead cranes, and Automated Storage and Retrieval Systems (ASRS) also come under materials handling.

(c) Industrial packaging

Packaging plays an important role in protecting the component parts from damages during transportation or storage. Packaging is done with the help of cardboard boxes, stretch wrap, banding, bags and so on. Transportation modes have a drastic impact on the packaging requirements. Hence, efficient mode must be selected by considering the factors, such as nature of products, perishability, durability, locations to which goods must be transferred etc.

III) Outbound Logistics

It is also termed as "physical distribution" management. It may be defined as the set of processes, systems and capabilities associated with the physical distribution of goods which enhances the firm's ability to serve its customers.

Example

Orders fulfilled by the famous retailers, such as L.L. Bean, Land's end and Eddie Bauer constitutes outbound logistics activity.

1. Finished Goods Inventory

Inventory of value-added goods is mainly dependent on demand forecasting measures.

However, if firm produces finished goods in large quantity more than that, which is required by the customers then it has to incur huge losses due to high carrying cost of inventory (of finished goods).

2. Distribution Planning

It is a widely used technique for outbound logistics system which influences the decisions related to the distribution of goods/ component parts to the customers. It refers to the transfer of right product to the right place at the right time. It enables the organization to which create their Distribution Requirement Plans (DRPs), which can be used for the accurate determination of distribution lead times.

3. Order Processing

It usually involves the credit worthiness of customers, information transfer from customers to the sales records, then processing and sending the orders to the shipping areas accompanied by the preparation of shipping documents. Such functions can be performed simultaneously by the use of updated operating systems.

4. Transportation

It is one of the most important activities of logistics which involves the physical distribution of goods with the help of a network. This network is formed by a group of different transportation organizations who are engaged in providing valuee-added service to the firms, that are responsible for the physical movement of goods. The logistics manager must select those modes of transportation that brings reduced cost and increased profitability to the firm while moving raw materials, components and finished goods to the customers.

5. Customer Service

Two important aspects of customer service that are found to be crucial from the perspective of logistics management is that,

i) Process of direct interaction with customers during order retrievals

ii) Levels of service offered by the organization to its customers.

From an order-taking perspective, logistics ensure that adequate inventory is available with the organizations to fulfill the needs of customers in a timely manner. While on contrary to this, second dimension of customer service deals with the responsibility of logistics management to ensure that the customers get the right product at the right time in the right quantity.

Q11. Explain the advantages of integrated logistics Management.

Ans : **(June-19, June-18, Imp.)**

The advantages or benefits of Integrated logistics management are as follows,

1. Realize Cost Savings

(a) It results in creation of synergies in the networks

(b) It ensure optimum utilization of logistics resources.

(c) It ensure consolidation and load optimization.

2. Improve Customer Service

(a) It ensures visibility on stock, products and orders.

(b) It maintains reliable service levels and lead times.

(c) It maintains proactive exception management to improve customer service.

3. Standardize Process of Global logistics

(a) It regulates the execution of supply chain.

(b) It ensures uniform Key Performance Indicators (KPI's) and reporting.

(c) It uses best of breed IT-systems and Integration.

4. Optimize the Networks of Logistics

(a) It simplifies the administration process.

(b) It involves shorter lead times.

(c) It develops optimum goods flows.

Through Integrated logistics management , the companies such as Gali limited provides the benefits to the customer such as,

1. Minimized product damage and obsolescence
2. Customized warehousing solutions
3. Improved visibility of supply chain
4. Transport savings
5. Single window of all requirements
6. Improved customer service and
7. Just-in -time Inventory.

Q12. Define Outbound Logistics.

Ans :

Outbound logistics is defined as, "Movement of materials associated with storing, transporting, and distributing an organization's goods to its customers"

Outbound logistics serves as a reference to documentation, picking, packing, physical goods issue in warehouse, loading, goods issue posting, advising advanced shipping notifications to business partners and obtaining a proof of delivery from the receiving business partner.

Outbound logistics processing comprises the preparation of goods to be delivered from a warehouse to a receiving location, which is within the scope of warehouse management.

To keep supply chain activities running smoothly, firms need to efficiently store, move, and transport goods while keeping inventory at minimum levels. Outbound logistics performance is an important task in Supply Chain. General out sourcing is used for servicing end customers. At the same time outbound costs need to be minimized while processes, flexibility, and customer service must be improved. Outbound logistics covers and supports the following,

(i) Operational shipping, manifesting, freight costing, freight settlement and foreign trade.

(ii) Build optimal loads with the routing and scheduling allowing a close collaboration between shipper and carrier via optimized carrier selection and tendering.

(iii) Trace and track the history of the warehouse processes in detail for each individual article.

(iv) All the processes in the warehouse from goods receipt through goods issue.

(v) Complete stock transparency, to allow firms to know what is in the warehouse.

(vi) Improve the accuracy of deliveries, thus increasing customer satisfaction.

(vii) Option to use electronic data entry and work in a paper-free environment.

(viii) Option to use RFID (Radio-Frequency Identification) to support goods issue and goods receipt processes.

(ix) Notification of goods to be supplied from a warehouse to a customer etc.

2.3 LOGISTICS PLANNING

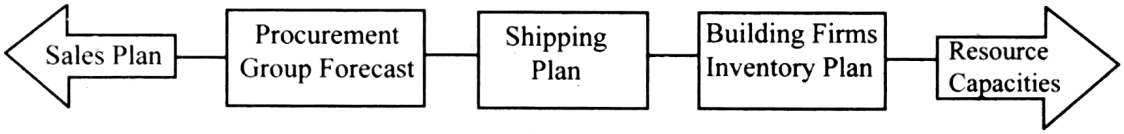
Q13. What is logistics planning ? Outline the process of logistics planning.

Ans : **(June-19)**

Logistics planning takes place when there is a need of transportation of materials among different entities who are involved in SC. The main objective of logistics planning is to assure that materials are transported from the place of origin to the end user on the basis of setup cost, schedule and quality norms. Logistics planning involves all types of materials such as raw materials both semi-finished goods and finished goods. It also involves making choices of alternative means of transportation, warehousing and transhipment, conforming to statutory requirements, supporting rules and regulations, selection of partners who undertake transportation and allied work, evaluating their performance and providing feedback etc.

Logistics Planning Process

The logistics planning process is shown in the figure below,



1. Translation of Sales Plan into Procurement Group Forecast

The primary step in logistics planning process in translation of the aggregate sales forecast into product-group- level procurement forecasts. Providing the firm with an entire product group requirements that matches with the inventory targets and financial and logistics, capacity constraints is the main objective of procurement planning. The development of procurement planning is the joint responsibility of general management, logistics marketing, sales and finance. The procurement planning output is defined in aggregate units of measure such as dollars or total units. The procurement plan should be reviewed and updated on a periodic basis. A procurement plan is considered to be effective if it is reliable with marketing and sales plans along with the company budgets included in the business plan.

2. Verifying the Aggregate Shipping Plan

The aggregate shipping plan is converted in the same product-groups, units of measure and time periods as the sales plan is composed of elements such as current customer order backlog, current customer backorders, and forecast by product group. The total dollar shipment figure should provide the sales revenue targets mentioned in the business plan. The shipping plan allows the firm to review the entire product line by product line based sales and inventory performance against the business plan.

3. Building the Firm's Inventory Plan

The traditional process of inventory plan focuses more on the inventory cycles through purchasing, stocking and shipping processes. The frequently used method of computing inventory turnover is through ratio method i.e., by dividing the forecasted annual cost of sales with average inventory level. The average inventory can be evaluated by adding the opening balances of product groups by period and in the previous period, adding all receipts and subtracting all shipments. The real value of the inventory planning is obtained by reviewing inventory balances every month through out the business year. Such monthly reviews allows marketing, sales and logistics management to calculate the sales performance of actual products with targeted inventory levels.

4. Determining the Total Logistics Resource Requirements Plan

The final step in the logistics planning process is to determine the total logistics resource requirements plan. In logistics planning capacity planning involves the aggregate resources that are required to encourage sales, shipping and inventory targets. In an enterprise the resources are classified as, inventory investment, transportation costs, ware house space capacities, labor and equipment needs. These elements are required to obtain the planned procurement for each product.

Once the marketing, logistics and sales planning process is completed, the firm can measure the planned cost of sales, sales income and other operating expenses of products and services per year. Such results helps the enterprise to validate the business plan ROI (Return on Investment) and to evaluate the available financial resources for the further growth of the firm. Moreover, shipment requirements and product group overview are used to acquire complete purchasing, delivery, inventory, facilities planning and demand management.

Thus, the logistics planning process builds a medium-range logistics operations planning platform for the top management.

2.4 LOGISTICS STRATEGY

Q14. Define logistics strategy. Explain the features of logistics strategy.

Ans :

The concept of logistics strategy is not yet evolved completely because of which it has not gained a proper definition. Thus, today, the term "logistics strategy" still presumes differently by different people.

Logistics strategy mainly deals with the determination of performance standards that has to be maintained in an organization. Most of them, establishes such standards in terms of service levels and cost objectives. Firms can achieve the desired logistics performance only by maintaining proper trade-offs between cost and service objectives. In order to make it effective, it needs to be integrated with corporate and marketing objectives.

Features of Logistics Strategy

Following are the important features of an integrated logistics strategy,

1. Consistency

For the development of an integrated strategy, all strategic activities need to be consistent across the entire supply chain, which in turn is a prerequisite for the long-term implications of a corporate market development strategy.

2. Consonance

It is two dimensional in nature as it helps in providing awareness about both competitive and customer-led marketing situations. Where one dimension is intended to bring flexibility in the logistics activity responsible for changing both corporate and marketing perspectives, while the other is concerned with environmental changes (e.g., technological changes and competitive changes).

3. Creativity

It helps in the determination of core competencies required for gaining competitive advantage. An example of creativity could be the design of customized offerings depending on the special needs of customers. Resource allocation problems can also be tackled with creativity.

Q15. Define Integrated Logistics Strategy. Explain the process of Integrated Logistics Strategy.

Ans : **(Imp.)**

The logistics strategy can be made effective by identifying the components of the process and then moving on to the development of the strategy document.

Components of the logistics strategy process can be represented as shown in figure.

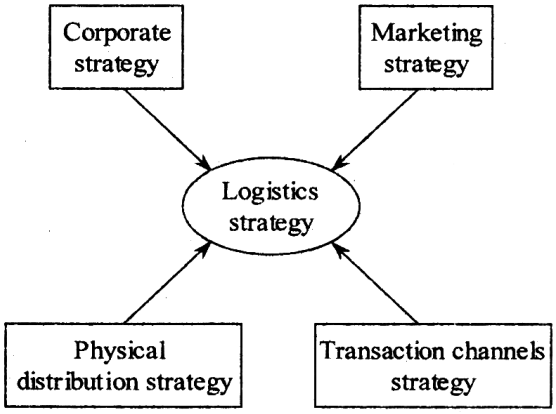


Fig. : Components of Logistics Process

The corporate logistics strategy, determines the methods with which it can effectively utilize the logistics function for the achievement of overall corporate objectives. After identifying the components of strategy, the next step is to integrate them with the pre-stated corporate strategic direction.

Thus, the logistics strategy enables the firm to determine, how the customer service can act as a supporting force for achieving corporate/marketing goals through efficient deployment of resources. Transportation, facilities, inventory and the information technology acts as building blocks of logistics strategy.

The following are the basic components of an integrated logistics strategy,

1. Corporate Strategy

Corporate strategy is mainly responsible for the achievement of corporate objectives such as,

a) To achieve high sales volumes and profit growth.

b) To improve the profit margins and cash flows of logistics operations.

c) To increase the profitability ratios i.e., return on capital employed and return on equity.

d) To achieve competitive position in an industry.

e) To expand the firm's operation on a global scale.

f) To diversify the business operations.

2. Marketing Strategy

It mainly deals with the policies of products and customer service, distribution intermediaries and promotional modes with which companies offerings can be communicated to the general public. It achieves the following objectives,

a) To achieve competitive advantage in the market by occupying significant proportion of market share.

b) To provide quality service to the customers.

c) To enhance the levels of customer satisfaction.

d) To select that market as a "target market" which provides ample of opportunities for growth and expansion.

e) To accurately forecast the demand of firm's products, so as to maintain equilibrium between supply and demand.

3. Physical Distribution Strategy

It considers transportation, facilities, inventory management and information management while formulating a distribution strategy. It is associated with the physical distribution of goods between the various partners of supply chain in such a way that it would reduce the cycle time of customer orders and would increase the service reliability,

2.5 REVERSE LOGISTICS

Q16. Define Reverse logistics. Explain the reasons and drivers of reverse logistics.

Ans :

Reverse Logistics

Reverse logistics is also known as Product Recall. It may be defined as a process of moving goods from their place of use, back to their place of manufacture for re-processing, refilling, repair, and recycling or waste disposal.

Reasons for Reverse Logistics

1. Rigid quality standards- it is critical in case of contaminated products, which can cause environmental hazard.
2. Rigid laws prohibiting unscientific disposal of items
3. Rigid laws making recycling mandatory
4. Transit damage – e.g. leaking containers containing hazardous material.
5. Product expiration.
6. Erroneous order processing by supplier
7. Exchange of new product for the old ones.
8. Return for repair or refill.

Drivers in Reverse Logistics

The success of reverse logistics depends upon the efficiency of following sub-systems :

1. Product Location

For product recall it is necessary to identify the product location in the physical distribution system of the firm. It is difficult in case of consumer goods but easier in case of industrial goods.

2. Product Collection System

After the product location is identified, product collection is to be done through company's field force or third party.

3. Recycling / Disposal Centers

This may be company's plant, warehouse or any other location. Called back products must be inspected before recycling or disposal etc.

4. Documentation System

Proper documents should be maintained at each level, this would help in tracing the product location.

Q17. Outline the Process of Reverse Logistics.

Ans :

Conventionally, the process of production ends with the customer. Whereas, in firms dealing with reverse logistics, customers are the initial points/ sources of processing. Reverse logistics in synchronization with source reduction processes not only enables the firm to reduce cost but also helps in building the image of "a responsible corporate citizen".

Mainly the process of reverse logistics initiates at warehouses which includes the following activities,

1. Returns management
2. Remanufacturing
3. Remarketing
4. Recycling and
5. Disposal.

Let us know about each activity of reverse logistics.

1. Returns Management

This stage is mainly responsible for the effective management of used/waste products. It must ensure that a proper storage facility is provided for stocking used/ waste products. It channelises the collection and storage of recalled products.

2. Remanufacturing Facility

At this stage, stocks of returned products are subjected to production processing which improves the performance of returned products. This remanufac-tured products increase corporate profitability by enhancing sales through price discount offerings.

3. Remarketing

In this stage, remarketers make use of coordination and reverse flow strategies for positioning and resale of these products when such products are not required by the original users. The Defense Logistics Agency (DLA) has established a comprehensive remarketing process by which used equipments can be transferred to other military services.

4. Recycling

Recycling is associated with the disbursement of returned products into their component parts such that they can be reused in more efficient manner than they would have been used previously. When they cannot be reused effectively, they need to get disposed off in the appropriate landfills (which also comes under reverse logistics).

5. Disposal

If the returned products cannot be recycled or remanufactured then they have to be disposed in the appropriate landfills depending on the nature of the products.

Example

Polythene bags used for carrying materials cannot enter into remanufacturing process hence can be disposed off with the help of waste dugouts, where pits are constructed for their decomposition.

Q18. Explain the Role played by reverse logistics in creating value in SCM.

Ans :

Role of reverse logistics in SCM can be understood from the following points,

Managing Reverse Flows

Several key activities or issues need to be considered while managing reverse flows in an efficient and effective manner. It has both pros and cons, as its proper management can improve firms financial position, while its mis-management brings heavy losses to a firm. Hence, proper care must be taken for its management which involves the following considerations,

1. Avoidance

Reverse flows can be avoided by delivering quality products at the initial stages of production by following efficient processes that minimizes returns.

2. Gatekeeping

By keenly checking and screening merch-andise at each stage of reverse logistics enables the firm to eliminate unnecessary returns.

3. Minimizing Reverse Lead Times

Adoption of those processes which can reduce the cycle times for returns so that they can capture value at considerably low times.

4. Information Systems

Suitable and updated information systems play an important role in improving product feasibility, uncertainty and economies of scale.

5. Facility Layouts

Firms must ensure that return centres are located optimally at various locations so as to facilitate the smooth flow of reverse logistics operations.

6. Pricing

Fixing the best price to the returned or resold products help in generating huge revenues for the firm.

7. Outsourcing

By outsourcing various functions, firms can gain increased efficiency and can reduce operating cost which it has to incur while carrying out in-built activities.

8. Zero Returns

Firms can improve customer expectations either by providing returns allowance or by destroying them when they are unable to fulfill their expectations.

9. Recovery of Assets

Classifying the returned items such that surplus, scrap or obsolete items can be discarded while only recyclable products reach the reverse logistics process. Thus, by following the above prerequisites, reyerse flows can be managed profitably and efficiently.

Q19. Define Reverse logistics strategy ?

Ans :

There is no specific reverse logistics strategy that can be applied to all the firms of an industry. However, it varies from one firm to another. This variation occurs because of changes in the number, frequency and character of returned items which is highly specific for a particular industry.

Example

The needs of a small online grocery retailer, supplying component parts to the large customer base is entirely different from that of heavy automobile industry, providing small component parts to regional suppliers.

Even, the balance of disposition options undergo a drastic change. This variation is due to the changes in the number of items that has to be repaired, refurbished, remanufactured and recycled. The following are some of the significant features seen in most successful reverse logistics strategies,

1. Even though all vendors of supply chain are providing the basic functionality of reverse logistics, they are not efficient in providing an effective module of reverse logistics. The best partners of supply chain are servicing the broad range of customers by offering flexible functionalities.

2.6 INVENTORY MANAGEMENT

Q20. Define inventory management. Explain the components of inventory.

Ans :

The term "Inventory" has originated from the French word "Inventaire" and the Latin word "Inventariom" which implies a list of things found. The term inventory has been defined by the American Institute of Accountants as the aggregate of those items of tangible personal property which (a) are held for sale in the ordinary course of business, (b) are in the process of production for such sales, or (c) are to be currently consumed in the production of goods or services to be available for sale. The term inventory refers to the stockpile of the products a firm is offering for sales and the components that make up the product. Inventories are the stocks of the product of a company, manufacturing for sale and the components that make up the product. The various forms in which inventories exist in a manufacturing company are: (i) raw materials, (ii) work-in process, (iii) finished goods, and (iv) stores & spares. However, in commercial parlance, inventory usually includes stores, raw materials, work-in-process and finished goods. The term inventory includes - raw materials, work-in-process, finished goods packaging, spares and others stocked in order to meet an unexpected demand or distribution in the future.

Components of Inventory

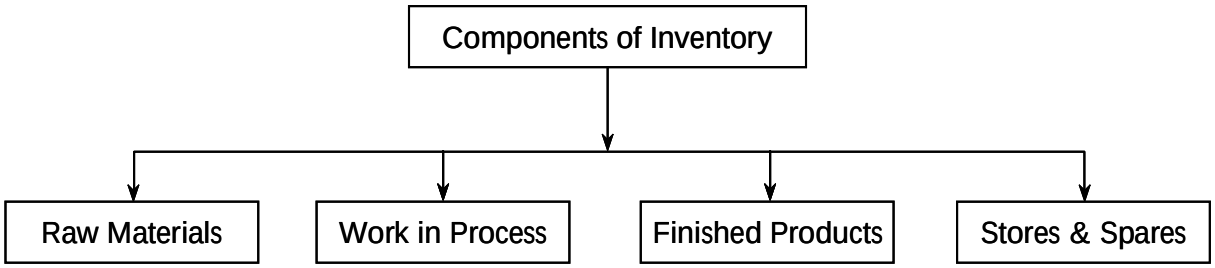
1. Raw Materials

Raw materials are those inputs that are converted into finished goods through the manufacturing process. These form a major input for manufacturing a product. In other words, they are very much needed for uninterrupted production.

2. Work-in-Process

Work-in-process is that stage of stocks that are between raw materials and finished goods. Work-in-process inventories are semi-finished

products. They represent the products that need to undergo some other process to become finished goods.



3. Finished Products

Finished products are those products, which are ready for sale. The stock of finished goods provides a buffer between production and market

4. Stores & Spares

Stores & spares inventory (include office and plant cleaning materials like, soap, brooms, oil, fuel, light bulbs, etc.,) are those purchased and stored for the purpose of maintenance of machinery.

Q21. Explain the steps involved in process of inventory Management.

Ans :

Process of Inventory Management

Inventory management and control refers to the planning for optimum quantities of materials at all stages in the production cycle and evolving techniques which would ensure the availability of planned inventories. Four steps are involved in the process, *viz.,*

Step 1

Determination of optimum inventory levels and procedures of their review and adjustment.

Step 2

Determination of the degree of control that is required for the best results.

Step 3

Planning and design of the inventory control system.

Step 4

Planning of the inventory control organization.

Step 1 Determination of Optimum Inventory Levels

Determination of inventory that an organization should hold is a significant but difficult step. Too much of inventory results in locking up of working capital accompanied by increased rarrying costs (but reduced ordering costs). Excess inventories, however, guarantee uninterrupted supply of materials and components, to meet production schedules and finished goods to meet customers demand. Too less of inventory releases working capital for alternative uses and reduces carrying costs and increases ordering costs. But there is the risk of stock out costs.

Step 2 Determination of Degree of Control

The second aspect of inventory management is to decide just how much control is loaded to realise the objectives of inventory management. The difficulty is best overcome by classification of inventory on

the basis of value. Popularly called the ABC classification, this approach is useful in deciding the degree of control. 'A' class items are 'high' in value but low' in quantity, 'C' class inventories are the opposite of 'A' group, *i.e.,* 'high' in quantity and 'low' in value. In between are the 'B' group stock which are more *or* less equal in quantity and value proportion to the total inventory. Tight control is exercised on 'A' category terns through accurate records of receipts and issues and by co-ordination of incoming shipments with production requirements. On the other hand, 'C' class items may simply be ordered in large quantities several months' need, no record being made of their issue to manufacturing. More stock is simply requested when the existing stock reaches a reorder point. The 'B' class items receive not so tight control but are not neglected either.

Step 3 Planning and Design of the ;Inventory System

An inventory system provides the organizational structure and the operating policies for maintaining and controlling goods to be inventoried. The system is responsible for ordering and receipt of goods, timing the order placement, and keeping track of what has been ordered, how much, and from whom.

Q22. Discuss the techniques of inventory management.

Ans :

Effective inventory management requires an effective control system for inventories. A proper inventory control not only helps in solving the acute problem of liquidity but also increases profits and causes substantial reduction in the Working Capital of the concern. The following are the important tools and techniques of inventory management and control:

1. Determination of Stock Levels
2. Determination of Safety Stocks.
3. Selecting a proper System of Ordering for Inventory.
4. Determination of Economic Order Quantity.
5. A.B.C. Analysis
6. V.E.D. Analysis
7. Inventory Turnover Ratios
8. Aging Schedule of Inventories
9. Classification and Codification of Inventories
10. Preparing of Inventory Reports
11. Lead Time
12. Perpetual Inventory System
13. JIT Control System

Economic Order Quantity (EOQ)

A decision about how much to order has great significance in inventory management. The quantity to be purchased should neither be small nor big because costs of buying and carrying materials are very high. Economic order quantity is the size of the lot to be purchased which is economically viable. This is the quantity of materials which can be purchased at minimum costs. Generally, EOQ is the point at which inventory carrying costs are equal to order costs. In determining economic order quantity it is assumed that cost of managing inventory is made up solely of two parts i.e. ordering costs and carrying costs.

i) Ordering Costs

These are the costs which are associated with the purchasing or ordering of materials. These costs are also known as buying costs and will arise only when some purchases are made. These costs will include costs of selling up machinery for manufacturing materials, time taken up in setting, cost of tools etc.

ii) Carrying Costs

These are the costs for holding inventories. These costs will not be incurred if inventories are not carried. The Planning Commission of India has estimated these costs between 15 percent to 20 percent of total costs. The longer the materials kept in stocks, the costlier it becomes by 20 percent every year. The ordering and carrying costs have a reverse relationship. The ordering cost goes up with the increase in number of orders placed. On the other hand, carrying costs go down per unit with the increase in number of units, purchased and stored.

Assumptions of EOQ

While calculating EOQ the following assumptions are made.

i) The supply of goods is satisfactory. The goods can be purchased whenever these are needed.

ii) The quantity to be purchased by the concern is certain.

iii) The prices of goods are stable. It results to stabilize carrying costs.

The EOQ can be calculated by using the following formula

$$EOQ = \sqrt{\frac{2AS}{I}}$$

Where A = Annual consumption in rupees.

S = Cost of placing an order

I = Inventory carrying costs of one unit.

ABC Analysis

The ABC analysis is based on the propositions that (i) managerial time and efforts are scarce and limited an (ii) some items of inventory are more important than others. The ABC analysis classifies various inventory items into three sets or groups of priority and allocated managerial efforts in proportion of the priority. The most important items are classified as class A, those of intermediate importance are classified as class B and the remaining items are classified as class C. The financial manager should monitor different items belonging to different groups in that order of priority. Utmost attention is required for class A, followed by items in class B and then items in class C.

Under ABC analysis, the different items may be placed in different groups as follows :

i) different items are given priority order on the basis of total value of annual consumption. Item with the highest value is given top priority and so on. The annual consumption value of all the items, already arranged in priority order, are then shown in cumulative terms for each and every item.

ii) thereafter, the running cumulative totals of annual value of consumption are expressed as a percentage of total value of consumption.

iii) then the cumulative percentage of consumption values are divided into three categories i.e. A,B, and C. Usually, group A is consisting of items having cumulative percentage value of 60% to 70%; group B is consisting of next 20% to 25% and the remaining items are placed in the group C.

Just In Time (JIT) Inventory Control System

Just in time philosophy, which aims at eliminating waste from every aspect of manufacturing and its related activities, was first developed in Japan. Toyota introduced this technique in 1950's in Japan, however, U.S. companies started this technique in 1980's. The term JIT refers to a management tool that helps to produce only the needed quantities at the needed time.

According to the official terminology of C.I. M.A , JIT is " a technique for the organization of workflows to allow rapid, high quality, flexible production whilst minimizing manufacturing work and stock level." There are two aspects of JIT. They are (i) just in time production and (ii) just in time purchasing.

Objectives of JIT

The ultimate goal of JIT is to reduce wastage and enhance productivity. The important objectives of JIT include:

i. Minimum / zero inventory and its associated costs.

ii. Elimination of non-value added activities and all wastes.

iii. Minimum batch / lot size.

iv. Zero breakdowns and continuous flow of production.

v. Ensure timely delivery schedules both inside and outside the firm.

vi. Manufacturing the right product at right time.

Features of JIT :

The main features of JIT inventory control system are as follows:

a) It emphasizes that firms following traditional inventory control system overestimate ordering cost and underestimate carrying costs associated with holding of inventories.

b) It advocates maintaining good relations with suppliers so as to enable purchases of right quantity of materials at right time.

c) It involves frequent production / order runs because of smaller batch / lot sizes.

d) It requires reduction in set up time as well as processing time.

e) The major focus of JIT approach is to purchase or produce in response to need rather than as per the plans and forecasts.

Advantages :

a) The right quantities of materials are purchased or produced at the right time.

b) Investment in inventory is reduced.

c) Wastes are eliminated.

d) Carrying or holding cost of inventory is also reduced because of reduce inventory.

e) Reduction in costs of quantity such as inspection, costs of delayed delivery , early delivery, processing documents etc. resulting into overall reduction in cost.

Q23. Explain the Role of Inventory Management in SCM.

Ans : **(Imp.)**

1. Supply Chain Inventory Management in Manufacturing

Manufacturers face a myriad of dynamic challenges that require not only exceptional advanced planning, but a thorough network of communication tools that allow you to address changes at a moment's notice. From rapid locational and volume changes in customer demand, to globalization, to natural disasters, any number of factors can have a serious effect on your revenue projections. And when you have inventory stuck in the supply chain, nobody is getting paid.

As such, the ability to quickly (and intelligently) address inbound and outbound issues through effective supply chain inventory management solutions not only ensures you keep the wheels of business turning, it gives you an advantage in being able to address consumer needs in a way that slower, less agile manufacturers will be unable to do.

Offering global supply chain management tools, Infra can partner with your company to leverage your manufacturing agility and help to meet (or exceed) forecasts through supply chain inventory management solutions that keep products moving.

2. Supply Chain Inventory Management in Retail

When you deal in retail, nothing is more important than the moment of transaction. This may seem simple, but companies who lose sight of this principle for even a minute will be eclipsed by another company who didn't. This key fundamental should be the premise for all supply chain inventory management decisions your company makes. All of your processes should be driven by the ability to facilitate the exchange of product for money. This means removing any obstacles that can slow (or potentially) stop this from happening.

In a proactive sense, however, global supply chain management tools that allow your company the ability to address event management on multiple fronts maximizes profitability by increasing supply where marketing and other promotions are pushing demand. This level of coordination is absolutely necessary in today's fiercely competitive global market. If you have doubts in your current supply chain inventory management systems to achieve these goals, you are probably leaving money on the table right now.

Q24. Elucidate 'Reasons for Maintaining Inventory in Logistics.

Ans :

Different logisticians have suggested different reasons for maintaining inventory in logistics. Some major reasons can be dealt here as follows,

1. Improves Customer Service

It has improved its customer service by providing marketing assistance through which products can be made available to the customers whenever they need them.

2. Economics of Scale

It is seen both in production and transportation functions. In case of manufacturing firm, it can be achieved by producing large number of units such that the total cost can be spread over large number of units. Similarly, a transportation firm can achieve it by carrying large number of products.

3. Hedging Against Uncertainties

It helps in overcoming the problems related to uncertainties. Such uncertainties may be due to demand fluctuations and also due to variations in suppliers replenishment lead times. Such uncertainties can be tackled/ managed efficiently by investing in safety stocks ensuring the achievements of acceptable service levels.

4. Hedging Against Contingencies

Inventory management enables the firms to continue their production process even in case of natural calamities such as cyclones, fires, floods and other problems creating variables.

5. Lot Size

It usually refers to the practice of purchasing products in bulk volume which exceeds the demand/ consumption rates so as to obtain economies of scale either by offering trade discounts or by causing bulk products per trip of transportation.

6. Specialisation

Through the management of stocks, firms could be able to achieve specialisation in their manufacturing activities. After processing of raw materials, they can be transported to different distribution centres. Firms undertake such processes to achieve economies of scale in manufacturing and transportation systems.

7. Inventory as a Buffer

As the channel members are distantly located, "buffer stock" has to be kept at various critical interfaces which can be used for safeguarding various processes such as procurement, manufacturing, distri- bution etc. Thus, the wide-acceptance philosophy of SCM has a profound impact on the flow of inventories throughout the manufacturing and logistics systems.

Q25. Explain the Types of Inventory Control System.

Ans :

There are two different categories of policies for controlling inventories : fixed order quantity policies and fixed time period policies.

These policies are for independent demand situations :

- **Fixed order Quantity**

  In this type of system, the order quantity is same. Based on the lead-time involved, the

reorder point will be decided and every time the quantum of order to be placed id same.

- **Fixed Interval System**

In this system, the ordering interval is same. For example, order every week, every month, etc. the order quantity may be different every time based on the costs involved. In fixed tome period policies, the time between orders is constant but the quantity ordered each time varies with demand and the current level of inventory.

Apart from these, sometimes other variants used are :

- **Two-bin system**

This system is simple to operate and easy to understand. Notionally, there are two bins kept full of items. Items from the first bin are used first. The moment the first bin is exhausted, an order is placed for items and the second bin acts as a buffer or safety cushion.

- **Optional replenishment**

This is a policy, which reviews the stock on the date of review, but it is optional to release the order for the variable quantity depending on the stock position.

- **MRP**

For dependent demand situations, normally, Material Requirement Planning (MRP) system is basically used. For example, consider the case of typical TV (Television). A TV consists of so many assemblies, sub-assemblies, and components. The demand, for say, picture tube is dependent on demand of TV. If one knows the demand for TV, one can derive the demand for picture tubes and other components required for assembling a TV.

2.6.1 Inventory Management in Supply Chain as an Elementary Customer Service

Q26. Explain the role of Inventory Manage- ment in Customer Service.

Ans : **(Imp.)**

Customer service and customer satisfaction are considered as the two important performance indices of SCM. As performance measure acts as an improvement element, it is the responsibility of managers and supervisors to incorporate changes within the organizational climate. Performance measures quantitatively reveal the characteristic features of products, services and processes that produce them.

Performance indicators of the firm need to be realistic and quantifiable (both in financial terms as well as in physical terms). Such indicators need to perform consistently so as to maintain uniformity throughout the supply chain.

Certain circumstances provide improvement opportunities for inventory management. Some of them involve,

1. Increased complaints that have been put forward by customers and distributors leading to increased frequency of order cancellation.
2. Reducing stock turn performance even though large amount of inventory is maintained in the warehouse.
3. Due to the delivery of dissatisfied service, level of backorders increases.

4. Shortages of storage space due to excessive inventory holdings.
5. Increased investment on dead/slow items.
6. Due to technological updations, large number of items become obsolete. Thus, the aforementioned circumstances call for the maintenance of inventory at cost-effective level by introducing several financial and operational measures.

Financial Performance

1. Increasing the rate of return on inventory investment.
2. Enhances the performance by increasing the percentage of inventory versus percentage of sales.
3. Depending on the demand of certain items, they need to be discarded per period.
4. Decreasing the level of capital that has been consumed by dead/ slow items.

Operational Performance

1. Increasing the service levels of customers over time.
2. Care must be taken while quantifying the level of inventory.
3. Customers who have not been serviced need to be identified.
4. Increasing sales percentage of stocks by improving the demand and supply relationships.
5. Identifying the number of stock outs per period.

After going through the insight of performance indicators, let us discuss about the role of inventory as an element of customer service.

Short Question and Answers

1. Define the term logistics and logistic management.

Ans :

Logistics

The word, 'Logistics' is derived from French word 'Loger', which means art of war pertaining to movement and supply of armies.

1. A military concept
2. Fighting a war requires:
   (i) Setting an objective
   (ii) Meticulous planning to achieve the objective
   (iii) Proper deployment of troops
   (iv) Supply lines consisting of weaponry, food, etc
3. Logistics plan should be such that there is minimum loss of men and material.

Logistics Activities

1. Customers service
2. Demand forecasting
3. Distribution
4. Inventory control
5. Material handling
6. Order processing
7. Part and service support
8. Plant and warehouse side selection
9. Procurement
10. Packaging
11. Return goods handling
12. Salvage and scrap disposal
13. Traffic and transportation
14. Warehousing and storage

Logistics is the one of the most important segment of the phenomenon of marketing in business. It is a subset of Supply Chain Management. In the business functioning, the trader gets order for supply of his goods or services through his marketing executives or directly from customers and then to execute the order to the satisfaction of the customer, the trader or his supplier company prepares the Logistics i.e., procures the product or services, puts labels on them, or gives some identification trademark name to them, makes necessary packing and packaging so as to save them from damage of any kind during loading, unloading, handling, transportation etc., till is supplied to the end customer. More simply, it is a bundle of goods finally ready to be supplied to the customer.

Logistics Management

Logistics management is a wide term, applicable to both private and non profit public sectors. In 1960's, the concept of logistics management was appeared in business literature as "Physical distribution management", which was mainly responsible for the management of external environment of logistics system. But in modern era. the term has been changed to "logistics" as it mainly deals with all the activities that have an impact on making goods and services easily available to the customers.

Definitions of Logistics Management

a) According to Council of Logistics Management (CLM)

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

b) According to Robert A. Novack

"Logistics is an activity involving the creation of time, place, form and procession of utilities within and among firms and individuals through strategic management with the goal of creating products/services that satisfy customer through attainment of value".

2. Objectives of Logistics Management.

Ans :

1. Rapid Response

Rapid response is concerned with a firm's ability to satisfy customer's requirement in a timely manner. Instead of stocking the goods and supplying on demand, orders are executed on shipment-to-shipment basis. Here IT helps to postpone the logistical operations to the latest possible time and then execute rapid delivery as when needed by customer.

2. Minimum Variance

Variance is any unexpected event that disrupts system. Logistical operations are disrupted by events like delays in order receipt, disruption in manufacturing, goods damaged at customer's location and delivery to an incorrect location etc. Traditional solution to deal with variance was to keep safety stock or use high cost transportation. Such practices were expensive and risky and thus have been replaced by information technology to achieve positive logistics control.

3. Minimum Inventory

The objective of minimum inventory involves asset commitment and inventory turnover. Asset commitment is the financial value of inventory developed throughout the logical system and inventory turnover is the rate of inventory usage over time. The objective is to reduce the inventory without sacrificing customer satisfaction.

3. Elements of Logistics Management?

Ans :

1. Transportation

It is one of the most important activities of logistics which involves the physical distribution of goods with the help of a network. This network is formed by a group of different transportation organizations who are engaged in providing valuee-added service to the firms, that are responsible for the physical movement of goods. The logistics manager must select those modes of transportation that brings reduced cost and increased profitability to the firm while moving raw materials, components and finished goods to the customers.

Customer Service

Two important aspects of customer service that are found to be crucial from the perspective of logistics management is that,

i) Process of direct interaction with customers during order retrievals

ii) Levels of service offered by the organization to its customers.

From an order-taking perspective, logistics ensure that adequate inventory is available with the organizations to fulfill the needs of customers in a timely manner. While on contrary to this, second dimension of customer service deals with the responsibility of logistics management to ensure that the customers get the right product at the right time in the right quantity.

2. Facility Location

This dimension of logistics, plays a key role in changing the relationships between facilities and markets or between supply areas and facilities, which in turn, influences transportation costs, customer service and inventory requirements which put forwards the need for a logistics manager to take all the decisions regarding facility locations.

4. Integrated Logistics Management.

Ans :

Integrated logistics management is an approach to the distribution mission of the firm whereby two or more of the functions involved in moving goods from source to user are integrated and viewed as an inter-related system or sub-system for purposes of managerial planning, implementation and control.

5. Inbound Logistics.

Ans :

The term 'inbound logistics' refers to all those activities that are found to be associated with the transfer of goods from the suppliers to the manufacturing plant, such that value-added goods can be delivered to the ultimate customers for their final consumption.

Inbound logistics is a cluster of the following activities,

1. Demand forecasting
2. Purchasing
3. Requirements planning
4. Production planning and
5. Manufacturing inventory.

1. Demand Forecasting

Demand forecasting is an important step in inbound logistics, wherein operating decisions are taken based on the forecasted results of demand for consumer's products. Through demand forecasting techniques, firms estimate both future and potential demand of their products, so as to ensure that sufficient quantity of goods must be available with the firm in order to meet consumer's demand.

2. Purchasing

It involves the process of procurement of goods, raw materials and others component parts from various suppliers depending on the consistent requirements of the firm. It integrates different members of supply chain and plays a key role in delivering quality products to the customers.

3. Requirements Planning

In this activity, logistics manager has to take various decisions regarding the selection of materials and equipments. Such type of decisions are mainly influenced by the nature of operations and also about the outputs constituting the firm's products. Firms must select only those materials that are of high quality and those which can be obtained at low cost.

4. Production Planning and Control

Production planning and control is mainly concerned with the proper alignment of product's demand with its supply i.e., it ensures that there is a proper supply of firm's products which helps in fulfilling the demands of customers. Firms can seize new opportunities of gaining profits only by maintaining a proper balance between firm's production and distribution activities.

5. Manufacturing inventory.

Manufacturing inventory control mainly deals with all those activities which are responsible for controlling the levels of inventory throughout the supply chain. Inventory needs to be available with the firm, so that it can process and fulfill the orders of customers on time.

6. Define Outbound Logistics.

Ans :

Outbound logistics is defined as, "Movement of materials associated with storing, transporting, and distributing an organization's goods to its customers"

Outbound logistics serves as a reference to documentation, picking, packing, physical goods issue in warehouse, loading, goods issue posting, advising advanced shipping notifications to business partners and obtaining a proof of delivery from the receiving business partner.

Outbound logistics processing comprises the preparation of goods to be delivered from a warehouse to a receiving location, which is within the scope of warehouse management.

To keep supply chain activities running smoothly, firms need to efficiently store, move, and transport goods while keeping inventory at minimum levels. Outbound logistics performance is an important task in Supply Chain. General out sourcing is used for servicing end customers. At the same time outbound costs need to be minimized while processes, flexibility, and customer service must be improved. Outbound logistics covers and supports the following,

(i) Operational shipping, manifesting, freight costing, freight settlement and foreign trade.

(ii) Build optimal loads with the routing and scheduling allowing a close collaboration between shipper and carrier via optimized carrier selection and tendering.

(iii) Trace and track the history of the warehouse processes in detail for each individual article.

(iv) All the processes in the warehouse from goods receipt through goods issue.

(v) Complete stock transparency, to allow firms to know what is in the warehouse.

(vi) Improve the accuracy of deliveries, thus increasing customer satisfaction.

7. What is logistics planning ?

Ans :

Logistics planning takes place when there is a need of transportation of materials among different entities who are involved in SC. The main objective of logistics planning is to assure that materials are transported from the place of origin to the end user on the basis of setup cost, schedule and quality norms. Logistics planning involves all types of materials such as raw materials both semi-finished goods and finished goods. It also involves making choices of alternative means of transportation, warehousing and transhipment, conforming to statutory requirements, supporting rules and regulations, selection of partners who undertake transportation and allied work, evaluating their performance and providing feedback etc.

8. Define logistics strategy.

Ans :

The concept of logistics strategy is not yet evolved completely because of which it has not gained a proper definition. Thus, today, the term "logistics strategy" still presumes differently by different people.

Logistics strategy mainly deals with the determination of performance standards that has to be maintained in an organization. Most of them, establishes such standards in terms of service levels and cost objectives. Firms can achieve the desired logistics performance only by maintaining proper trade-offs between cost and service objectives. In order to make it effective, it needs to be integrated with corporate and marketing objectives.

9. Define Reverse logistics.

Ans :

Reverse logistics is also known as Product Recall. It may be defined as a process of moving goods from their place of use, back to their place of manufacture for re-processing, refilling, repair, and recycling or waste disposal.

Reasons for Reverse Logistics

1. Rigid quality standards- it is critical in case of contaminated products, which can cause environmental hazard.
2. Rigid laws prohibiting unscientific disposal of items
3. Rigid laws making recycling mandatory

4. Transit damage – e.g. leaking containers containing hazardous material.
5. Product expiration.
6. Erroneous order processing by supplier
7. Exchange of new product for the old ones.
8. Return for repair or refill.

10. Define inventory management.

Ans :

The term "Inventory" has originated from the French word "Inventaire" and the Latin word "Inventariom" which implies a list of things found. The term inventory has been defined by the American Institute of Accountants as the aggregate of those items of tangible personal property which (a) are held for sale in the ordinary course of business, (b) are in the process of production for such sales, or (c) are to be currently consumed in the production of goods or services to be available for sale. The term inventory refers to the stockpile of the products a firm is offering for sales and the components that make up the product. Inventories are the stocks of the product of a company, manufacturing for sale and the components that make up the product. The various forms in which inventories exist in a manufacturing company are: (i) raw materials, (ii) work-in process, (iii) finished goods, and (iv) stores & spares. However, in commercial parlance, inventory usually includes stores, raw materials, work-in-process and finished goods. The term inventory includes - raw materials, work-in-process, finished goods packaging, spares and others stocked in order to meet an unexpected demand or distribution in the future.

Choose the Correct Answers

1. Which of the following are the elements of logistics management? [d]
   (a) Transportation (b) Warehouse/storage
   (c) Packaging (d) All the above
2. Concept of logistics which focuses on teamwork in whole supply chain management to maximize performance of a distribution system is classified as [a]
   (a) Integrated logistics management (b) Intermodal logistics management
   (c) Intra-modal logistics management (d) Exclusive logistics management
3. Materials management is a part of, [a]
   (a) Inbound logistics (b) Outbound logistics
   (c) Integrated logistics (d) All
4. Independent service provider of logistics who can do all functions required by clients is classified as [c]
   (a) Public held logistic provider (b) Privately held logistic provider
   (c) Third party logistics provider (d) Single part logistics provider
5. Process which consists of coordination of communication channels to deliver and compelling message about company and its products is classified as [a]
   (a) Integrated marketing communications (b) Integrated strategic channels
   (c) Integrated outbound channels (d) None of above
6. Logistic network through which unwanted or excess products by resellers or consumers is classified as [d]
   (a) Inbound distribution (b) Outbound distribution
   (c) Forward distribution (d) Reverse distribution
7. Logistic network which moves finished product from company to resellers and then to end users is classified as [d]
   (a) Risk averse distribution (b) Reverse distribution
   (c) Inbound distribution (d) Outbound distribution
8. Logistic network which moves materials from suppliers to manufacturing unit is classified as [a]
   (a) Inbound distribution (b) Outbound distribution
   (c) Forward distribution (d) Reverse distribution
9. In reserve logistics _____ is a difficult task. [c]
   (a) Profit maximization (b) Inventory Management
   (c) Demand forecasting (d) Sales forecasting
10. Process which involves controlling, implementing and planning materials and final goods to meet final customer at high profits is classified as [c]
   (a) Exclusive distribution (b) Exclusive dealing
   (c) Physical distribution (d) Supply chain management

Fill in the blanks

1. The process of planning, implementing and controlling the efficient flow of goods, services and information for the purpose of achieving customers satisfaction is called as _____.
2. _____ plays an important role in protecting the component parts from damages during transportation of storage.
3. Demand forecasting, purchasing, requirements planning and production planning and control are the activities involved in _____.
4. _____ is an important aspect of supply chain management.
5. According to _____"competitive advantage stems from the those activities whose performance enables the firm to achieve cost advantage over their competitors which form the basis for differentiation.
6. Finished goods inventory, distribution planning, order processing, transportation and customer service are the activities involved in _____ .
7. _____ mainly deals with the determination of performance standards that has to be maintained in an organization.
8. The logistics strategy enables the firm to determine, how the customer service can act as a supporting force for achieving _____ through efficient deployment of resources.
9. _____ plays an important role in improving the environment and making it "clean and green" by efficiently utilizing the used/waste products.
10. Formula for inventory/stock = _____.

ANSWERS

1. Logistics
2. Packaging
3. Inbound logistics
4. Inventory control
5. Micheal Porter
6. Outbound Logistics
7. Logistics strategy
8. Corporate/Marketing goals
9. Reverse logistics
10. Cumulative Supply – Cumulative Demand

UNIT III

Role of Transportation in Supply Chain : Transportation in Supply Chain, Transportation formats, and factors influencing their choice, Multi Modal transport, Warehousing – Types of warehouses, Warehousing operations, Warehouse Management Systems. Third Party warehousing, Role and Importance of handling systems.

3.1 TRANSPORTATION IN SUPPLY CHAIN

Q1. Describe the role of transportation in supply chain management ?

Ans : **(June-18)**

The transportation system is the physical link connecting a company with the customers, raw material suppliers, plants, ware houses and distribution channel members. It's interesting to note that all these elements of logistic system are fixed points, transportation is the connecting medium. The better is the performance and efficiency of transportation system the better will be organizational performance in terms of cost and customer's satisfaction. Knowledge of logistics and transportation is fundamental to the operations of any business. Transportation adds value to the goods by providing time and place utility, by ensuring availability of items when they are needed, and where they are needed. For most companies there is a geographical spread between the source and market of goods produced because of economies of scale and mass production, specialization of labor, infrastructure facilities, etc. Transportation is the connecting link.

In any organization involved in manufacturing or production of goods and services, management of logistics assumes significance. Appropriate planning, implementing and controlling the flow of goods, its storage and the effectiveness with which several activities follow, from the point of origin, to the point of consumption, occupies a significant place in modern business. The function of logistics includes sourcing, procurement, production planning, scheduling, packaging, assembly and customer services. Each one of these activities is very important. The developments in the field of transportation and communication are resulting in emergence of global supply chains and logistics processes. Technology is also having impact on logistics management.

Elements of Transportation System

The strategy, must acknowledge the following elements :

- **Customer Requirements**

  The supply chain involves continuous and efficient movement of product from vendor to manufacturer to customer. Therefore the transportation program must reflect and meet the customer's needs. The time and service aspects of transportation are vital.

- **Timely Shipments**

  Customers demand their shipments be delivered as they require – on the date needed, by the carrier preferred, in the proper shipping packaging method and complete, both shipped complete and delivered complete and in good order.

- **Mode Selection**

  How to move the product, i.e. by air versus surface? What roles do transit time play in supply chain? How will the inventory and service impacts be measured as compared to the freight charges?

- **Carrier Relationships**

  Volume creates carrier/forwarder attention. Developing supply chain responsive programs requires effort by both the carriers and the organization concerned. Transportation must

be responsive and can create a competitive advantage.

- **Measurement**

  One needs to evaluate how well the strategy and carriers are performing. This takes two approaches. One is measuring. Measuring means comparing performance versus standards.

- **Regulatory Impact**

  Regulatory changes can change, for better or worse. This may affect the strategy formulation. The recent regulations in Delhi (and now in Mumbai) about CNG vehicles have affected the transportation scenario in a significant manner.

- **Flexibility**

  Change is happening. It is not a question of whether or not it happens. The only question is how quickly it occurs. The strategy has to be ready to change. New customers. New products. New businesses. New suppliers. New corporate emphasis. Each of these can dramatically change the way strategy is formulated and implemented. Accordingly, the transportation has to respond to these changes.

Q2. Who are the participants in transportation system.

Ans :

1. Shipper and Consignee

The shipper and the consignee have the common objective of moving goods from origin to destination within a prescribed time at the lowest cost. The service should include a specified pick-up and delivery' time, predictable transit time, zero loss, and damage as well as accurate and timely transaction of information.

2. Carrier

The carrier is an intermediary between the shipper and the consignee. The main objective of the carrier is to maximize the revenue associated with the transaction while minimizing the cost associated to complete the transaction. The objective is to charge the highest price acceptable to the above parties keeping the cost namely, labor, fuel, and vehicle cost required to move the goods at the minimum.

3. Government

Transportation is an important factor as it affects the economy to a large extent and hence it maintains a high level of interest in it. It is desirable to have a stable and efficient transportation environment to sustain the economic growth. Transportation enables the efficient movement of products to markets throughout the country and thus promotes product availability at a reasonable cost.

Many governments are more involved with carrier activities and practices. Involvement may take the form of regulation, promotion, or ownership.

4. Public

The public is concerned with the transportation accessibility, expense effectiveness, and environmental and safety standards. The public ultimately determines the need for transportation by demanding goods around the world at reasonable price.

The relationship between these parties is complex because of the interaction between the parties. There occur conflicts between parties with micro-interest, government, and public. Hence, there is a need for regulations to get the process smooth.

Q3. Explain the various Modes of Transportation ?

Ans : **(Oct.-20)**

Basically, logistics manager makes use of five different modes of transportation, based on the geographical location and the nature of products that has to be transported. Each mode has its own features i.e., cost and time requirements which differs from one mode to another. Following are the five basic modes of transportation,

1. Railways
2. Roadways
3. Airways
4. Waterways
5. Pipelines.

1. Railways

Railways are primary long-distance, large volume movers that are usually engaged in transferring low value, high density goods. A major advantage of this mode lies in its ability to transfer a bulk of goods (large volume of goods) at considerably low cost than transferred by any other modes of transportation.

Advantages

1. It helps in achieving economies of scale where average production cost can be reduced by producing bulk quantities of outputs such that per unit cost can be lowered by spreading fixed cost over large volume of output.
2. It is capable of transferring large volume of high density goods.
3. Among other modes of transportation* ills found to be associated with lowest cost per ton-mile.
4. It also provides other services along with the basic purpose of transportation such as reliability and safety.
5. It also enables the firm to enhance their profitability by adopting various market penetration strategies.
6. It is faster and cheaper mode of transportation when compared to any other mode.

Disadvantages

1. It is a costly process if the distance between the manufacturer and supplier increases.
2. It is characterized by low accessibility. 'Accessibility' is a term generally used to describe the ability of a carrier to provide service to and from the source to the destination.
3. It is a slow process and requires relatively high time for performing its operations.
4. It has to follow fixed path along the railway tracks without following any shortest alternative route.

2. Roadways

They constitute the most common means of transportation. Motor earners are capable of operating under all types of infrastructures, they can be operated by a publicly maintained highways by exercising small investments in these assets. They are suitable and are the most favourable method for handling small shipment orders.

Advantages

1. It is one of the simplest methods used by logisticians for the transfer of goods.
2. Its cost structure is characterized by low fixed cost and high variable cost.
3. Infrastructure and financial facilities are provided by government through tax charges and licensing fees.
4. They are mainly engaged in transferring both highland low value products to distantly located geographical areas.
5. Certain large trucking companies are also offering multiple logistics services by outsourcing the main functions of logistics.

Disadvantages

1. It is a costly affair as it involves a series of small carriers for the movement of goods.
2. Huge amount of capital is required to establish the motor carrier industry.
3. It is associated with the fulfillment of only small shipment orders.
4. ' Driving regulations can cause delays.
5. Bad weather may act as a major obstacle during the on-time delivery of goods.

3. Airways

It is found to be the newest and recently utilized mode of transportation. This is mainly used for the delivery of fragile and non- bulky

/light weighted goods from the distant suppliers. Even the delivery of highly demandable scarce products find its ways in air freighting.

Advantages

1. Its major advantage- lies in its ability to transfer goods in a very short span of time (speed delivery).
2. Its fixed cost is relatively lower than other modes while its variable cost increases due to the excessive usage of fuel, labour efficiencies etc.
3. It is associated with reduced lead time.
4. Improves service levels as customers need not wait for long time for the fulfillment of their service orders.

Disadvantages

1. It is expensive.
2. It has to suffer from customs and excise regulations.
3. Reliability is less. .
4. It is not suitable for transporting heavy and bulky goods.
5. If it met with an accident, there may be huge loss of goods, property and life.

4. Waterways

If the movement of goods takes place through lakes, canals and navigable rivers, it is said to have been transferred through waterways. It is- the oldest mode of transportation. It is primarily used to transfer low value and high density goods that can be easily loaded or unloaded. Usually minerals, agricultural and forest products can be transferred with the help of such waterways.

Advantages

1. Its main advantage lies in its ability to move large shipments.
2. It is an economic mode of transportation for bulky and heavy goods.
3. It does not require much investment in maintaining and constructing routes as most of them are naturally made.
4. It helps in the promotion of international trade.

Disadvantages

1. It involves extended transit times and low accessibility.
2. It is usually affected by adverse weather conditions.
3. As it is a slow moving transportation mode, perishable goods cannot be moved by this mode.
4. It is more prone to the theft and loss of goods.

5. Pipelines

Pipelines is the most economical and convenient mode of transportation required for the transfer of water, petroleum and natural gas. It is the only mode which is operating on '24 x 7' basis. It is associated with high fixed cost while its operating costs is found to be lower than other modes.

Advantages

1. Low cost of operations.
2. Usually remains unaffected by weather conditions.

Disadvantages

1. It requires large amount of initial investment for maintaining and installing the pipelines.
2. Its accessibility is restricted to only those shippers that are located adjacent to the pipelines.

Q4. Explain the Impact of Transportation on Supply Chain Management.

Ans :

As transportation is mainly concerned with the movement of goods from point of origin to final point of consumption c the process), it creates time and place utilities which are the important prerequisites for customer satisfaction and marketing offers. During the process of trade-off analysis, relevant transportation mode is selected based on the scope of transportation/logistics/marketing

interface. Time utility is created by the firm when focal firms are able to deliver right products, at the right time to the right customers. However, time utility mainly depends on the ability of the firm as to how efficiently it can deliver the products to customers on time and as to how long it can store them in warehouses, before delivering them to the endusers. On contrary' to this, place-utility is created when focal firm is able to deliver the products to the right location from where they can reach the customers.

Thus, transportation is essential for delivering products across the supply chain to the right location on right time.

The following are the important factors that influences the transportation decisions,

1. Customer Communications

IT-enabled communication systems involve electronic transfer between the different parties of supply chain which helps in maintaining effective communications between customers and suppliers, suppliers and distributors, distributors and retailers etc., such that cycle times of an order can be reduced by fast delivery of goods/information to them. Thus, advanced information systems can be applied for enhancing the efficiencies of transportation.

2. Market Coverage

Transportation costs along with flexibility, reliability and frequency of products availability holds a major impact on marketing decisions. The characteristics of the product needs to be considered while making transport decisions, where high volume of valuable products require extended delivery systems that are capable of increasing the frequencies of their delivery.

3. Sourcing Decisions

Low cost transportation mode is required to source materials/component parts from local markets while the extended delivery system/ internodal transportation is required for sourcing system materials/ component parts from distantly located markets. While taking sourcing decisions, many large firms conduct trade-off analysis where the required resources and cost associated with their deliveries are considered.

4. Processing/Manufacturing

Decisions related with the processing/ manufacturing locations are mainly dependent on transportation costs.

Example: Location of extraction-based industries near their source of raw materials, so that transportation can be made efficient as it encounters low cost of procurement. Similarly, for the products which involve value added activities need to be located near to the customers.

5. Pricing Decisions

For most of the firms as transportation cost forms a significant proportion of total product costs, they need to take proper decisions regarding the selection of transportation mode which in turn holds an impact on the price of products. Hence, firms must select only those transportation modes that reduces both cost and distance from the markets.

6. Customer Service Decisions

Transportation decisions are also influenced by the method with which customers are being served. Such decisions are also affected by the type of markets in which focal firms are positioning/targeting their products.

3.1.1 Transportation Formats

Q5. Explain the various transportation formats in supply chain management.

Ans :

Under certain circumstances the functions of different participants of transportation may overlap. Such as if a shipper has a private fleet he does not require separate carrier for the movement of goods from one place to an-other. Thus, in this case shipper performs dual functions of an originating party (sender of goods) a "carrier" of goods. There are three common ways through which a shipper can satisfy his/her transportation requirements,

1. Private fleet
2. Contract carrier
3. Common carrier.

Each transportation format can be discussed as follows,

1. Private Fleet

A private fleet is a transportation format in which firms/shipper possess their own transportation carriers. Private carriers are owned by the firm and are not subjected to the terms and conditions of hire purchase and economic regulations. But they should comply with the rules and regulations prescribed by the government authorities. Some of them includes, avoiding the movement of hazardous goods, following vehicles pollution norms, I safety and so on.

Firms with private fleet should either own their carriers or have the carriers on lease. The carriers must be controlled and managed by the firms/shipper.

Example

The trucks used by the SIA publications and distributors forms an example for private fleet. Private fleet should operate in line with the firm's operations. Unlike hiring the carriers, private fleet is costlier for transporting goods to long distances. Because of this reason, most of the firms are preferring the hiring option instead of purchasing or leasing them.

2. Contract Carriers

Contract carriers offer transportation services to a number of shippers based on a predetermined contract or agreement including the rate at which service is provided along with other terms and conditions. This agreement represents the permit for transportation of commodities through the carriers.

Example

Transportation services provided by specific agencies based on a contract is an example of contract carrier.

The rates for transportation carrier differ from one shipper to other and it depends on the level of transportation services required for the shipper. Contract carriers are more economical than the private fleet because,

i) The cost of service does not represent the fixed cost of a vehicle.

ii) It does not include maintenance cost of vehicles.

iii) Contract carriers will offer better and consistent services than private fleet as they are engaged only in those transportation services which are found to be efficiently dealt by them.

3. Common Carriers

Common carrier is most commonly a public transportation carrier.

Example

Indian Railways is a common carrier mostly used in India.

These carriers provide transportation services to public at an affordable price without any discrimination in prices. Common carriers are most economical and also best suitable for transporting heavy loads to different places where road system is not well developed.

Example

Industries producing coal use Indian Railways for transportation.

3.2 FACTORS INFLUENCING TRANSPORTATION CHOICE

Q6. What are the factors Influencing Transportation Choice?

Ans : **(June-18)**

Slatter (1990) suggests a very thorough approach to transport mode selection. His approach will influence that has taken here.

We shall start by considering some of the issues of strategic significance for the business which

can have an influence on overall logistics decisions as well as those for transportation mode options.

Strategic Issues Influencing Logistics and Transportation Selection

There are five factors which should be considered in the choice of transportation :

1. Company Characteristics

These are important and the concern the company's marketing, financial and operation strategies. The company marketing strategy is important because this will determine the parameters for the customer service offer. This may be customized to meet different customer needs or in the case of markets that are not service sensitive, a standard qualifying levels of service may be satisfactory. Financially strategies are equally important. The structure of the firm's operating function will have an important influence.

2. Market Structure

Market structures are important considerations. There are two factors

i) Competitive structure

ii) Geographical structure.

The fiercely competitive markets delivery may be one of the key factors. Influencing customers, selection of suppliers. Add to this a national market operation and clearly transport decisions are of a major influence in achieving customer satisfaction.

3. Product Characteristics

The product characteristics to be considered one weight, size and shape, robustance, shelf-life potential danger, value and special characteristics which may require expensive handling service and/or equipment. These characters are most important to select the transport selection.

4. Customer Characteristics

These characteristics have an impact on profitability. Often it is those characteristics which influence delivery costs that are important as to whether or not a customer is profitable to the business. Depends upon the customer requirement they can select the transportation.

5. Environmental Issues

These issues influence a transport decision in a number of ways. Some times, Govt. Policy also affects to transport decision clearly effective transport selection benefits from a current and detailed knowledge and understanding of Govt. Infrastructure policy. Transport technology changes continually and again, current knowledge of benefits offered by technological developments in both the short and long run case assist in planning decisions.

Apart from these characteristics cost factors also affect on transport decision. Like, vehicle investment, labour costs, insurance, risk administrative overheads, maintenance of labour cost etc.

Q7. What are the Factors Influencing the Performance of Transportation System.

Ans : **(Imp.)**

The firms need to maintain an effective transportation system which can reduce the costs and time and can provide quality services to the customers. The factors that affect the performance of transportation system are as follows,

1. Cost
2. Speed and
3. Consistency.

1. Transportation Cost

The cost of transportation is one of the important factors which affects the performance of the transportation system. The transportation cost includes the cost incurred for the shipment of goods from one location to other location and the maintenance costs. The firm should select the transportation system which minimizes the total transportation cost.

2. Transportation Speed

Like cost speed is also an important factor which has a significant impact on the transportation performance. The speed of a transportation system represents the time required for the shipment of goods from one location to other location or from source to destination. The selected transportation system should reduce the total time required for shipment of goods.

Relation between Cost and Speed

The two factors speed and cost are related in the following two ways,

i) The transport firms providing faster transportation services charge high rates for their services.

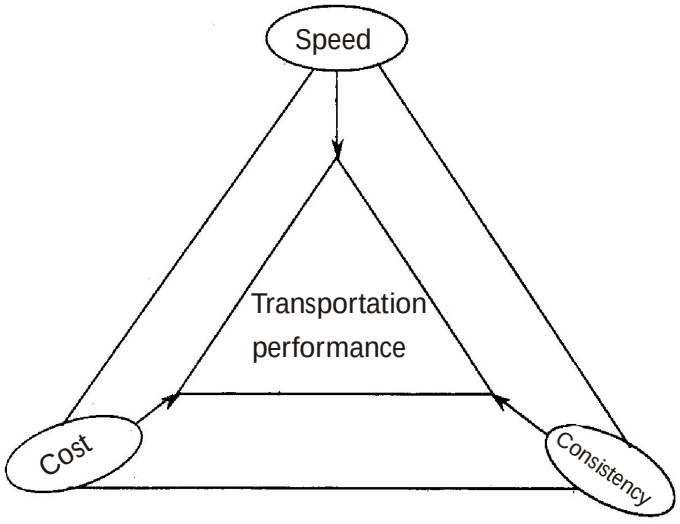
ii) The faster the transportation speed the lesser will be the cost required for the in-transit maintenance of inventory.

For selecting effective and economical transportation, the firm should trade-off between the cost and speed required for the transportation system.

3. Consistency

Consistency means maintaining a pace in the transportation speed of the goods, it is necessary for a firm to maintain consistency in its transportation system i.e., the speed should be maintained consistently with the supply for providing quality services to the customers. Consistency is considered as the most significant aspect of transportation which highlights the quality of the system.

If the transportation of the goods from source of destination for the first time takes two days time and four days time for the next time, then this shows lack of consistency in the transportation system. This in turn leads to complex problems in the continuous flow of supply chain. In the absence of consistency, the firm should maintain safety stock for protecting it against the service breakdowns.



In the present environment, with the introduction of sophisticated techniques, the firms can control the variances in the transportation system for maintaining consistency in its performance.

Thus, it is necessary for a firm to select and manage a suitable and desired transportation mix for the continuous flow of goods across the supply of the firm.

Q8. Explain the Factor Affecting Transportation Decisions.

Ans :

Transportation is essential for delivering products across the supply chain to the right location on right time. The following are the important factors that influences the transportation decisions,

1. Customer Communications

IT-enabled communication systems involve electronic transfer between the different parties of supply chain which helps in maintaining effective communications between customers and suppliers, suppliers and distributors, distributors and retailers etc., such that cycle times of an order can be reduced by fast delivery of goods/information to them. Thus, advanced information systems can be applied for enhancing the efficiencies of transportation.

2. Market Coverage

Transportation costs along with flexibility, reliability and frequency of products availability holds a major impact on marketing decisions. The characteristics of the product needs to be considered while making transport decisions, where high volume of valuable products require extended delivery systems that are capable of increasing the frequencies of their delivery.

3. Sourcing Decisions

Low cost transportation mode is required to source materials/ component parts from local markets while the extended delivery system/ internodal transportation is required for sourcing system materials/ component parts from distantly located markets. While taking sourcing decisions, many large firms conduct trade-off analysis where the required resources and cost associated with their deliveries are considered.

4. Processing/Manufacturing

Decisions related with the processing/ manufacturing locations are mainly dependent on transportation costs.

Example:

Location of extraction-based industries near their source of raw materials, so that transportation can be made efficient as it encounters low cost of procurement. Similarly, for the products which involve value added activities need to be located near to the customers.

5. Pricing Decisions

For most of the firms as transportation cost forms a significant proportion of total product costs, they need to take proper decisions regarding the selection of transportation mode which in turn holds an impact on the price of products. Hence, firms must select only those transportation modes that reduces both cost and distance from the markets.

6. Customer Service Decisions

Transportation decisions are also influenced by the method with which customers are being served. Such decisions are also affected by the type of markets in which focal firms are positioning/targeting their products.

3.3 MULTI MODEL TRANSPORT

Q9. Discuss about multi model (or) Inter Model Transportation.

Ans :

Multimodal Transportation

Multimodal transportation is a type of transportation system which uses more than one mode of transportation for shipment of materials/ equipments from source to destination. It involves the use of more than one means of transport such as a combination of rail, truck, aeroplane, ship etc. With an increase in the transportation flexibility and increase in international shipping, there has been an increase in the use of multimodal transport system. The multimodal transportation allows the free movement of materials or equipments between different modes. While selecting the transportation mode, the organization should consider the following factors,

(i) Nature and value of materials

(ii) Time and distance for transportation

(iii) Costs of transportation

(iv) Stability of a carrier

(v) Material security, loss and damage

(vi) Availability of special facilities

(vii) Delivery schedule.

Intermodal transportation is the use of more than one mode of transport to move a shipment to its destination. Intermodal movements combine the cost and service advantages of two or more modes in a single product movement. Benefits of long haul, short time & flexibility are optimized for achieving overall cost reduction

Depending upon the type and amount of goods, time of delivery, and prices following three Intermodal combinations are available:

1. Piggyback

It is coordination between railways and road transport. It is also called as TOFC (Trailer on Flatcar) or COFC (Container on Flatcar). In piggyback the motor carrier trailer placed on rail flatcar, which moves the trailer by rail for a long distance. Then the motor carrier moves the trailer for short distance for deliveries. Here the placement of trailer on a railcar can lead to damages.

2. Fishyback

It is coordination between waterways and road transport. In fishyback the truck or trailer rides on the ship for small portion of its journey. This service is provided in coastal waters between Atlantic and Gulf ports.

3. Birdyback

It is coordination between airways and road transport. In birdyback the major portion of journey is covered by airways then the cargo is transported by trucks or trailers.

4. Others

Water and railways, air and railways, air and waterways, pipeline and water, pipeline and roadways etc.

Features of Multimodal Transport System

1. Goods mainly in international trade pass through the hands of more than one carrier and more than one mode of transport.
2. Under conventional system of segmented transport, the consignee enters into separate contracts with each other.
3. The liability of each carrier is limited to the carrier in limited to the carriage performed by him.
4. The consignor or his agent has to attend to all arrangements required for transshipment of goods from one mode to another, including warehousing.

Advantages of Multimodal Transport

1. Minimizes time loss at transshipment points.
2. Provides faster transit of goods.
3. Reduces burden of documentation and formalities.
4. Saves cost.
5. Establishes only one agency to deal with.

3.4 WAREHOUSING

Q10. Define warehousing. What are the objectives of warehousing.

Ans :

Warehouse is a location provided with adequate facilities, where bulk shipments are received from production centers, which are then broken into small order size for shipment to the customers as per their requirement.

Objectives of Warehousing

1. To fulfill expected customer service level.
2. To achieve transportation economies by moving higher volume of goods.
3. To achieve economies of scale in production by accommodating additional quantity of produced.
4. To maintain steady source of supplies by balancing supply and demand.

5. To provide mixed products option to customers.
6. To provide temporary storage of materials to be disposed off (reverse logistics)

3.4.1 Types of Warehouse

Q11. What are the different types of Ware houses?

Ans :

Types of Warehouses

1. Private Warehouse

These are the warehouses owned by the company for their exclusive use of storing the goods manufactured or traded by them for onward selling in the market.

Advantages

1. Better control over storage and movement of goods.
2. Less chance of errors in handling the goods.
3. Customized design and flexibility in operations.
4. Cost effective and economic.

Disadvantages

1. Lack of geographical flexibility.
2. Requires stable demand and high product throughput.
3. Requires initial larger financial investment.
4. Has permanent liability.

2. Public Warehouses

These are the warehouses hired from other agencies for storing the goods for a specific period of time by paying agreed rent. E.g. Central Warehousing Corporation (CWC)

Advantages

1. Generally located near ports and market place and thus has fixed periodic operating cost.
2. Great flexibility in location changeover.
3. No permanent liability.
4. Adjustments as per season are possible.

Disadvantages

1. Lack of flexibility in operations
2. Not suitable for specialized services.

3. Contract Warehouses

It is a specialized form of public warehouses managed by Third Party Logistics companies for providing total warehousing services by paying the agreed charges.

Advantages

1. Great flexibility in location changeover
2. No permanent liability.
3. Adjustments as per season are possible.
4. Availability of expert manpower and dedicated resources.

Disadvantages

1. Less control on operations.
2. Performance of organization depends on the performance on third party.

4. Co-operative Warehouses

These warehouses are owned, managed and controlled by co-operative societies. They provide warehousing facilities at the most economical rates to member of society.

Operations/Functions of Warehousing

1. Receiving finished goods from production centers.
2. Performing quality and quantity checks.
3. Sorting goods at specific locations.
4. Packing the products for executing customer's order.
5. Shipping goods by selected mode of transport.
6. Preparing records and documents of stock.
7. Information transfer to management.

3.4.2 Warehousing Operations

Q12. Explain different types of Warehousing operations.

Ans : **(Oct.-20, June-19)**

1. Inventory Holding/Storage Functions

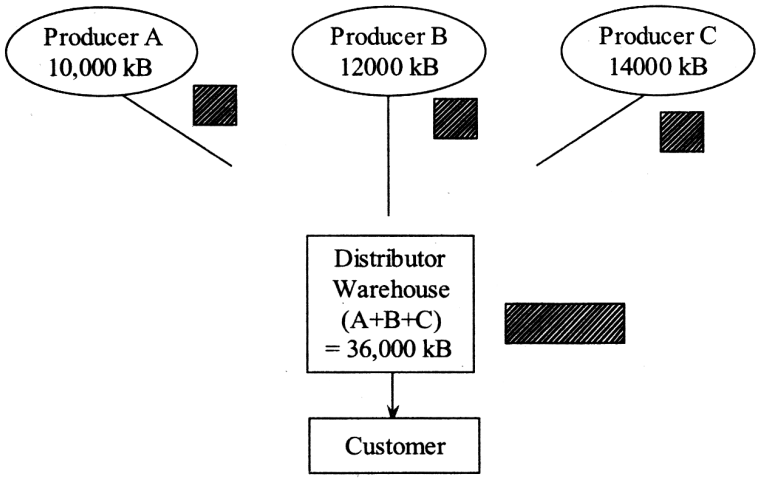
Storage functions are mainly concerned with the accumulation of inventory over a specific time period. They are, mainly influenced by locations time stipulations and so on. Storage functions can be studied under the following sub-types.

(a) Holding

Holding facilitates the proper arrangement of goods in a warehouse, so as to protect them against uncertainties. Characteristics of inventory plays a vital role in determining the duration of time required for the holding goods in storage. Different types of storage systems are available for different types of products i.e., specialized long-term storage can be use used for wines, liquors whereas general purpose merchandise storage is used for storing seasonal goods.

(b) Consolidation

If the products are collected from various sources, firm must implement a single large distribution centre which is helpful in combining various small shipments as shown in the following figure (2).



Figure

Such distribution warehouse is different from holding warehouse where long-term storage is practised while holding warehouses are meant for temporary storage. It is also helpful in depicting how a holding warehouse should allocated its space for different products.

A warehouse which concentrates mostly on receiving and shipping activities eliminating storage and order picking activities are referred to as “Cross docks” “Pool points”. In such warehouses, goods can be easily transferred within 24 hours inbound to outbound centres without storing them.

(c) Break Bulk

The procedure of break bulk is completely opposite to the procedure of consolidation. It is found to be the most favorable mode for the storage of volume shipments. This method is applied for the transfer of goods when the quantity ordered by the customer is less and also when the distance

between the customer and producer is more. It is commonly seen in terminal or distribution warehouse, particularly when the per unit rate of inbound transportation is less than the per unit rate of outbound transportation as in figure (3).

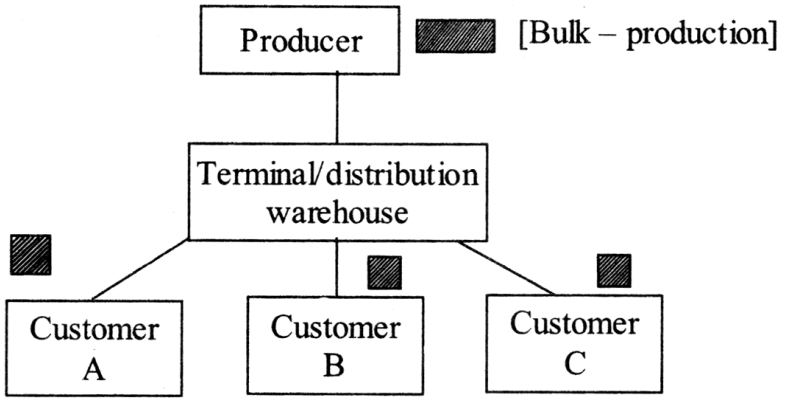
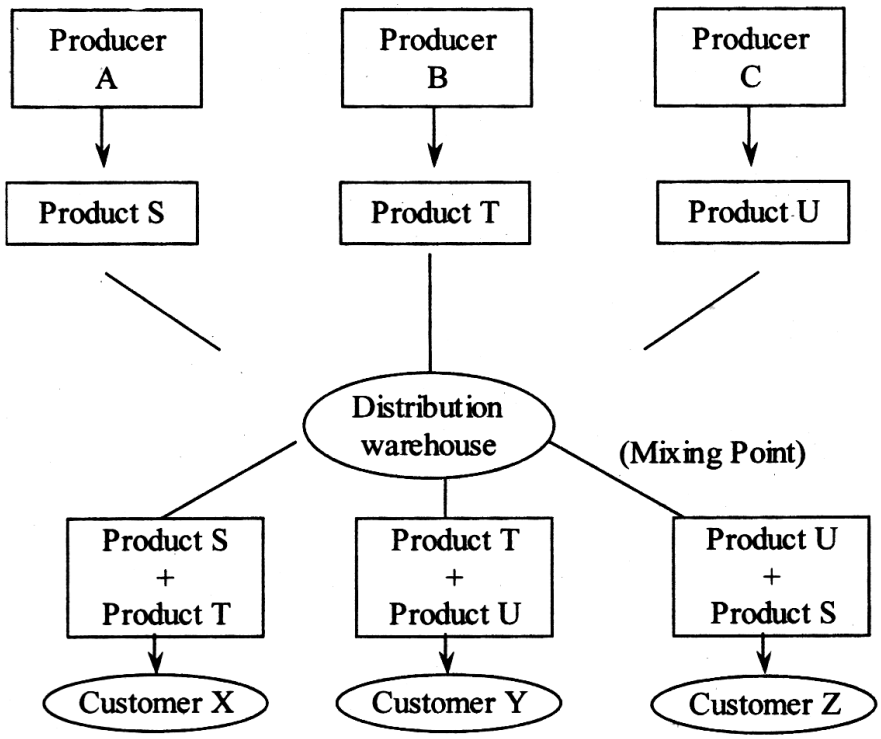


Fig. Break Bulk Storage

(d) Mixing

The demand of the customers cannot be accomplished fully by a single producer. Therefore, to satisfy the customers, firms must gather stores (different products from wide range of producers) and mixed them at a common point usually referred to as "mixing point" so as to fulfil the customer order as in figure (4). In the absence of mixing facility, customer receives inadequate quantity at high transportation cost which has to be avoided.



Q13. "Public warehouses are much more beneficial than private warehouses". Discuss.

Ans :

Pubic warehousing/rented warehouse space is found to be more advantageous than private warehouse space. Some of its main advantages are as follows,

1. Absence of Fixed Investment

Public warehousing does not involve any fixed investment if the firm has to acquire a rented space. Firms using rented space do not have to incur direct costs but its expenditure is mainly influenced by the extent of service provided by the warehouse.

2. Reduced Cost of Operation

Cost of public warehousing is comparatively less than either based or private warehousing. This is due to the fact that both leased and private warehouse encounters capacity problems which causes either under or over utilization of warehouse space. Such problems can be overcomed by using public/rented warehouses as they helps in optimum utilization of storage space.

3. Location Flexibility

As public warehouse is a rented space, its location can be easily changed depending on the market tends. It is inexpensive and focuses mainly on the fulfillment of short-term obligations. This feature of meeting short-term obligations provide grater flexibility which is a prerequisite for establishing an optimal logistics network.

4. Services

Public warehouses offer wide variety of services to gain a strong position in a market. In addition to its basic services such as storing, handling, receiving shipping and consolidating it also provides other services. Some of them are,

(a) Bonding

It establishes bonding arrangements between a merchandiser and the government on account of the transfer of goods such as tobacco, teakwood, wines etc., on which taxes or duties are levied.

(b) Field Warehousing

It acts as one of the financing method through which working capital can be increased by a third party or a pubic warehouse man wherein, a third party leases a portion of the private warehouse consisting of stored goods from the owner of goods and issues a warehousing receipt which acts as a guarantee for the owner of goods while seeking bank loan.

(c) Stock Spotting

It is an extension of break bulk function in which producers are engaged in spotting an assortment of their inventories in pubic warehouse, located near to their markets, public warehouses offer this type of services only to meet the increased demand of customers

(d) Documentation and Legal Considerations

Public warehouses are accountable for safeguarding the public property. American warehouseman's association has highlighted a following section on liabilities from the terms and condition of a standard contract.

"The warehouseman should not be liable for any loss or injury to goods stored however caused unless such loss or injury resulted from failure by the warehouseman to exercise such case in regard to them as a reasonably careful man would excise in circumstances, and the warehouse and is not liable for damages which could not have been avoid by the exercise of such care".

3.5 Warehouse Management Systems

Q14. Define Warehouse Management Systems? What are the functions of Warehouse Management Systems.

Ans :

A Warehouse Management System (WMS) is a software application used to control the day-to-day activities of a warehouse. The Warehouse Management System (WMS) has been evolved in the same manner as that of the other software solutions. Initially, its scope was restricted to only control, storage functions. Later, it has been widened to include the light manufacturing, transportation management, order management and other accounting systems.

Evolution of WMS can be compared with Material Requirements Planning (MRP) which is basically designed for planning the raw materials but later evolved into the MRP-II Manufacturing Resource Planing. MRP-II is an updated and automated version of MRP-I with additional features of scheduling and capacity planning. After that ERP has evolved from MRP-II, include some additional functions along with the core activities of MRP-II.

Similarly, WMS also being evolved continuously in order to bring improvement in its functionality. Initially, WMS was designed to manage and control the storage of goods along with directed picking and replenishment activities. Later, the functionality of WMS can be further improved through the addition of other functions such as gathering information regarding the orders, location, item, quantity etc., so as to decide the location for storage, retrieval and order scheduling.

Benefits of Ware house Management System

Generally, the WMS yields the following benefits:

a) Reduces inventory

b) Bring reduction in labour cost

c) Increases the storage capacity

d) Helps in improving the customer service and

e) It also plays a vital role in increasing the accuracy of inventory levels.

Though WMS yields number of benefits, firm has to issues these benefits with the costs incurred for installation md maintenance of WMS (Warehouse Management system). The main objective of a warehouse management system is to control the movement and storage of materials. It is complex, data intensive and application oriented ;system, it requires lot of resources and data management and i separate IS department for initializing and maintenance md also costlier compared to other software system.

Reality of WMS Performance

In General, WMS is said to yield the benefits mentioned above. But in real sense WMS yields accuracy in nventory, minimizes the labour cost and reduces the cycle time which intrum improves the efficiency of a customer service. The other benefits such as increased storage capacity md reduced inventory are difficult to gain in practical implementation of WMS. This is because increase in nventory accuracy may leads to the reduced safety stock levels which does not have any significant effect on the level if inventory. Warehouse Management System (WMS) does lot have any important effect on the factors controlling the nventory levels of a warehouse.

Firm has to implement the WMS if the existing warehousing system is unable to improve the customer ;services.

Functions of Ware house Management system

i) Integration with Automated Materials Handling Equipment

WMS allows the integration of automated tools and machinery with the automated materials handling equipment for efficiently handling and controlling the system.

i1) Use of Advanced Shipment Notifications

WMS makes use of (ASN) Advance Shipment Notification in order to receive the stock automatically after identifying the labels attached by the vendors to do the shipments.

iii) Cycle Counting

WMS also perform the cycle counting function in order to operate the specific activities by modifying the cycle counting if necessary.

iv) Labour Tracking and Capacity Planning

WMS also used for labour reporting and capacity planning by providing a setup for recording standard and available machine and labour hours per task and per shift, these data helps the WMS in planning the capacity and load md also in reporting productivity of the firm.

v) Activity-based Billing

WMS also serves the function of activity-based billing in which an individual, determines the fees-based on the specific activities of the warehouse. It is specifically designed for third party logistic operators.

vi) Browser-based

WMS can be performed by using browser-based approach more effectively than any other software system. All these functions of WMS mostly benefits the 3PL operators.

3.6 THIRD PARTY WAREHOUSING

Q15. Define Third Party Warehousing. What are the different types of Third Party Warehousing?

Ans : **(Oct.-20)**

Third-party Warehousing

The companies which are not able to build warehouses to store the inventory on their own are moving towards the third-party warehousing. In this third-party warehousing, a third-party provides warehousing services to the firms. All these changes in warehousing are in accordance with the increase trade, competition and technological advancement.

Third party services are offered by state warehousing corporations and other public sector undertakings such as Central Warehousing Corporations (CWC), public state warehousing corporations and others. Out of all these corporations the most dominant service provider of warehousing is CWC which carry out its operations by 444 warehouses and has a storage capacity of 7.3 million tones. It performs different types of warehouse activities for storage of specific items including,

i) Food grain warehouses

ii) Customer bounded warehouses

iii) Inland clearance depots

iv) Container freight stational; and

v) Aircargo complexes.

Types of Third-Party Warehousing

Third-party warehousing is categorized into three types i.e.,

I. Private warehousing

II. Public warehousing and

III. Contract warehousing.

I. Private Warehousing

Some organizations whether dealing in production or service sector invests huge amount of capital for owing storage space which entails them the following benefits,

i) Huge earnings can be accrued from the ownership of real estate.

ii) If the space is purchased privately, then it can be optimally utilized for reducing various cost overheads.

iii) In future, the same space can also be utilized for some other purpose too.

iv) Effective warehousing enables to render high degree of service.

v) Space can also the utilized as private truck fleet, purchasing department or sales office

vi) For specialized products such as pharmaceuticals other chemicals, private ownership is the only alternative

Thus, it has been seen that private warehousing is found to have an upper hand over rented or leased warehouse.

II. Public Warehousing

Many firms specifically operate warehousing as a separate business. Such fpis may acts both as service providers and also as public warehouse. Public warehousing is similar to private warehousing and deals with receiving, storage, shipping and other related activities.

Advantages of Public Warehousing

Pubic warehousing/rented warehouse space is found to be more advantageous than private warehouse space. Some of its main advantages are as follows,

1. Absence of Fixed Investment

Public warehousing does not involve any fixed investment if the firm has to acquire a rented space. Firms using rented space do not have to incur direct costs but its expenditure is mainly influenced by the extent of service provided by the warehouse.

2. Reduced Cost of Operation

Cost of public warehousing is comparatively less than either based or private warehousing. This is due to the fact that both leased and private warehouse encounters capacity problems which causes either under or over utilization of warehouse space. Such problems can be overcomed by using public/rented warehouses as they helps in optimum utilization of storage space.

3. Location Flexibility

As public warehouse is a rented space, its location can be easily changed depending on the market tends. It is inexpensive and focuses mainly on the fulfillment of short-term obligations. This feature of meeting short-term obligations provide grater flexibility which is a prerequisite for establishing an optimal logistics network.

4. Services

Public warehouses offer wide variety of services to gain a strong position in a market. In addition to its basic services such as storing, handling, receiving shipping and consolidating it also provides other services. Some of them are, bonding, field warehousing, stock spotting, documentation and legal considerations.

5. Warehouse Receipt

Warehouse receipts may be negotiable or non- negotiable. In negotiable, goods can be transferred to any person who possess the receipt. Whereas in non-negotiable, goods are transferred only to the designated person.

6. Bill of Lading

It is a document which discloses all the terms and conditions while transferring the goods.

III. Contract Warehousing

In contract warehousing, warehouse services are provided by a third party to the firm based on the predetermined agreement or contract. Most of the firms are now choosing contract warehousing as it is very economical.

It is very essential for the firms, to review their warehouses continuously as there are rapid technological advancement. Thus, it plays an important role in the successful performance of the organization and in determining the industry competitiveness.

3.7 Role and Importance of Handling Systems

Q16. What is Material Handling ? Explain the Importance of Material Handling System.

Ans : **(June-19)**

Material handling is an important part of managing materials Physically moving material requires equipment of various kinds, depending on the type and amount of material to be moved. Handling technology has developed to such an extent that it Notes has dramatically changed the traditional concept of a warehouse.

Material handling equipment can be generally classified as:

i) Positioning equipment,

ii) Transport equipment,

iii) Unit load formation equipment.

i) Positioning Equipment

Positioning equipment is used to handle material at a single location, so that it is in the correct position for subsequent handling, machining, transport, or storage. It includes hoists and lifts. Unlike transport equipment, positioning equipment is usually used at a single workplace.

Transport equipment is used to move materials from one location to another. It includes cranes and industrial trucks.

ii) Transport equipment

Unit load formation equipment is used to maintain integrity when handling a single load during transport and for storage. It includes pallets, bags and skids.

iii) Unit load formation equipment.

Though the above classification is based on application, the Material Handling Equipment Conveying equipment which includes specialist bulk handling equipment such as stackers

Cranes and hoists

Industry classifies itself on the basis of equipment category into four different sectors, namely:

General equipment such as elevators, industrial trucks etc., and

and reclaimers, Forklift trucks.

Importance

1. Movement

It is associated with the transfer of goods into and out of storage facilities or within these facilities. Efficiency of materials handling can be achieved by efficient transfer of goods to, from and within the storage facility.

2. Time

Aspect of time can be studied from production and customer's perspectives. In case of production, it refers to the time required for bringing the raw materials to the production site. Efficiency is said to have been achieved if it takes less time for the transfer of goods. Otherwise, it has to encounter problems of work stoppage, higher inventories and increased space of storage.

Similarly, from the customers point of view, it refers to the time required by the firm for the fulfillment of their orders. Even, reduced shipment times/cycle times is said to be efficient.

3. Quantity

Quantity refers to the amount of raw materials/finished goods transferred from/to an organization. Its accurate estimation results in delivering right product to the right customer at the right time in right quantity.

4. Space

Space refers to the warehouse/plant capacity used by the materials handling equipment. Such space will be fixed. However, efficiency of operations can be achieved by effectively utilizing this space.

Q17. What are the objectives and classification of Material Handling System?

Ans :

1. To achieve efficiency in movement of products in & out of stores or warehouse.
2. To ensure movement of goods in right quantity
3. To ensure availability of products when and where required.
4. Effective utilization of available space, equipment and manpower.
5. To sort inbound shipments as per precise customer requirements

Classification of Material Handling System

1. Manual System

Manual handling of materials is done when the weight of materials is low and distance to be traveled is less. It is the cheapest option for material handling.

Equipments required are manual trolleys, racks, drawers, lockers etc.

2. Mechanical System

Mechanical handling of materials is done when the weight of materials is high and distance to be traveled is more. It is the safest option for material handling.

Material Handling Equipments

i) Forklift Trucks

They are lifting devices, can move loads both horizontally and vertically.

ii) Cranes

They are drag devices, either floor mounted or overhead mounted.

iii) Conveyors

They eliminate re-handling before and after each function.

iv) Carousels

several bins on an oval track keep rotating. The operator can choose required bin to pick from. The system saves space and reduces walking time and distances.

3. Automated System

Automated handling of materials is done when the weight of materials is very high and distance to be traveled is more as well as the warehouse space is limited. It is the best and efficient option for material handling.

Material Handling Equipments

i) Sortations

In Sortations, labels are read and the packages are delivered to right docks for onward dispatch

ii) Robotics

It is a human like machine that can be programmed to perform one or series of activities.

iii) Automated Storage and Retrieval System

It has following merits and demerits.

Merits ARS

1. Reduction in labour cost and material handling costs.
2. Increase in productivity.
3. Increase accuracy and speed of services
4. Reduce handling related product damage.

Demerits of ARS

1. It requires huge initial capital cost.
2. It has perpetual maintenance costs.
3. It cannot not respond to the changing needs.
4. Downtime of equipment may cause interruptions.
5. Its user required proper training.

Q18. Explain the role of Material Handling System.

Ans : **(June-19)**

Materials handling refers to all those activities that are responsible for the movement of goods either within or out of a warehouse. It is associated with three activities namely,

1. Loading and unloading
2. Movement to and from storage, and
3. Order filling.

1. Loading and Unloading

Loading and unloading constitutes the first and last elements of materials handling process.

When goods are transferred to the transportation equipment, then it is referred to as “loading”. This is almost similar to

unloading, but involves the performance of additional activities such as checking the order content, order sequence and careful packaging.

Goods are unloaded/off-loaded from the transportation equipment as soon as they reach warehouse. This process is termed as unloading. Sometimes the functioning of unloading and movement of goods to a warehouse are considered as a single process whereas, in some other situation they are treated as separate entities. However, it is advisable to consider them as a separate entity because when goods are unloaded they are initially sorted, inspected and classified before they have been transferred to the warehouses.

2. Movement To and From Storage

Goods can be transferred several times from the loading area to an unloading area. Initially movement occurs from an unloading site to a warehouse then it moves from either a shipping dock or from the order picking area for its replenishment. Various models are available for the movement of goods ranging from manual push trucks and carts to fully automated and computerised assembling and retrieval systems.

3. Order Filling

Depending on the sales order stocks, are selected from the warehouse. This process is termed as order filling process. Selection of order can be undertaken either from order picking areas or directly from semipermanent storage areas. Among all elements, order filling is found to be a complex materials handling activity as it is labour intensive and deals with low quantity but expensive orders.

Q19. List out the various principles of Material Handling System.

Ans :

Principles of Materials Handling

The following are the important guidelines/ principles for effective materials handling,

1. Planning principle
2. Systems principle
3. Materials flow principle
4. Simplification principle
5. Principle of gravity
6. Principle of space utilization
7. Unit size principle
8. Principle of mechanization
9. Automation principle
10. Principle of equipment selection
11. Standardization principle
12. Adaptability principle
13. Principle of deadweight
14. Utilization principle
15. Maintenance principle
16. Principle of obsolescence
17. Control principle
18. Principle of capacity
19. Performance principle and
20. Principle of safety

Short Question and Answers

1. Private Fleet.

Ans:

A private fleet is a transportation format in which firms/shipper possess their own transportation carriers. Private carriers are owned by the firm and are not subjected to the terms and conditions of hire purchase and economic regulations. But they should comply with the rules and regulations prescribed by the government authorities. Some of them includes, avoiding the movement of hazardous goods, following vehicles pollution norms, I safety and so on.

Firms with private fleet should either own their carriers or have the carriers on lease. The carriers must be controlled and managed by the firms/ shipper.

Example

The trucks used by the SIA publications and distributors forms an example for private fleet. Private fleet should operate in line with the firm's operations. Unlike hiring the carriers, private fleet is costlier for transporting goods to long distances. Because of this reason, most of the firms are preferring the hiring option instead of purchasing or leasing them.

2. Contract Carriers.

Ans:

Contract carriers offer transportation services to a number of shippers based on a predetermined contract or agreement including the rate at which service is provided along with other terms and conditions. This agreement represents the permit for transportation of commodities through the carriers.

Example

Transportation services provided by specific agencies based on a contract is an example of contract carrier.

The rates for transportation carrier differ from one shipper to other and it depends on the level of transportation services required for the shipper. Contract carriers are more economical than the private fleet because,

i) The cost of service does not represent the fixed cost of a vehicle.

ii) It does not include maintenance cost of vehicles.

iii) Contract carriers will offer better and consistent services than private fleet as they are engaged only in those transportation services which are found to be efficiently dealt by them.

3. Multi Model Transport.

Ans:

Multimodal transportation is a type of transportation system which uses more than one mode of transportation for shipment of materials/ equipments from source to destination. It involves the use of more than one means of transport such as a combination of rail, truck, aeroplane, ship etc. With an increase in the transportation flexibility and increase in international shipping, there has been an increase in the use of multimodal transport system. The multimodal transportation allows the free movement of materials or equipments between different modes. While selecting the transportation mode, the organization should consider the following factors,

(i) Nature and value of materials

(ii) Time and distance for transportation

(iii) Costs of transportation

(iv) Stability of a carrier

(v) Material security, loss and damage

(vi) Availability of special facilities

(vii) Delivery schedule.

4. Define warehousing.

Ans:

Warehouse is a location provided with adequate facilities, where bulk shipments are received from production centers, which are then broken into small order size for shipment to the customers as per their requirement.

Objectives of Warehousing

1. To fulfill expected customer service level.
2. To achieve transportation economies by moving higher volume of goods.
3. To achieve economies of scale in production by accommodating additional quantity of produced.
4. To maintain steady source of supplies by balancing supply and demand.
5. To provide mixed products option to customers.
6. To provide temporary storage of materials to be disposed off (reverse logistics)

5. Define Warehouse Management Systems?

Ans:

A Warehouse Management System (WMS) is a software application used to control the day-to-day activities of a warehouse. The Warehouse Management System (WMS) has been evolved in the same manner as that of the other software solutions. Initially, its scope was restricted to only control, storage functions. Later, it has been widened to include the light manufacturing, transportation management, order management and other accounting systems.

Evolution of WMS can be compared with Material Requirements Planning (MRP) which is basically designed for planning the raw materials but later evolved into the MRP-II Manufacturing Resource Planing. MRP-II is an updated and automated version of MRP-I with additional features of scheduling and capacity planning. After that ERP has evolved from MRP-II, include some additional functions along with the core activities of MRP-II.

6. Functions of Ware house Management system

Ans:

i) Integration with Automated Materials Handling Equipment

WMS allows the integration of automated tools and machinery with the automated materials handling equipment for efficiently handling and controlling the system.

i1) Use of Advanced Shipment Notifications

WMS makes use of (ASN) Advance Shipment Notification in order to receive the stock automatically after identifying the labels attached by the vendors to do the shipments.

iii) Cycle Counting

WMS also perform the cycle counting function in order to operate the specific activities by modifying the cycle counting if necessary.

iv) Labour Tracking and Capacity Planning

WMS also used for labour reporting and capacity planning by providing a setup for recording standard and available machine and labour hours per task and per shift, these data helps the WMS in planning the capacity and load md also in reporting productivity of the firm.

v) Activity-based Billing

WMS also serves the function of activity-based billing in which an individual, determines the fees-based on the specific activities of the warehouse. It is specifically designed for third party logistic operators.

7. Third-party Warehousing.

Ans:

The companies which are not able to build warehouses to store the inventory on their own are moving towards the third-party warehousing. In this third-party warehousing, a third-party provides warehousing services to the firms. All these changes in warehousing are in accordance with the increase trade, competition and technological advancement.

Third party services are offered by state warehousing corporations and other public sector undertakings such as Central Warehousing Corporations (CWC), public state warehousing corporations and others.

8. Advantages of Public Warehousing.

Ans:

Pubic warehousing/rented warehouse space is found to be more advantageous than private warehouse space. Some of its main advantages are as follows,

1. Absence of Fixed Investment

Public warehousing does not involve any fixed investment if the firm has to acquire a rented space. Firms using rented space do not have to incur direct costs but its expenditure is mainly influenced by the extent of service provided by the warehouse.

2. Reduced Cost of Operation

Cost of public warehousing is comparatively less than either based or private warehousing. This is due to the fact that both leased and private warehouse encounters capacity problems which causes either under or over utilization of warehouse space. Such problems can be overcomed by using public/rented warehouses as they helps in optimum utilization of storage space.

3. Location Flexibility

As public warehouse is a rented space, its location can be easily changed depending on the market tends. It is inexpensive and focuses mainly on the fulfillment of short-term obligations. This feature of meeting short-term obligations provide grater flexibility which is a prerequisite for establishing an optimal logistics network.

9. Contract Warehousing

Ans:

In contract warehousing, warehouse services are provided by a third party to the firm based on the predetermined agreement or contract. Most of the firms are now choosing contract warehousing as it is very economical.

It is very essential for the firms, to review their warehouses continuously as there are rapid technological advancement. Thus, it plays an important role in the successful performance of the organization and in determining the industry competitiveness.

10. Material Handling ?

Ans:

Material handling is an important part of managing materials Physically moving material requires equipment of various kinds, depending on the type and amount of material to be moved. Handling technology has developed to such an extent that it Notes has dramatically changed the traditional concept of a warehouse.

Material handling equipment can be generally classified as:

i) Positioning equipment,

ii) Transport equipment,

iii) Unit load formation equipment.

Choose the Correct Answers

1. Participant in Transportation [d]
   (a) Public (b) Shipper
   (c) Consignee (d) All
2. A warehouse that focuses on timely movement of goods, [a]
   (a) Is a distribution centre (b) A freight forwarder
   (c) A storage centre (d) An inventory centre.
3. In SCM, logistics cost constitutes, [d]
   (a) Transportation (b) Materials handling and warehouse
   (c) Order processing and inventory (d) All the above
4. _____ Factor influencing the performance of transportation system [d]
   (a) Cost (b) Speed
   (c) Consistency (d) All
5. _____ are primary long-distance, large volume movers. [a]
   (a) Railways (b) Roadways
   (c) Airways (d) Waterways
6. Which of the following, is the function of inventory holding? [a]
   (a) Mixing (b) Loading and unloading
   (c) Movement to and from storage (d) Order filling
7. Type of Warehousing [a]
   (a) Commodity warehouse (b) Bulk Warehouse
   (c) Material handling (d) Break-bulk
8. A document that discloses all the terms and conditions while transferring goods is, [b]
   (a) Letter of credit (b) Bill of lading
   (c) Purchase invoice (d) Sales invoice
9. Benefits of WMS [a]
   (a) Reduce inventory (b) Reduce Transportatin Cost
   (c) Reduce Warehouse Cost (d) All
10. WMS stands for [c]
   (a) Warehouse material system (b) Water management system
   (c) Warehouse management system (d) Warehouse management storage

Fill in the blanks

1. _____ Factor of Multi Modal Transportation .
2. Materials handling involves the movement of goods from to or out of the _____.
3. _____ are special type of inventory having special demand and supply patterns.
4. Function of Inventory holder _____.
5. When goods are transferred to the transportation vehicle then it is called_____ .
6. _____ is a medium through which a shipper can transport the goods to the consignee.
7. _____ helps the firms to obtain benefits by combining different modes of transport.
8. Principle of Material handling _____
9. Public warehousing is similar to _____ and deals with receiving, storage, shipping etc.
10. _____ is a software application that is used to control the day-to-day warehousing activities.

ANSWERS

1. Cost
2. Warehouses / storage
3. Spare parts
4. Holding
5. Loading
6. Carrier
7. Multimodal transportation
8. Material Flow
9. Private Warehousing
10. Warehousing Management System (WMS)

UNIT IV

Information Technology in SCM : Information and Communication Technology in SCM, Role of IT in SCM. Current IT trends in SCM, RFID, Bar coding . Retail SCM – problems and prospects, Role of Packaging.

4.1 Information and Communication Technology in SCM

Q1. Discuss the role of Information and Communication Technology (ICT) in development of SCM in India.

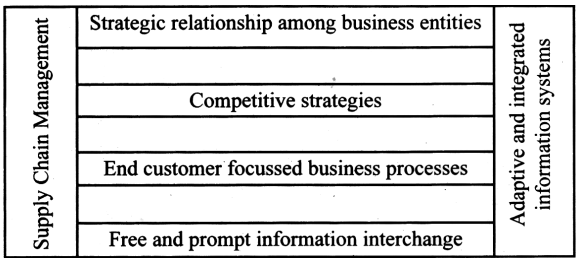
Ans : **(June-19, June-18)**

Information and Communication Technology (ICT) plays a vital role in ensuring the upstream and downstream flow of information in real time on 24/7 basis in SCM. ICT is a combination of two technologies i.e., Information technology and Communication technology. Both technologies has gained a dramatic technological progress in the last decades.

ICT based solutions are being offered in different entities in a supply chain. The availability of such ICT based solutions is another root cause of a myth in SCM that is proved to be a universal solution for all problems. The implementation of ICT (end to end) technology based solutions in SCM is beneficial for the business entities which makes the entities to invest in a supply chain management.

Most of the benefits of implementing SCM arises from their effective implementation and business strategies. The, role of ICT based solutions is that of a key enabler. They are not total solutions, they just improve efficiencies of flow of money, material and information in SCM. Having a world class software solution is not enough for the business, in order to get the desired results the effort is to be supported by business approaches and practices.

In the current business scenario, a considerable human intervention is required for interchanging information among two business entities engaged in supply chain due to the differences in their information systems. With the 'end-to-end' supply chain, it is easy to track inventories across the supply chain and to initiate actions in advance. The information regarding production schedules of producing partners, demanded inventories, expected shipment dates and arrival dates of consignments in transit etc. can be easily available and shared with the supply chain partners freely. The figure below shows the role of ICT in supply chain management.



Q2. Define Information. Explain the characteristics of information.

Ans :

Introduction

Information is crucial to supply chain performance because it provides the foundation on which supply chain processes execute transactions and managers make decisions. Without information, a manager will not know what customers want, how much inventory is in stock, and when more products should be produced and shipped. In short, without information a manager can only make decisions blindly. Therefore, information makes the supply chain visible to a manager. With this visibility, a

manager can make decisions to improve the supply chain's performance. In many ways, information is the most important of the four supply chain drivers because without it, none of the other drivers can be used to deliver a high level of performance.

Characteristics of Information in Supply Chain Decisions

Information must have the following characteristics to be useful when making supply chain decisions:

1. **Information must be Accurate**

   Without information that gives the true picture of the state of the supply chain, it is very difficult to make good decisions. That is not to say all information must be 100% correct but rather that the data available paint a picture of reality that is at least directionally correct.

2. **Information must be Accessible in** a **Timely Manner**

   Often accurate information exists, but by the time it is available, it is either out of date or if it is current, it is not in an accessible form. To make good decisions, a manager needs to have up-to-date information that is easily accessible.

3. **Information must be of The Right Kind**

   Decision makers need information that they can use. Often companies will have large amounts of data that is not helpful with decision-making. Companies must think about what information should be recorded so that valuable resources are not wasted collecting meaningless data while important data goes unrecorded.

Use of Information in Supply Chain

Information is the key component at every stage of decision-making in the supply chain. At the strategic level, the information from other members in the supply chain is used to undertake demand planning and design the supply chain network. At the operational level, such information forms the basis for decisions on the product range, capacity allocation and inventory levels. The management of the company has to evaluate how to make best use of the available information. For example, Dell computers, a prominent user of the IT systems in its supply chain management, uses the direct contact established with its customers to access valuable and accurate information from them. This information is used to understand customer behavior and changing preferences, which would form the basis for forecasting demand through the use of different IT tools. This demand forecast is shared with suppliers so that they can make arrangements to meet the demand. Thus Dell uses the information it has access to make decisions that improve the profitability and responsiveness of its supply chain. The information is used in decision-making relating to inventory, transportation, facility locations.

1. **Inventory**

   Efficient inventory management requires timely and accurate information regarding customer demand, supplier's lead time, production capacity, inventory carrying costs, etc.

2. **Transportation**

   Transportation management involves decisions on transportation networks, routing and scheduling of shipments and shipment sizes. These decisions are usually based on information relating to order size, transportation costs, customer locations and warehouse locations.

3. **Facilities**

   Facility-related decisions like new facility location, capacity allocation to a particular plant, etc., require information on various factors like customer demand, tariffs and tax incentives, facility costs, infrastructure, etc.

   Information is crucial to making good supply chain decisions at all three levels of decision-making (strategy, planning, and operation) and in each of the other supply chain drivers (inventory, transportation, and facilities). IT enables not only the gathering of this data to create supply chain visibility, but also the analysis of this data so that the supply chain decisions made will maximize profitability.

Q3. Explain the functionality of information in supply chain management.

Ans :

Information is one of the greatest facilitators in supply chain management. Supply Chain information is a critical component of a firm's ability to respond rapidly to the end consumer demand in today's highly competitive marketplace. Timely and accurate information is also critical for three reasons:

- Information on order status, product availability, delivery schedule, and invoices is perceived by customers as a necessary element of total customer service;
- Information can reduce inventory by minimizing demand uncertainty; and
- Information increases flexibility with regard to how, when, and where resources may be utilized for strategic advantage.

Information integrates supply chain activities by building on four levels of functionality:

- Transaction,
- Management control,
- Decision analysis, and
- Strategic planning systems.

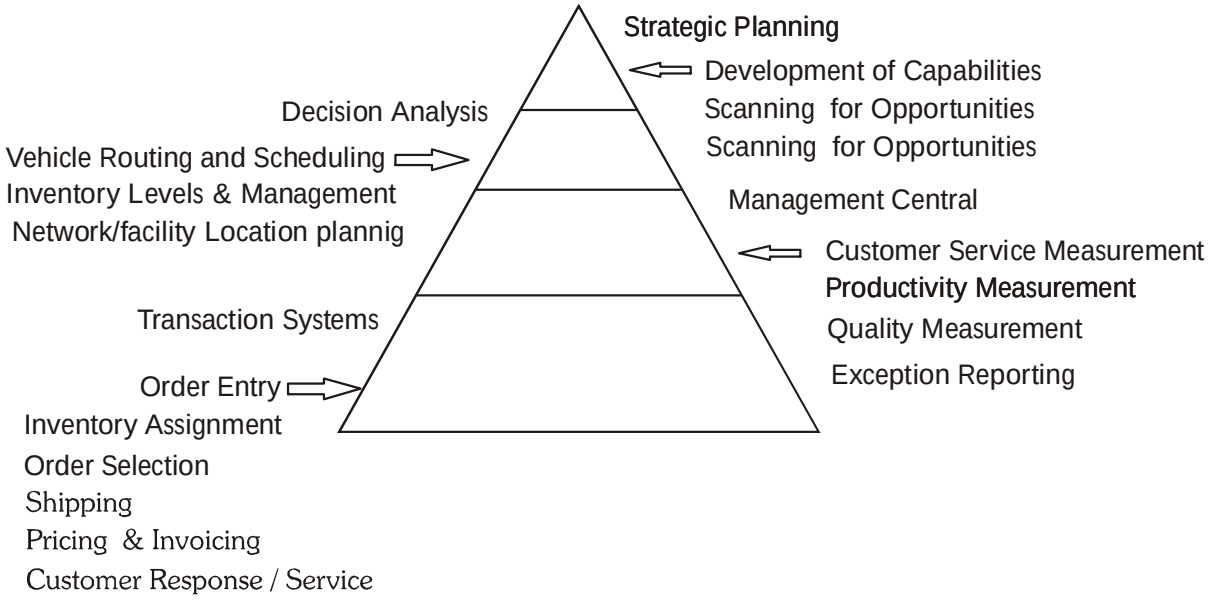


Fig . Information Functionality

i) Transaction

Transaction activities include order entry, inventory assignment, order selection, shipping, pricing, invoicing, and customer inquiry. The customer order performance cycle order starts with an entry transaction on the receipt customer order. This initiates the next transaction i.e. assign inventory to the order. A third transaction is then generated to direct the material handlers to select the order.

This is followed by a transaction directing the movement, loading, and delivery of the order. The final transaction prints or transmits the invoice for payment. Thus, the customer order performance cycle is completed through a series of information system transactions. The process also enables order status information to be available to customers as and when they desire such information.

The transaction system is characterized by formalized rules, inter-functional communications, a large volume of transactions, and an operational day-to-day focus. Because of the large number of system users, heavy communication demands, high transaction volume, and significant software complexity transaction system costs can be relatively high. In the transactions system, the major emphasis is on information system efficiency. However, as the processes are highly structured, the system costs are relatively well-defined and benefits or returns can be easily computed.

ii) Management Control

Management Control is characterized by an evaluative, tactical, intermediate-term focus that evaluates past performance and identifies alternatives. Information on common performance measures includes financial, customer service, productivity, and quality indicators.

iii) Decision Analysis

This focuses on decision applications to identify, evaluate, and compare logistics strategic and tactical alternatives for managerial decisions. There are a number of analytical tools that are commonly available in most supply chain application packages. Some of the common ones include inventory planning and management, forecasting, vendor scheduling, vehicle routing, and cost-benefit analysis of operational trade-offs and arrangements. Similar to the management control, decision analysis is characterized by a tactical, evaluative focus. However, unlike management control, decision analysis focuses on evaluating future tactical alternatives.

Decision analysis SCIS emphasis shifts more to effectiveness (identifying profitable versus Notes unprofitable accounts) rather than efficiency (faster processing or increased transaction volume while utilizing fewer staff resources). To do so effectively, the SCIS needs to be relatively unstructured and flexible to allow consideration of a wide range of options.

iv) Strategic Planning

As is apparent from the title, the focus is on information that supports the ability of the organization to develop and refine supply chain strategy. These decisions are less structured than the other areas, but have a long-term focus.

Traditionally, information flow was used to improve transaction system efficiency. While this has offered returns in terms of speed and lower operating costs, expected benefits in terms of cost reductions are diminishing as competitors develop their competencies. With increasing competitiveness, the area in SCIS applications that has the maximum potential for providing major savings is shifting focus on the management control, decision analysis, and strategic planning components.

4.2 The Role of IT in SCM

Q4. Explain the role of Information Technology in Supply Chain Management.

Ans : **(Oct.-20)**

Information Technology (IT) plays an important role in managing information and flow of goods. Organizations faced challenges for smooth integration of suppliers, wholesalers and retailers and also to manage data precisely for real-time in whole supply chain. Although, the emergence of different softwares such as EDI, GPS, RFID, ERP, WMS etc have significantly facilitated the smooth flow of supply chain management.

Technologies Used in Supply Chain Management

Following are the technologies used in supply chain management,

1. Electronic Data Interchange (EDI)

Electronic Data Interchange (EDI) is the process where computers are used to exchange business related information. EDI plays a vital role in SCM. The significance of EDI in SCM can be understand from the following points,

(i) EDI reduces human involvement and increases paper less transactions.

(ii) It reduces the data storage expenses as storage and manipulation of data is done electronically.

(iii) EDI enables trading partners to complete the transactions quickly.

(iv) Through EDI inventory can be reduced with efficient planning information.

(v) Finally, EDI when joined together with artificial intelligence, results in efficient SCM.

Steps in EDI Implementation

Implementation of EDI system includes the following steps,

(i) Building an Organizational Structure

The first step in implementing the EDI system is building an organizational structure in which the process is either controlled and managed by a team or an individual person and maintain interaction with external parties.

(ii) Selecting the Location of EDI

Secondly, the various business activities are reviewed strategically and the areas where implementation of EDI would be beneficial are selected.

(iii) Identifying an EDI Solution

The next step is identifying an EDI network and software provider. This is done either by an expert within the organization professional or outside the organization.

(iv) EDI and other Systems

Integrating EDI with other back-end systems, reduces the expenses which enhances savings and improves overall business efficiency.

(v) Evaluating the Internal Business Processes

Proper information flow across EDI network is possible through mapping of all the business documents and systems.

(vi) Trail and Errors

Once the EDI system is ready to implement, a trail process must be carried out to rectify the errors if any.

(vii) Integrating Trading Patterns

Once the mistakes in implementing the EDI system are rectified, final step is integration of EDI system with trading partners.

2. Radio-Frequency Identification (RFID)

RFID stands for Radio Frequency Identification. RFID is an identification device used for describing several technologies which makes use radio waves to identify people, place or objects through radio signals.

RFID technology has been practised since many years, but it could not gain popularity due to its expensive installation and implementation. RFID technology is developing day-by-day and the researchers are trying to minimize the cost so that RFID can be used widely.

3. Bar Coding

A bar code is an arrangement of black and white bars of different width, whose sequence depicts either letters or numbers. This sequence is a code, which is being translated by the scanners into useful information such as the type of product, manufacturing place, price of the product, the starting point of shipment etc. Bar coding is a simple, useful,

quicker and a correct technique which can store greater volume of information.

Q5. Outline the Process of Implementing an IT - Enabled SCM System.

Ans :

There are many steps in the implementation of an IT-enabled supply chain management system. As the implementation process is not just limited to one firm but involves all the firms spread across the supply chain, the process is usually complex and requires through analysis and planning. The implementation process is as follows (shown in figure below):

1. Evaluating Organizational Requirements

The firm has to first evaluate its organizational needs and its internal environment. It should analyze whether supply chain management fits into the organization's strategy and requirements. Implementing IT systems may require changes in the firm's relationships with suppliers and its internal business processes. So the firm should analyze the implications of implementing the system. For example, implementing an e- procurement application may reduce the number of suppliers needed and marginalize smaller suppliers who can not afford to implement IT systems. Thus implementing supply chain IT systems may have long term implications for the partners in the supply chain. The firm should undertake a cost-benefit analysis and evaluate the threats and opportunities involved in implementing the IT systems.

Once the firm has examined all considerations and has decided to implement an IT system, it is usually the firm's IT department which oversees the implementation. There is a need to for the IT department to interact with users and functional area heads in order to help it decide upon its course of action. The types of systems that can be implemented can be explored. The acceptance and level of readiness among the staff is also determined at this stage.

2. Evaluating the External Environment

Next, the firm has to evaluate the external players, i.e., upstream members like suppliers and downstream members like customers. The firm should choose a few supply chain partners to implement a pilot project. It should select partners who are willing to build a long term relationship with the firm, as this is crucial for successful implementation. The firm should also assess the partner's readiness to participate in the implementation. The partner's awareness and expertise in technology are other factors to be considered. The partner's chosen should have technical resources that are compatible with the firm's resources. Once the pilot project partners are selected, the next step is to decide on the technology to be used, i.e., the hardware and software solutions.

3. Identification of IT Infrastructure

The selection of IT infrastructure is the key to the smooth functioning of the IT system. The selection should be based on the requirements of the firm and also of the supply chain partners. The selection parameters should also include the reliability, quality and functionality of the hardware and software.

4. Actual Implementation of the IT System

The IT system may be either developed in-house or outsourced, It is also possible to buy an off-the shelf package; there are many available in the market. As the scope of the system extends beyond the firm to outside partners, the implementation is often complex and time consuming. The success of the implementation depends not just on the ability and expertise of the firm but also on the partners' level of readiness and co-operation. If some of the partners have already adopted certain systems in their firms, the compatibility of the systems could become a key issue in implementation. This problem is greater if the partners or the firm use proprietary systems. So it is better for a firm to adopt a system based on open standards,

which enables easier integration with different systems. Another important issue in implementation is to convince the partners to adopt the system. The firm may use different strategies for this. If the firm is the major member of the supply chain, then partner firms will usually defer to its wishes. Big firms like Wall-Mart, Ford and GM are examples of this situation. Otherwise, the firm can provide incentives and concessions to encourage its partners to adopt the system. It may provide discounts or assistance to its partners through training and implementation support.

5. Scaling up the System

If the pilot project is successful, the firm can extend or expand the system to other supply chain partners or to other functions. If the firm has implemented the application with one or two partners, then the application can be extended to multiple partners. The firm can also try to add other services or systems depending upon the success of the implementation of a particular system.

For example, if the firm has implemented an e-procurement application, the firm can move on by adding on other functionalities to the application like electronic payments so that the entire purchasing function is automated.

6. Resolve Implementation Issues

There are several implementation issues that need to be resolved. The first issue is whether the implementation should be module-by-module or system-wide implementation. In module-by-module implementation, the company implements certain modules before others. This type of implementation keeps implementation costs down. The process of change is also more gradual so implementation is smoother. The other approach to implementation is system wide implementation. System wide implementation takes much more time. Companies adopt module-by-module implementation as it is faster and enables them to catch up with their competitors. Module-by-module implementation is usually recommended. But the firm should ensure that the focus is on system-wide integration and the implementation of each module should be undertaken with this in mind.

4.3 THE CURRENT IT TRENDS IN SCM

Q6. What are the Current IT trends in SCM?

Ans :

1. Customer-Centric Investments

At present there is an increased focus on customer-centric technologies and strategies. Better communication with customers and more productivity is the main motto of all the organizations. In supply chain industry, manufacturers focuses on customer demand for customer centricity that effect the individual product launch. It also creates an entire supply chain process which is customer focussed. The manufacturers are pushing towards getting better in analyzing data sources, sensing demand, predicting market drivers and responding quickly and precisely in order to meet customer expectations.

2. Big Data Analysis

Big data is providing a greater data accuracy, clarity, decisive insight and signaling a rise in more contextual intelligence to supplier networks in the current era. These are shared throughout the supply chains. Modern analytics are mixed with more number of optimization tools involving demand forecasting, integrated business planning and super collaboration along with risk analytics. Further more, the big data analytics helps the supply chain to meet the accelerating demands for shipment and transactions as most of the organizations are forced to function as digital enterprises.

3. Cyber Security

According to the study conducted by manufacturers alliance for productivity and innovation (MAPI) about 40% manufacturing

companies were getting affected by cyber threats since last 12 months. These cyber threats with almost all cyber breaches have resulted in over $1 million damages. In order to protect the technologies from the threats, supply chain executives are focusing on data protection technologies and strategies.

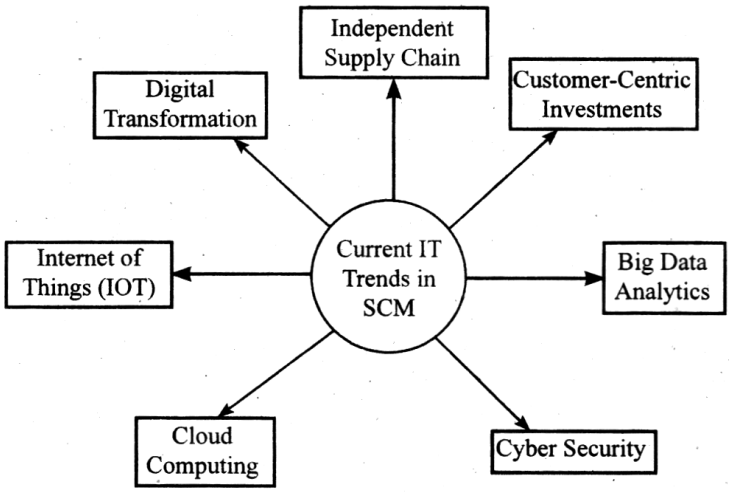


Fig.: Current IT Trends in SCM

4. Cloud Computing

Cloud computing applications provides a transformational effect on the business and the supply chain operating model through optimizing opportunities for flexible participation and enriched data analytics. The cloud- based supply network allows innovations in supply chain management. It empower information to be more readily available and bring huge value to operational processes with respect to end-to-end visibility.

5. Internet of Things (IOT)

According to Gartner's internet of things in supply chain illustrates, how smart devices are changing the experience of customer and mean while how badly Internet Of Things (IOT) innovations are tracking the supply chain. By 2020, it is estimated that internet of things will connect 25 billion devices creating both enthusiasm and doubt about the value to the supply chain. By implementing IOT supply chain, strategists can differentiate the future IOT with the current IOT. This innovation has already being initiated by Amazon with IOT order buttons that makes customers to place orders on a one click.

6. Digital Transformation

In the present market situations, digitalization is made mandatory for a success of the firm. A recent report stated that manufacturers who has not adopted digitalization have to confront struggles in order to succeed in future. The report states that, by 2018, only 30% of manufacturers will be able to maximize their profits through investing in digital transformation. By 2019,75% of large manufacturers will update their operating models with Internet of Things (IOT). In addition to this, by 2018, 60% of manufacturers will acquire new revenue from information-based products and services. Mean while, the embedded intelligence will more to the profitability levels.

7. Independent Supply Chain

At present, supply chain industry is looking forward to develop an independent supply chain in the coming future. The independent supply chain will be exerted by technologies which are now in the initial stages of quality assessment. Some of the examples of these technology are, Uber's self-driving truck, Amazon's drone delivery with in 30 minutes and various robotic tasks that are replacing the present ordinary tasks at assembly lines, ware-housing and industrial farming environments.

4.4 RADIO FREQUENCY IDENTIFICATION DEVICE (RFID)

Q7. Explain in detail about radio frequency identification device (RFID).

Ans :

Radio Frequency Identification Device (RFID)

RFID is basically a form of labeling where electronic labels or tags are programmed with unique information and attached to objects that need to be identified or tracked, such as pallets, vehicles, automated guided vehicles, etc. Some RFID systems are read-only, while others allow readers add new information or change existing information on the tag itself.

The most popular applications of RFID is transportation are for vehicle and container ID, tollbooth collection and vehicle monitoring. The RFID system consists of two parts: a tag and a reader. The tag is a small transceiver that is activated by the reader which transmits an signal using radio frequency waves. The tag, in turn, transmits encoded data back to the reader, which acknowledges and logs the signal via a computer. In India, RFID is in nascent stage.

Simply stated, RFID uses radio frequencies to transmit data between a portable device and a managing computer. The key components of an RFID system include a tag, a portable tracking device, an antenna an a controller. The RFID tag contains a small chip and a coiled antenna to broadcast a signal. This tag is attached with the product. A 'reader' to track the product captures the signal the tag emits.

The 'reader' is usually a remote mechanism, such as a hand-held device or a satellite. It enables data capturing and tracking of items using radio frequencies and transmitting data between a managing computer and any of several portable devices. The 'RFID' was originally developed during World War II for the allied planes to distinguish themselves from enemy aircraft.

Key components of an RFID solution consist of :

- Hardware, which includes serves, readers and writers, tags, controllers and cabling.
- RFID software for integration to back-end and legacy applications.
- Enhancement of legacy applications to sustain the value RFID can provide.

RFID chips, which are thin and small, vary in price depending on the amount of product information a retailer wants to receive from each chip. The usages of RFID may affect two major areas in any businesses: Front-end POS (point of sale) systems and back-end enterprise resource planning, supply chain management and merchandise management systems. RFID has also kick-started development of newer electronic codes to manage product identification across the supply time.

The Universal Product Code (UPC) system of bar codes has served its purpose for many years. Its ability to provide valuable information to retailers was helpful. Now, it is time to look at RFID technology that can offer quantum leaps in benefits to retailers. RFID tracking devices offer many advantages over bar code systems.

Advantages of RFID

- **Remote sensing**

  Physical contact is not required between the data carrier and the communication device. For the typical garment retailer, this means that instead of having to walk down each aisle within a store or warehouse to take inventory,

workers can execute a command somewhere within that same building and complete the inventory calculation in minutes.

- **Simultaneous reading / writing**

  Read/write capabilities can be performed within the same assembly line or remotely across continents.

- **Mobility**

  Mobile-tracking devices can be reused or disposed, as the RFID operation requires.

- **High accuracy**

  RFID ensures almost 100 percent scanning achievement are in the first pass of the item being scanned. This compares very favorably with the best bar code systems that till experience a 2-3 per cent failure rate in first passes.

- **Cluster reading**

  Multiple tags can be read simultaneously. This is known as 'cluster reading; and accelerates the data collection process considerably.

- **All-weather capability**

  RFID provides the retailer with the ability to scan through all types of weather, as well as through other surroundings such as metals, bodies of water and dirt. With this capability, RFID succeeds where normal bar code scanning typically fails.

Conceptually, bar coding and RFID are quite similar; both are intended to provide rapid and reliable item identification and tracking capabilities. The primary difference between the two technologies is that bar coding scans a printed label with optical laser or imaging technology, while RFID scans, or interrogates, a tag using radio frequency signals.

Because of the low cost of bar code labels, established standards and global deployment, bar coding is widely accepted while, in general, RFID has been limited to niche applications. Furthermore, just as there are different bar code topologies is use today, there are different RFID standards regarding the way data is captured from tags-the RF communications protocol. Appendix 6.2 gives an overview of RFID applications in SCM.

4.5 BARCODING

Q8. Define bar coding. What are the various benefits of bar coding?

Ans :

Bar Coding

A *bar code* is a series of parallel black and white bars, both of varying widths, whose sequence represents letters or numbers. This sequence is a code that scanners can translate into important information such a shipment's origin, the product type, the place of manufacture, and the product's price. Bar code systems are simple to use, accurate, and quick; and they can store large amounts of information.

Different industries use different bar code standards. A *bar code standard* states the language the code uses, the print quality companies expect on the label, the type of information the label contains, and the information format. Over thirty major U.S. industries have developed written standards for bar coding in manufacturing and warehouse operations. For example, different standards include the Automotive Industry Action Group (AIAG) standards and the Universal Product Code that the grocery industry uses. With one bar code language standard, suppliers and vendors in a particular industry can easily read each other's package labels.

Bar code scanners fall into two main categories: automatic and handled. Automatic scanners are in a fixed position and scan packages as they go by on a conveyor belt. In contrast, a worker can carry the portable handheld scanner or wand throughout the warehouse.

To read bar codes, these optical scanners emit light beams and translate the reflections bouncing

off the black an white bars into electrical signals. These electrical signals, which the scanner records as binary digits of 1s and 0s, form the code.

Most of us encounter bar coding in large retail outlets like supermarkets, where clerks now scan individual package bar codes at the cash register. Supermarkets haves almost eliminated the practice of labelling every time with a price tag. More important, the bar code contributes to much more effective retail inventory control.

The scanner and cash register, along with a backup computer system, enable the retail outlet to closely monitor sales and, therefore, inventory levels. The instantaneous transmission of information has allowed companies greater central control and inventory reduction in many retail locations.

Bar coding had its initial logistics impact when companies used it on cartons and monitored or scanned the codes as the cartons flowed into a warehouse. Bar coding at the warehouse improves data collection accuracy, reduces receiving operations time and data collection labor, and helps to integrate data collection with other areas, leading to better database and inventory controls. Companies can assign items more quickly into the warehouse, and warehouse personnel can select and prepare orders much more rapidly.

Benefits of Bar Code Technology

- **Improved Operational Efficiency**

  Since barcodes permit faster and more accurate recording of information, work in process can move quickly and be tracked precisely. Quite a bit of time can be spent tracking down the location or status of projects, folders, instruments, materials, or anything else that moves within an organization. Bar codes can help keep better track so that one can save time and respond more quickly to inquiries and changes.

- **Save Time**

  Depending on the application, timesaving can be significant e.g. determining inventory status. Consider a shipment of 10 cartons; it will take approximately 2 minutes or more to write down produce codes and serial numbers compared to about 10 to 20 seconds to scan the bar codes. In a busy operation this can be a significant saving.

- **Reduce Errors**

  Clerical and data entry errors can be a significant source of costs and related problems; extra freight costs, unhappy customers and time spent to track down problems are few of the examples.

- **Cut Costs**

  Bar codes can be used to address specific, localized problems or integrated into organization-wide information systems. When applied with planning they can save time and errors, resulting in a reduction of costs.

- **Customer or Regulatory Requirements**

  Regulatory agencies or your customers may impose labeling requirements that you must meet. While these requirements may be a necessary part of doing business, you can save time and money

by utilizing the bar codes within your own operations. For example, you can collect shipping manifest information quickly and accurately by scanning the bar code labels that you printed to satisfy the customer.

4.5.1 Differences between RFID and Bar Coding

Q9. What are the differences between RFID and Bar Coding ?

Ans :

Following are the differences between bar coding and RFID,

S.No	Bar Coding	S.No	RFID
1.	In case of bar coding, a code is printed on the product label.	1.	In RFID technology, a small microchip is inserted with in the pack.
2.	The storage capacity, is less in bar coding.	2.	Huge data can be stored in RFID tags.
3,	Bar coding is less secured.	3.	RFID technology is more secured and protected than bar coding.
4.	Bar coding depends upon line-of-sight scanning.	4.	No such dependency is there in RFID technology
5.	Less expensive.	5.	Highly expensive.
6.	With standard bar code language, suppliers and manufacturers can understand each other's package labels.	6.	No such standards are used.

4.6 RETAIL SCM

Q10. Define retail supply chain management. What are the various elements of retail supply chain management?

Ans : **(Imp.)**

Supply chain management comprises of various processes and activities required for the conversion and processing of raw materials or component parts to produce finished goods that can be transferred to the end users by using an appropriate channel of distribution. Hence, supply chain is an association of several processes as product development, sourcing, manufacturing, distribution, transportation, warehousing etc. The limits of supply chain depends upon the scope of its operations which may range from direct supplier to direct customers or from its supplier's supplier to customer's customer.

Besides taking care of all the above mentioned activities retailers must also be concerned with other supply chain issues such as selecting products for stock (Assortment management), pricing of the product and also with the reverse logistics (if goods are returned from customers). Efficiency and effectiveness of such processes are mainly effected by the variety/types of products offered by the retailers, its price and also by the levels of customer service, offered by focal firm. Wal-mart, one of the world's leading retailing company has continuously bought many innovations in the supply chain processes and has improved the overall supply chain CRP (Continuous Replenishment Programs), CPFR (Collaborative Planning Forecasting and Replenishment). FRM (Floor Ready Merchandise) etc., are the few programs/innovations introduced by Wal-mart.

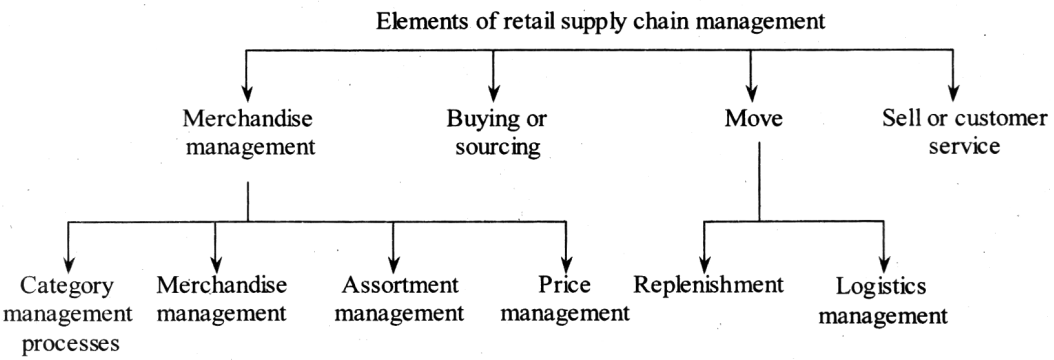
Retail supply chain is not a single entity, but it is found to be cluster of supply chains. For instance, a software manufacturer will usually deal with a single software dealer/supply chain, but a retailer like spencer has to deal with large number of supply chains for different products i.e., for consumer durables, food and grocery, dairy products, furniture, jewellary etc. Further these supply chains will have different group of suppliers, separate forecast and replenishment patterns etc.

Elements of Retail Supply Chain Management

Basically the elements of retail supply chain management's are categorized into four types. They are,

1. Merchandise management processes
   - i) Category management processes
   - ii) Merchandise management
   - iii) Assortment management
   - iv) Price management.
2. Buying or sourcing processes Product design/source
3. Move or logistics processes
   - i) Replenishment
   - ii) Logistics management.
4. Sell (or) customer service

The elements of supply chain management are illustrated in the figure.



1. Merchandise Management Process

Merchandise management process consists of four other management processes namely category management processes, merchandise forecasting and budgeting process, assortment process and price management process. Merchandise mainly deals with selling of goods.

i) Category Management Processes

It is a process which defines merchandise categories and develops strategies for each category. It has to perform the following functions such as category planning, category role definition, developing category strategies and tactics.

ii) Merchandise Forecasting and Budgeting Process

These processes are helpful in long term forecasting of merchandise requirements, financial budgeting process and budget control i.e., open to control process.

iii) Price Management Process

Price management basically includes planning processes like promotion planning, planning markdowns, Trade funds planning, promotion optimization, promotion collaboration etc.

iv) Assortment Process

Wide range of products offered for customers retail store is called assortment. Assortment process is helpful for store management as it depicts the physical existence of products that has to be displayed at the stores during a particular period of time.

2. Buying or Sourcing Processes

Retailers have several sourcing options, they can either make direct purchases from the manufactures or the wholesalers or distributors. Sourcing includes designing private labels, packaging design, outsourcing manufacturing, selecting vendors, releasing purchase orders and ultimately vendor selection.

3. Move : This is two ways,

i) Replenishment

Replenishment is refilling the stock which can be done from vendor to store or from vendor to central warehouse or from central warehouse to store approaches. Several new technological approaches such as VMI (Vendor Managed Inventory), CRP (Continuous Replenishment Program), CPFR (Collaborative Planning Forecasting and Replenishment Approach), DSD (Direct Store Deliveries) also performs the function of stock replenishments.

ii) Logistics Management

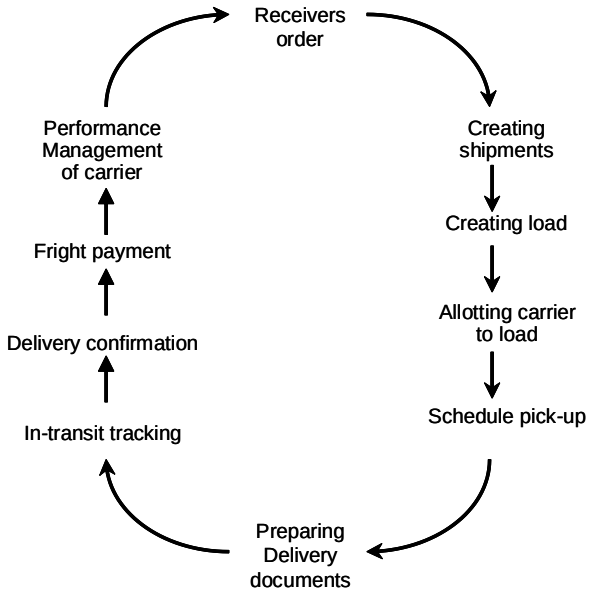
Logistics management deals with various processes engaged in moving goods from either suppliers to firm or from firms to customer like transportation, warehouse management, inventory management, etc. Besides this, new retailing also includes logistics outsourcing, green logistics and so on.

4. Sell : It provided a services to the customers.

Q11. Discuss briefly about transportation Cycle for a Retailer.

Ans :

Transportation cycle deals with a series of activities which a retailer performs for shipping a set of articles. For example, delivery of a full truck load from a retailer's retail distribution company to a store.



The following are the steps involved in the transportation cycle of a retailer.

1. Receiving Order

In the first step, order is placed at a store of a retail distribution company. In case of a continuous replenishment process, there will be no order and on the basis of the stock information at store, replenishment decisions are taken.

2. Creating Shipments

This is the second step of the transportation cycle of a retailer in which, on the basis of the common service requirements and fright terms, the orders are grouped. The retailers will separate the order which are very large of which needs multiple shipments or periodic delivery schedule.

3. Creating Load

In this step, the retailer decides about the type of transportation mode that has to be selected for shipments by considering the delivery date for stores for meeting the desired service level. It is mostly found that the retail distribution company tends to be located usually a hundred kilometers away from a retail store so the load will mostly be transferred by trucks.

4. Allotting Carrier to Load

This step basically involves a decision about load to a particular carrier. Depending on the cost, service, performance, availability etc., appropriate allocation must be done. The retailers who have their own fleet makes use of them for transporting loads whereas, others who don't have their own carriers will outsource their transport operations to the third party.

5. Schedule Pickup

In this step, the shipment is moved towards the warehouse for picking and work scheduling.

6. Preparing Delivery Documents

It is concerned with the preparation of the important delivery documents like pick sheets.

7. Using In-transit Tracking

The consignee is monitored by the retailer after it leaves the retail distribution company till it reaches the store. Manual tracking systems and sophisticated tracking systems are used by the retailers for monitoring the consignee. If any delay takes place, then the retailer had to take immediate corrective actions for avoiding out of stock situation in stores.

8. Confirmation of Delivery

After the arrival of shipment at the store, it should give a proof of delivery to the transporter. The proof of delivery can be given either in the form of a physical document or can be sent to the retailer electronically with the help of Electronic Data Interchange (EDI). Sometimes, the retailers gives payment to the transporter on the basis of the proof of delivery.

9. Fright Payment

After the delivery of the shipment, the transporter is liable to give his claims which needs to the processed by the retailers. The retailer verifies the claims or documents submitted by the transporter and if any transit damage or delay occurs beyond a limit then the retailer ; will deduct some percentage of the transporter's payment.

10. Performance Measurement of Carrier

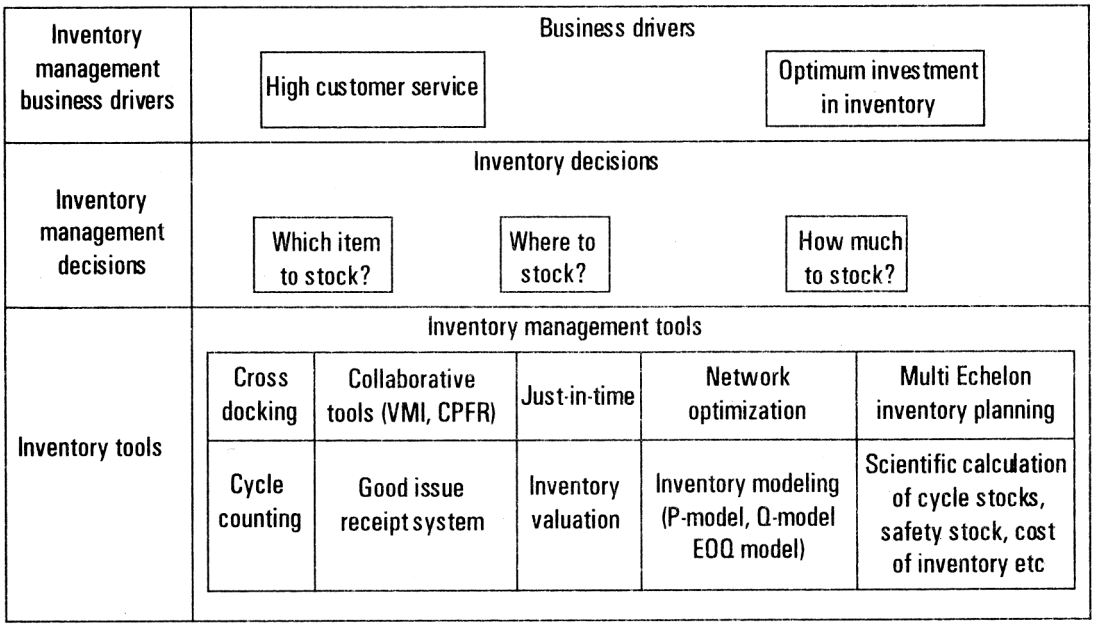
This is the last and final step of transportation cycle where the performance of the carrier is evaluated on the basis of the schedules performance, damaged record, |service flexibility etc.

Q12. Elucidate the Retailer's Inventory Management Framework.

Ans :

Working capital inventory is also important for smooth functioning of business processes. Every firm requires some amount of inventory. For example, amount of materials required to meet its demand for consumption and also to overcome the uncertainty involved in future for its usage and availability.

In order to maintain optimum level of inventory, retailers must have proper framework for inventory management. The fragment for inventory management in retail outlets is divided into 3 parts. They are business drivers which leads to efficient inventory management, inventory decisions and inventory management tools. In order to have business drivers retailers must make effective inventory decisions which in turn require different tools.



ii) Business Drivers

Customer service and customer satisfaction are considered as the two important performance indices of SCM. As performance measure acts as an improvement element, it is the responsibility of managers and supervisors to incorporate changes within the organizational climate. Performance measures quantitatively reveal the characteristic features of products, services and processes that produce them.

Performance indicators of the firm need to be realistic and quantifiable (both in financial terms as well as in physical terms). Such indicators need to perform consistently so as to maintain uniformity throughout the supply chain.

Certain circumstances provide improvement opportunities for inventory management. Some of them involve,

1. Increased complaints that have been put forward by customers and distributors leading to increased frequency of order cancellation.
2. Reducing stock turn performance even though large amount of inventory is maintained in the warehouse.
3. Due to the delivery of dissatisfied service, level of backorders increases.
4. Shortages of storage space due to excessive inventory holdings.
5. Increased investment on dead/slow items.
6. Due to technological updations, large number of items become obsolete. Thus, the aforementioned circumstances call for the maintenance of inventory at cost-effective level by introducing several financial and operational measures.

ii) Financial Performance

1. Increasing the rate of return on inventory investment.

2. Enhances the performance by increasing the percentage of inventory versus percentage of sales.
3. Depending on the demand of certain items, they need to be discarded per period.
4. Decreasing the level of capital that has been consumed by dead/ slow items.

iii) Operational Performance

1. Increasing the service levels of customers over time.
2. Care must be taken while quantifying the level of inventory.
3. Customers who have not been serviced need to be identified.
4. Increasing sales percentage of stocks by improving the demand and supply relationships.
5. Identifying the number of stock outs per period.

4.6.1 Factors to be Considered by a Retailer for Deciding an inventory

Q13. What factors to be Considered by a Retailer for Deciding an inventory ?

Ans :

The following are the factors which needs to be considered for dividing the type and quantity of inventory.

1. Type of Item

Different inventory items will have different inventory strategies. For the items like dairy products, bakery products, fish, meat, fresh vegetables, fruits etc., there is no need for maintaining a safety stock. But for the seasonal products, inventory have to be maintained by the retailer. The retailers who want to sell the products throughout the year always maintains a safety stock for products.

2. Service Level

On the basis of the service level offered to the customers per category retailer, has to take decision about the amount of inventory he has to maintain. Location of retail outlets also affects the service level.

Example. In major cities, where competition is intense the retailer has to provide high levels of customer service when compared to small cities where their is no much competition.

3. Inventory Network

A new warehouse have to be relocate at the current network of warehouses and retial stores for fulfilling customer service level at low cost.

4. Place to Hold Inventory

Inorder to fulfill the service level commitment with in a total inventory budget and storage capacities the retailer must decide the place for holding the inventory, either at store as it helps in providing higher service level or at warehouse which provides in flexibility across the supply chain. This problem in decision is known as multi echelon inventory problem.

5. Customer Demand

Inventory decisions are influenced by pattern of customer demand. Based on historical data, retailers determine average customer demand and its fluctuations by using different forecasting tools.

6. Replenishment Lead Time

Inventory decisions must also consider the duration of lead time required for replenishing inventory. If such duration is long, then retailer has to hold inventory for variability of this period.

7. Inventory Costs

Retailer should consider the cost of inventory before deciding the type of items have to be stocked.

Example: Retailer must be careful in selecting the high cost item as more amount of capital

is required to stock them when compared to low cost item.

4.6.2 Best Practices in Retail Inventory Management

Q14. Discuss about Best Practices in Retail Inventory Management.

Ans :

The main aim of the retailers is to provide excellent service to the customers with a minimum investment in inventory. For this purpose the retailers make use of best practices in retail inventory management. These practices are as follows,

1. Cross docking
2. Vendor managed inventory
3. Collaborative planning, forecasting and replenishment
4. Build to order model
5. Postponement
6. Determining a fixed set of options which covers maximum customer requirements.

1. Cross Docking

With the help of cross docking, inbound and outbound shipments can be coordinated effectively which in turn helps in reducing the amount of inventory at retail distribution centres. In cross docking, the items will be directly transported to the store which not only enables retailers to help reduce the levels of inventory but also to reduce the lead times of supply from supplier to store. Wal-Mart is the best example where the concept of "cross docking" is used effectively for reducing the levels of inventory in retail warehouses.

2. Vendor Managed Inventory

In vendor managed inventory, the stocks are managed by the suppliers on the basis of the stock and sales information received from the retailers on a regular basis. If the supplier has complete information about the sales trend of the product, it not only enables him in the effective management of stocks but also for its constant replenishments which in turn reduces the levels of inventory.

3. Collaborative Planning, Forecasting and Replenishment (CPFR)

In this practice of a retail inventory management, the retailer prepares the business plan, future forecasting and replenishment plan along with the suppliers. In order to formulate such plans the information needs to be regularly shared among the retailers and suppliers which is also a prerequisite for making better inventory replenishment decisions, through which stocks can be reduced and customer service can be enhanced to a great extent.

4. Build to Order Model

The build to order model is one of most successful model used by the industries whose products can become obsolete soon depending on the rapid changes in consumer preference (for making finished good inventory). But this model is not useful in the industries which have long manufacturing lead time. For example, FMCG products.

5. Postponement

In this practise of retail inventory management, the retailers makes the final product according to the specifications of customers. This practice was successfully used by the apparel retailers for purchasing raw fabric and for making additions such as colouring, stitching etc.

6. Determining a fixed Set of Options Which Covers Maximum Customer Requirements

This practice of retail inventory management helped the retailers to reduce their inventory

and fulfill the requirements of customers. The best example where this practice is used is Me Donalds where few standard menus are available for the customers at low priced.

4.6.3 Problems and Prospects of Retail SCM

Q15. What are the problems / and Prospects issues of retail SCM ?

Ans : **(June-18)**

Important Issues and Problems in Retail Supply Chain

Important issues to growth of the credibility of logistics function as well a increasing its functions.

1. Customer expectations

Main role of marketing identifying the customer needs and wants. But for retailing, being so close to the consumer is required to respond to changes in expectations and preferences at very short notice one of the most important approach to use marketing segmentation techniques to identify the target customers. So this concept is most important in retail supply chain.

2. Gross margin management

The management of gross margin is vital for success in retailing. The gross margin should cover all the expenses of the business (including interest and tax) and benefits to shareholders. The management should focus on external aspects of the supply chain.

i) Sourcing

ii) Supplier – distribution relationships

iii) Merchandising

iv) Strategic and operational partnership

3. Operating margin management : Now a day's major topic is internal customer service in retailing. So this is the responsibilities of the distribution activity to meet these at budgeted costs.

The retail logistic mix comprises : Facilities.

i) Transportation

ii) Inventory

iii) Capacity utilization issues

iv) Information management

4. Financial management : The role of logistics in maximizing profitability and cash flow is one not to be ignored. Much of the working capital of a retail business can be tied up in inventory. Retailing adds value for the consumer by offering appropriate merchandise in locations and at times, convenient to the customer. This suggests that effective retailing is concerned with management of stocks and flows.

5. Techniques, methodology and models: effective logistics management requires the support of models and computer based planning & control systems.

During the 1970's attention was focused on the development of operational system such as vehicle scheduling programs. The strategic aspects of logistics planning and control were largely unaddressed. Now a days man technique, new methodologies and models are entered in retailing, main aspect is information technology.

6. Organizational design requirements for retail supply management

In supply chain organization strategy, culture and leadership style these characteristic effecting on retailing. The retail business always focuses in customer satisfaction.

Prospects of Retail Supply Chain Management

The problems and prospects of retail supply chain deals with the challenges and emerging trends

of supply chain business for small businesses. The retail supply chain has been emerging rapidly in present business scenario. The main reason behind this rapid growth is the emergence of online shopping businesses like Amazon, Snapdeal, E-bay, Flipkart etc.

A survey stated that, more number of product categories are available online compare to the traditional way of shopping in a shop or store. A result, people preferring online products rather than physical store products. Thus, the future prospect of retail supply chain is bright in coming years.

4.7 Role of Packaging

Q16. What is packaging ? Explain the role of packaging in retail business.

Ans : **(June-19)**

Packaging

Packaging interacts with the logistics system in a number of different and important ways. The size of and protection afforded by the package affect the type of materials-handling equipment used and the level of product damage incurred. The package has an impact on the stacking height of the product in the warehouse and thereby on the utilization and cost of the warehouse. Also, from a logistics manager's point of view, packaging in quite important for effective damage protection, not only in the warehouse but also during transportation. Packaging may contribute nothing to a product's value, but the influence on logistics costs is considerable.

Package size may affect a company's ability to use pallets or shelving or different types of materials-handling equipment. Many companies design packages that are too wide or two high for efficient use of either a warehouse or transportation carrier. So, coordinating packaging with ware-housing and with transportation is quite important. Also, poor packaging can contribute to higher handling costs and result in lower future sales if the goods arrived damaged.

Reasons of Retail Packaging

Packaging of merchandise is essential for the following reasons in the retail supply chain,

1. In case of private labels, the retailer is obliged to fulfil the following responsibilities of packaging.
   a) Package design.
   b) Involvement of third parties for development of product design.
   c) Delivery of packaging materials etc.
2. The retailer cannot change the primary package design supplied by other companies dealing with consumer goods. The secondary packaging can be changed if retailers want the products in a specific manner.
3. The items which are imported or fragile must be properly packed by the retailer before the materials are despatched. This constitutes an essential part if the retailer has to make payments at the point of dispatch.

Role of Packaging

1. Packaging plays an important role in every business. It is one of the major factors influencing the profits of the business.
2. Packaging protects the product from damages.
3. Packaging helps in differentiating one product from another product.
4. The cost of the product can be maximized with the help of proper packaging.
5. Packaging helps in providing value-added services to the customers.
6. Proper packaging design helps in increasing merchandise, shelf presence, product presentation, marketing and consumer acceptance.
7. Effective package design helps in minimizing cost for materials, handling, storage and distribution.

8. Package designs contain ingredients which helps in preparing recipe giving the details of all the items and in an easy way.
9. Packaging acts as an essential element of the product proposition.
10. Packaging helps in knowing the product validity by mentioning its manufacturing and expiry date, so that the product can be best utilized within its valid period.
11. Consumers have a wide variety of choices with different brands but while selecting product, customers prefer quality products at low cost.

    Example: In spite of many chocolates, 'Dairy milk' is preferred by most of the customers because of its colour, taste and designs.
12. Package design also acts as a sales promoter for increasing the sales of customers.

Role of Repackaging

1. Repackaging is done to ensure product safety before reaching the ultimate customers.
2. Repackaging satisfies consumers and helps the firm in maximizing its profits.
3. Repackaging process helps in reducing human errors.
4. Repacking unit in pharmacy line provides repacking services in case the products package needs to be modified by following regulations as per the Greek labelling for products.
5. Product sorting for repacking purpose has become easy due to innovative technology.

   Example: Canned tomatoes seem to be available with green and red colour. But by using "photoelectric eye" technology these tomatoes can be made available in to eight different colours at a very less time. After this sorting process, again rechecking is done by the staff and finally sent for repacking.
6. Repacking also takes in to consideration certain factors especially related to food products which need to be in perfect condition and free from, harmful effects.

   Example: The temperature needed for one product may not be same for other products. The temperature/air circulation needed for storing oranges is different from apples, bananas etc. So, in order to avoid the risk of damage, products must be stored in a temperature which is suitable to that particular product.
7. Thus, the role of repackaging helps in minimizing losses and a gain to consumers and the organization.

Problems of Packaging and Repackaging

The problems of packaging and repackaging are as follows :

i) Packaging and repacking consumers a lot of time.

ii) Improper packaging and repackaging would increase the number of disappointed customers.

iiii) The products market value may decline due to poor packaging and repackaging

iv) If the packed products get damaged during transit, then the manufacturers need to allot lot of time for the purpose of packaging and repackaging.

v) Repackaging process can sometime may also result in human errors.

vi) Ineffective packaging and repackaging would lead to maximum cost for materials, handling, storage and distribution.

vii) Ineffective package design would not promote sales.

viii) Poor packaging and repackaging does not ensure safety.

ix) Poor packaging and repackaging also leads to difficult in product sorting.

Q17. Explain different kinds of packaging.

Ans :

Depending on the use of packaging materials, the packaging for export products can be classified the following categories:

i) Plastic Packaging

The various kinds of plastic materials are used for packaging of the export products. The most common plastic materials used for packaging are polyethylene (PE) and polypropylene (PP).

Plastic boxes can be used especially as retail packages for jewellery and other small, precious products. They are also well-suited to add appeal to products such as embroidered handkerchiefs or tablecloths, souvenir dolls, etc. They come in square, oval or round shapes; printed or plain.

ii) Paper Based Packaging

Paper based materials are used as wrapping, as paperboard cartons or corrugated fibreboard boxes. The various types of paper can be coated with plastics, waxed or treated with anti corrosion agents. Paper is either produced from virgin wood fibres or recycled fibres. The former is stronger than the latter.

Paper wrappings provide protection against dust and light, but do not provide mechanical protection.

Paper absorbs moisture when the surrounding air is more humid than the paper, and it gives up, moisture when the surroundings are drier. Thus, paper wrappings can be used to some extent as moisture protection inside the packages as well to show down the harmful effect of moisture in the air.

iii) Paperboard Folding Cartons

Folding cartons made of different paperhood qualities can be used as retail packaging for variety of reasons. Folding cartons are economical; they can be shaped in almost unlimited number of ways; they can be printed very decoratively; properly designed cartons provide mechanical protection to products; they protect products against dust and light, and are easy to handle in retail shops. The most important property of such cartons is their stiffness.

iv) Paper Board Cans

The paperboard can is a form of paper based retail packaging, which is quite inexpensive and is used to pack different types of products. These cans can be lined inside with aluminium foil or plastic films to provide additional protection against humidity. Such cans are used for packaging toys, puzzles, games, tennis-balls and other sports goods.

v) Combined Plastic and Card Board Packaging

There are three main types of packaging that combine paperboard and plastic materials. These are as follows:

1. Skin Packaging,
2. Blister Packaging, and
3. Plastic Bags with a Paperboard Card.

These packages are used mainly for retail packaging of pens, small toys, gift items and lightweight souvenir articles. This type of packaging has several advantages: the product is visible through the plastic; the paperboard card can be printed to provide information and to add sales appeal; especially small products are not lost or stolen easily.

1. Skin Packaging

Skin packaging is a form of packaging where the product is first placed on a paperboard card with heat seal coating. It is suitable for products, which need protection against moisture and are not very heavy or expensive. It is however, not suitable for products which are sensitive to heat.

2. Blister Packaging

In this form of packaging, the product is first placed into a pre-formed plastic blister. Then a paperboard card is attached to it. Blister packaging can be used for a variety of products such as toys, pens, textile articles and decorations etc.

3. Plastic bag with Paperboard Card

In this form of packaging, a paperboard card is attached to the plastic bags through a hole in the bag. This adds sales appeal to plain plastic bags and is always very cost effective. The paperboard card can be printed on adding information and attraction. The plastic bags can be made of any materials but PP film but pp film should be perferred in the interest of better product presentation.

vi) Miscellaneous Packaging

Exporter can make use of wood, textiles, straw, leaves or any other locally available materials for packaging of the goods. Specially made wooden boxes can be used to package traditional ceramics, wood carving , various gift items, pieces of jewellery, etc. If wooden packaging is used as a gift or retail package, it has to be made with as much care as the product itself. This means that it should be smooth, clean , and dry, with any hinges or locks well made and functioning . It is also importance to pack the product with sufficient cushioning material into a wooden package, so that the product is not damaged during transport. Before using wood as packaging material, one should always check, whether there are any regulations concerning the treatment or certification of wooden materials.

Short Question and Answers

1. Define Information.

Ans :

Information is crucial to supply chain performance because it provides the foundation on which supply chain processes execute transactions and managers make decisions. Without information, a manager will not know what customers want, how much inventory is in stock, and when more products should be produced and shipped. In short, without information a manager can only make decisions blindly. Therefore, information makes the supply chain visible to a manager. With this visibility, a manager can make decisions to improve the supply chain's performance. In many ways, information is the most important of the four supply chain drivers because without it, none of the other drivers can be used to deliver a high level of performance.

2. Radio Frequency Identification Device.

Ans :

RFID is basically a form of labeling where electronic labels or tags are programmed with unique information and attached to objects that need to be identified or tracked, such as pallets, vehicles, automated guided vehicles, etc. Some RFID systems are read-only, while others allow readers add new information or change existing information on the tag itself.

The most popular applications of RFID is transportation are for vehicle and container ID, tollbooth collection and vehicle monitoring. The RFID system consists of two parts: a tag and a reader. The tag is a small transceiver that is activated by the reader which transmits an signal using radio frequency waves. The tag, in turn, transmits encoded data back to the reader, which acknowledges and logs the signal via a computer. In India, RFID is in nascent stage.

Simply stated, RFID uses radio frequencies to transmit data between a portable device and a managing computer. The key components of an RFID system include a tag, a portable tracking device, an antenna an a controller. The RFID tag contains a small chip and a coiled antenna to broadcast a signal. This tag is attached with the product. A 'reader' to track the product captures the signal the tag emits.

The 'reader' is usually a remote mechanism, such as a hand-held device or a satellite. It enables data capturing and tracking of items using radio frequencies and transmitting data between a managing computer and any of several portable devices. The 'RFID' was originally developed during World War II for the allied planes to distinguish themselves from enemy aircraft.

Key components of an RFID solution consist of :

- Hardware, which includes serves, readers and writers, tags, controllers and cabling.
- RFID software for integration to back-end and legacy applications.
- Enhancement of legacy applications to sustain the value RFID can provide.

3. Advantages of RFID.

Ans :

Advantages of RFID

- **Remote sensing**

Physical contact is not required between the data carrier and the communication device. For the typical garment retailer, this means that instead of having to walk down each aisle within a store or warehouse to take inventory, workers can execute a command somewhere within that same building and complete the inventory calculation in minutes.

- **Simultaneous reading / writing**

  Read/write capabilities can be performed within the same assembly line or remotely across continents.

- **Mobility**

  Mobile-tracking devices can be reused or disposed, as the RFID operation requires.

- **High accuracy**

  RFID ensures almost 100 percent scanning achievement are in the first pass of the item being scanned. This compares very favorably with the best bar code systems that till experience a 2-3 per cent failure rate in first passes.

- **Cluster reading**

  Multiple tags can be read simultaneously. This is known as 'cluster reading; and accelerates the data collection process considerably.

- **All-weather capability**

  RFID provides the retailer with the ability to scan through all types of weather, as well as through other surroundings such as metals, bodies of water and dirt. With this capability, RFID succeeds where normal bar code scanning typically fails.

4. Define bar coding.

Ans :

A *bar code* is a series of parallel black and white bars, both of varying widths, whose sequence represents letters or numbers. This sequence is a code that scanners can translate into important information such a shipment's origin, the product type, the place of manufacture, and the product's price. Bar code systems are simple to use, accurate, and quick; and they can store large amounts of information.

Different industries use different bar code standards. A *bar code standard* states the language the code uses, the print quality companies expect on the label, the type of information the label contains, and the information format. Over thirty major U.S. industries have developed written standards for bar coding in manufacturing and warehouse operations. For example, different standards include the Automotive Industry Action Group (AIAG) standards and the Universal Product Code that the grocery industry uses. With one bar code language standard, suppliers and vendors in a particular industry can easily read each other's package labels.

Bar code scanners fall into two main categories: automatic and handled. Automatic scanners are in a fixed position and scan packages as they go by on a conveyor belt. In contrast, a worker can carry the portable handheld scanner or wand throughout the warehouse.

5. What are the differences between RFID and Bar Coding ?

Ans :

Following are the differences between bar coding and RFID,

S.No	Bar Coding	S.No	RFID
1.	In case of bar coding, a code is printed on the product label.	1.	In RFID technology, a small microchip is inserted with in the pack.
2.	The storage capacity, is less in bar coding.	2.	Huge data can be stored in RFID tags.
3,	Bar coding is less secured.	3.	RFID technology is more secured and protected than bar coding.
4.	Bar coding depends upon line-of-sight scanning.	4.	No such dependency is there in RFID technology
5.	Less expensive.	5.	Highly expensive.
6.	With standard bar code language, suppliers and manufacturers can understand each other's package labels.	6.	No such standards are used.

6. Define Retail supply chain management.

Ans :

Supply chain management comprises of various processes and activities required for the conversion and processing of raw materials or component parts to produce finished goods that can be transferred to the end users by using an appropriate channel of distribution. Hence, supply chain is an association of several processes as product development, sourcing, manufacturing, distribution, transportation, warehousing etc. The limits of supply chain depends upon the scope of its operations which may range from direct supplier to direct customers or from its supplier's supplier to customer's customer.

Besides taking care of all the above mentioned activities retailers must also be concerned with other supply chain issues such as selecting products for stock (Assortment management), pricing of the product and also with the reverse logistics (if goods are returned from customers). Efficiency and effectiveness of such processes are mainly effected by the variety/types of products offered by the retailers, its price and also by the levels of customer service, offered by focal firm. Wal-mart, one of the world's leading retailing company has continuously bought many innovations in the supply chain processes and has improved the overall supply chain CRP (Continuous Replenishment Programs), CPFR (Collaborative Planning Forecasting and Replenishment). FRM (Floor Ready Merchandise) etc., are the few programs/innovations introduced by Wal-mart.

Retail supply chain is not a single entity, but it is found to be cluster of supply chains. For instance, a software manufacturer will usually deal with a single software dealer/supply chain, but a retailer like spencer has to deal with large number of supply chains for different products i.e., for consumer durables, food and grocery, dairy products, furniture, jewellary etc. Further these supply chains will have different group of suppliers, separate forecast and replenishment patterns etc.

7. Cross Docking.

Ans :

With the help of cross docking, inbound and outbound shipments can be coordinated effectively which in turn helps in reducing the amount of inventory at retail distribution centres. In cross docking, the items will be directly transported to the store which not only enables retailers to help reduce the levels of inventory but also to reduce the lead times of supply from supplier to store. Wal-Mart is the best example where the concept of "cross docking" is used effectively for reducing the levels of inventory in retail warehouses.

8. What is packaging ?

Ans :

Packaging interacts with the logistics system in a number of different and important ways. The size of and protection afforded by the package affect the type of materials-handling equipment used and the level of product damage incurred. The package has an impact on the stacking height of the product in the warehouse and thereby on the utilization and cost of the warehouse. Also, from a logistics manager's point of view, packaging in quite important for effective damage protection, not only in the warehouse but also during transportation. Packaging may contribute nothing to a product's value, but the influence on logistics costs is considerable.

Package size may affect a company's ability to use pallets or shelving or different types of materials-handling equipment. Many companies design packages that are too wide or two high for efficient use of either a warehouse or transportation carrier. So, coordinating packaging with warehousing and with transportation is quite important. Also, poor packaging can contribute to higher handling costs and result in lower future sales if the goods arrived damaged.

9. Reasons of Retail Packaging.

Ans :

Packaging of merchandise is essential for the following reasons in the retail supply chain,

1. In case of private labels, the retailer is obliged to fulfil the following responsibilities of packaging.
   a) Package design.
   b) Involvement of third parties for development of product design.
   c) Delivery of packaging materials etc.
2. The retailer cannot change the primary package design supplied by other companies dealing with consumer goods. The secondary packaging can be changed if retailers want the products in a specific manner.
3. The items which are imported or fragile must be properly packed by the retailer before the materials are despatched. This constitutes an essential part if the retailer has to make payments at the point of dispatch.

10. Role of Repackaging.

Ans :

1. Repackaging is done to ensure product safety before reaching the ultimate customers.
2. Repackaging satisfies consumers and helps the firm in maximizing its profits.
3. Repackaging process helps in reducing human errors.
4. Repacking unit in pharmacy line provides repacking services in case the products package needs to be modified by following regulations as per the Greek labelling for products.
5. Product sorting for repacking purpose has become easy due to innovative technology.

   Example: Canned tomatoes seem to be available with green and red colour. But by using "photoelectric eye" technology these tomatoes can be made available in to eight different colours at a very less time. After this sorting process, again rechecking is done by the staff and finally sent for repacking.

Choose the Correct Answers

1. Advantage of RFID. [d]
   (a) Cluster Reading (b) Mobility
   (c) High Accuracy (d) All
2. Delivery of a full truck load from retail distribution company to a store is an example of _____ [c]
   (a) Inventory management (b) Trade cycle
   (c) Transportation cycle (d) SCM cycle
3. _____ involves processing of various business transactions. [a]
   (a) Business transaction processing (b) Business intelligence
   (c) BPR (d) All the above
4. RFID stands for _____ [a]
   (a) Radio Frequency Identification Devices (b) Radio Field Interlinked Data
   (c) Regional Force Integrated Design (d) Research Field Interlinked Design
5. Benefit of Barcode Technology. [d]
   (a) Reduce errors (b) Save time
   (c) Cut Cost (d) All
6. _____ plays an important role in managing information and flow of goods. [c]
   (a) ICT (b) International technology
   (c) Information technology (d) Information transition
7. Component of Retail Supply Chain. [a]
   (a) External supply chain (b) Reverse supply chain
   (c) Global supply chain (d) All
8. _____ reduces human involvement and increases paperless transactions. [b]
   (a) Knowledge management (b) EDI
   (c) RFID (d) Bar coding
9. _____ are the elements of retail SCM. [d]
   (a) Merchandise management (b) Buying or sourcing
   (c) Sell or customer service (d) All the above
10. ICT stands for _____. [c]
   (a) International Communication Technology
   (b) Internal Communication Technology
   (c) Information Communication Technology
   (d) Information Communication Transformation

Fill in the Blanks

1. Retail SCM is an important concept as _____ plays a vital role in moving products from its origin to end user.
2. The organizations are using _____ for decision support system.
3. _____ is a simple, useful, quicker and correct technique which can store greater volume of information.
4. Dialogue module, data base module and model sub-system are the components of _____.
5. _____ is a new novel technology concept that processes immense potential to tap information resource for business entities.
6. _____ aims to promote economical, environmental and technological significance.
7. _____ is the information system that capture knowledge and provide solutions to human expertise.
8. _____ is the process where computers are used to exchange business related information.
9. Knowledge which is semi-structured in nature is known as _____.
10. _____ is a combination of two technologies.

ANSWERS

1. Retailer
2. Data Warehousing
3. Bar Coding
4. Decision Support System
5. Data Mining
6. Packaging
7. Expert System
8. Electronic Data Interchange (EDI)
9. Explicit Knowledge
10. Information and Communication Technology

UNIT V

Key Operation Aspects in Supply Chain

Supply chain Network Design, Distribution network in Supply Chains, Channel design, Factors influence design, role and importance of Distributors in SCM, Role of Human Resources in SCM. Issues in Workforce Management and Relationship Management with suppliers, Customers and employees, linkage between HRM and SCM.

5.1 Supply Chain Network Design

Q1. Define Supply Chain Network Design. State its objectives and challanges of supply.

Ans :

Chain Network Design

Supply chain network design is a process of determining the number of suppliers, the locations of facilities determining the product flow within the supply chain and location of distribution centres to effectively meet up the customer demand.

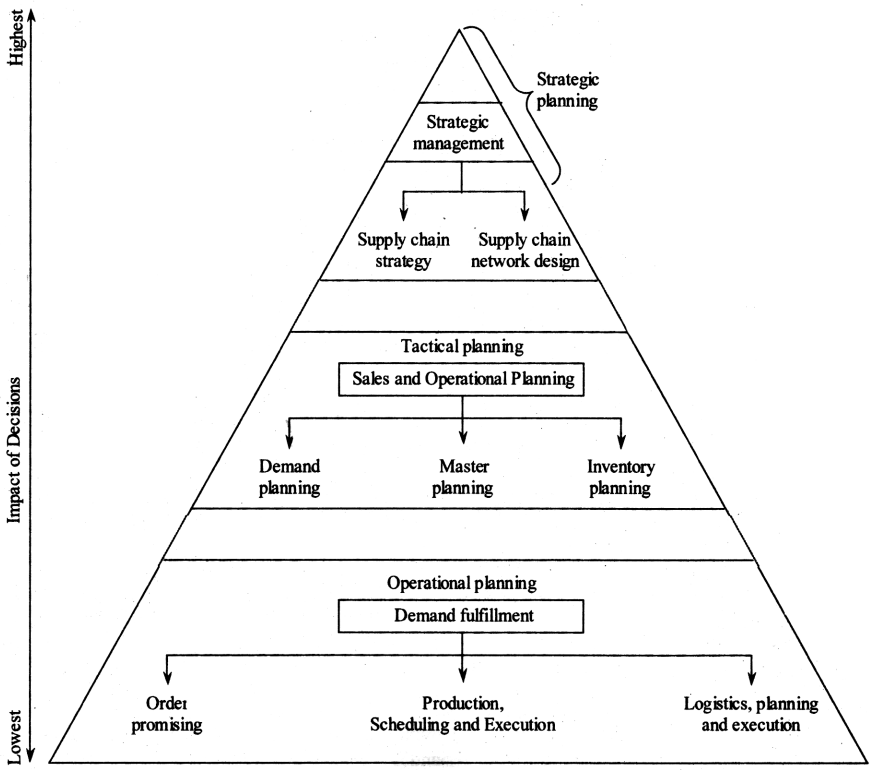


Fig. Supply Chain Network Design

Objectives of Supply Chain Network Design

The objectives of supply chain network design includes :

i) To optimize the facilities located in the supply chain,

ii) To allocate optimum capacities and technical requirements to each facility.

iii) To assign the sources and markets to facilitate the transportation of materials to minimum distances.

iv) To minimize the overall costs of logistics and transportation.

Supply chain network design decisions should support the following strategic activities of the firm :

a) Introduction of new product in the market.

b) Optimal sourcing of materials

c) Location of manufacturing plants

d) Selection of target customers and location of facilities and

e) Number of distribution centres to be located by considering the customer convenience and cost benefits.

Inspite of all the above activities supply chain network design needs to maintain appropriate trade-off with the other strategies of the supply chain such as: Inventory, manufacturing, procurement, distribution etc., so as to avoid the conflict among them.

Challenges of Supply Chain Network Design

With increased global competition, firm needs to produce innovative and customized products so as to gain market share through redesigning the existing network design. Traditionally the network designs undergo the process of redesigning under rare situations. However, with the changing global market conditions, it became necessary to frequently to update the design of supply chain network according to the tastes and preferences of the customers.

The challenges faced by the supply chain network includes :

- Lack of appropriate levels of flexibility in the configurational pattern of supply chain network has failed to respond to the changing demand and supply requirements.
- Emergence of rapid demand for the initiation of product variety.
- The difficulty in deciding upon the appropriate distribution channel.

The reasons for these challenges in the supply chain network arises as a result of increased complexity in supply chain resulted from the expansion of firms operations in domestic markets to global markets. If the supply chain strategy is implemented without proper planning at the strategic level, it only increases the cost burden on the firm thereby making the entire process a complicated affair.

Q2. Describe the Framework for Designing Supply Chain Network.

Ans : **(Oct.-20)**

The main aim behind designing a supply chain network is to maximize the profitability of a firm by meeting the demands and expectations of the customers. The designing process of a supply chain network involves four phases.

These phases are as follows :

1. Defining the Supply Chain Strategy

In this phase, the manager defines the supply chain design of a firm. This phase deals with the determination of the stages involved in the supply chain and the operational processes of a supply chain i.e., outsourcing or in-house production. The supply chain strategy aims at meeting the need and

expectation of customers. It outlines the capabilities which a supply chain network must possess for supporting the company's supply chain strategy.

The supply chain manager forecasts the changing global competition and the actions of its competitors. They also identifies the constraints on available capital and determines whether the growth can be attained by acquiring the present faultiest, expanding the facilities, or partnering.

2. Defining Regional Facility Configuration

In this phase, the firm determines the region of the location of facilities, their roles and their capacity to allocate to each facility. The number of facilities and their location should be decided based on the demand estimations of the county, customer preferences and type of market (i.e., homogeneous or heterogeneous). In case of homogeneous markets, the firm needs to consolidate the existing facilities to a large extent and for heterogeneous markets, the firm needs to locate small facilities in each region.

3. Selecting Desirable Potential Sites

In this phase, the firm selects a set of potential sites in each region for the location of facilities. The selection of site for plant location is made by analyzing the infrastructure facilities which are available to meet the market demand. The infrastructure requirement are of two types:

4. Location Choices

In this phase, the supply chain manager need to identify the exact location and allocation of capacity to each facility. He should focus more on the potential sites which are selected in the previous phase. By considering the margin, market demand, total logistics costs, tax rates, factory costs etc.

5.1.1 Distribution Network in Supply Chain

Q3. What are the factors influencing distribution network design ?

Ans : **(June-19)**

The performance of a distribution network of a supply chain depends on the ability of the firm to accomplish the objective of meeting the needs and expectation of the customers effectively at low cost. Thus, the performance of a distribution network can be evaluated with the help of the following two dimensions:

(i) The degree to which the customer's needs are fulfilled and

(ii) The cost of meeting the needs of the customer's.

These dimensions acts as the basis for differentiating the distribution network options and also have a significant impact on the firm's profitability.

A manager should consider the following measures of customer service which are affected by the structure of distribution network while designing the distribution network.

(a) Response time

(b) Product variety

(c) Product availability

(d) Customer experience

(e) Time to market

(f) Order visibility

(g) Returnability.

(a) Response Time

Response time is the time taken for delivering the order to customers.

(b) Product Variety

Product variety means the variety of products which are offered by the distribution network.

(c) Product Availability

Product availability means the chances of having a product in the warehouses to meet the customers' demands.

(d) Customer Experience

It means the ease with which the customer's places and receives the orders and the degree to which this experience is customized.

(e) Time to Market

It means the time taken for introducing a new product in the market.

(f) Order Visibility

It means the ability of the customers to track their orders from placement to delivering.

(g) Returnability

It is the facility provided to the customers to return the damaged goods to the firm.

Thus, in order to satisfy the needs of the customers, the firm need to perform effectively in all the above aspects. The firm's which prefer customers who gives importance to short response time should be located close to them. These firms establishes number of facilities each with low capacity in their network. On the other hand, the firms which prefer customers who are ready to tolerate long response times needs only few locations which can be far from the customer. These firms can increase the capacity of each location the figure given below depicts the relationship between desired response time and number of facilities.

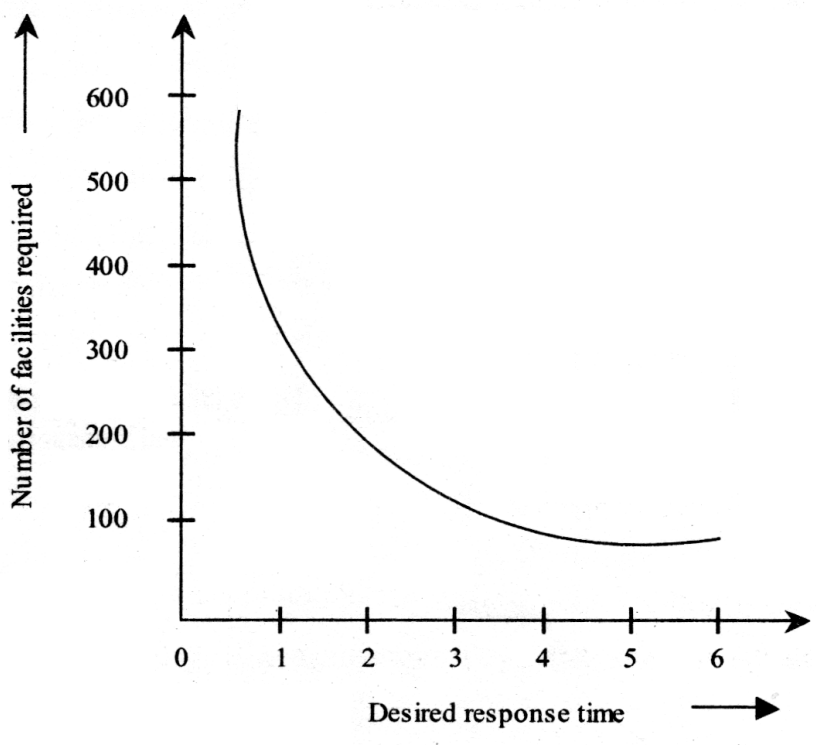


Fig : Impact of Number of Facilities on Response Time

In the figure (1), it can be seen that a decrease in the desired response time increase the number of facilities needed in the network. The following logistics costs are effected by the changes in the distribution network design.

(i) Inventory costs

(ii) Transportation costs

(iii) Facility costs

(iv) Information costs

(v) Logistics costs.

(i) Inventory Costs

Inventory costs of a firm increases with an increase in the number of facilities in the supply chain. In order to reduce the inventory costs, firm should reduce the number of facilities in their supply chain network.

(ii) Transportation Costs

Transportation costs are of two types i.e., inbound transportation cost and outbound transportation costs. The costs which are incurred on getting the materials into warehouse are called as inbound costs whereas the costs which are incurred on shipping the material from warehouse to the delivery point are called as outbound costs.

Generally, the outbound costs are higher than the inbound costs as the inbound lot sizes are of greater quantities. By maintaining economies of scale in inbound shipment the increase in the facilities reduces the transportation costs.

(iii) Facility costs

A firm can reduce the facility costs by reducing the number of facilities located in the supply chain network. This in turn helps the firm to maximize the economies of scale.

(iv) Information costs

For better maintenance of distribution network, the firm should depend on the information technology which requires high costs.

The figures given below depicts the relationship between the number of facilities and inventory costs, transportation costs, facility costs & logistics costs.

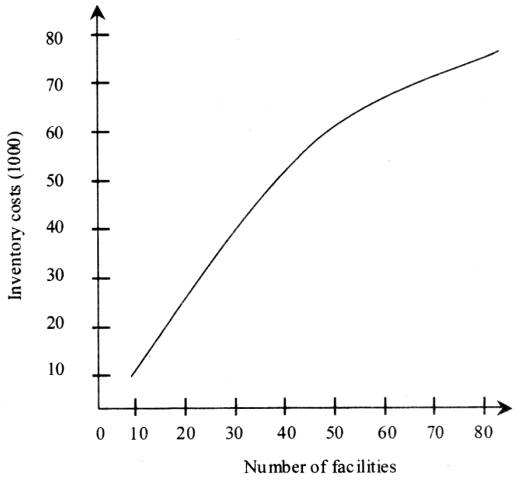


Figure : Relationship between number of facilities and Inventory costs

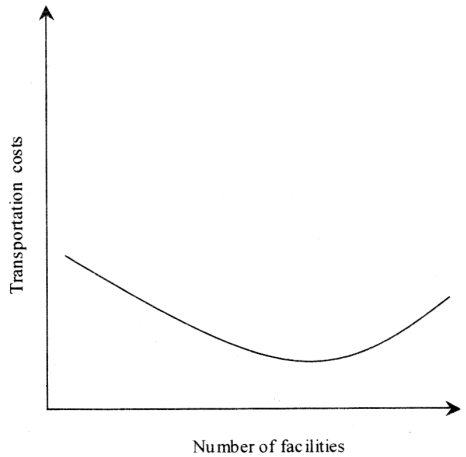


Figure : Relationship between number of facilities and Transportation costs

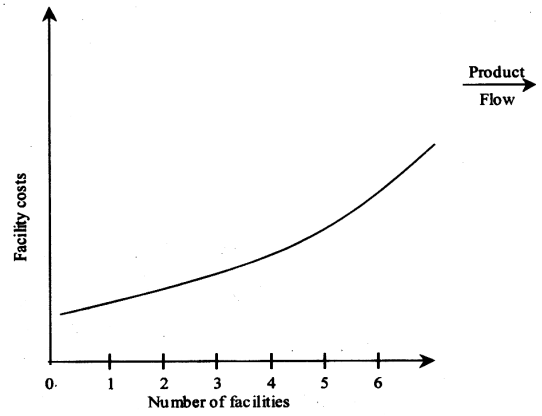


Figure : Relationship between Number of Facilities and Facility Costs

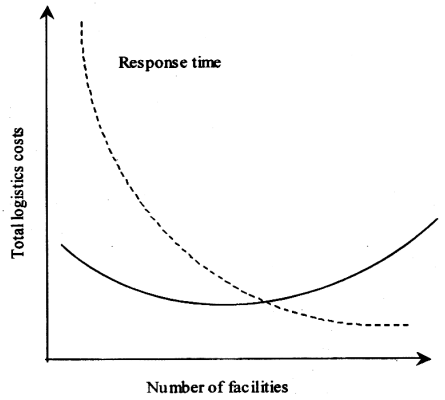


Figure : Variation in Logistic Costs and Response with Time Number of Facilities

(v) Logistics costs

The sum of inventory, transportation and facility costs for a supply chain network is the total and logistics cost. With an increase in the number of facilities, the total logistics costs firstly decreases and then increases. Every organization must have at least the minimum number of facilities which reduces the total logistics cost. If a firm further desires to decrease the response time to its customers, then it should increase the number of facilities beyond the cast minimizing point. If a firm is assured that the increase in revenues due to better responsiveness in more than the increase in costs due to additional facilities, then it must add the facilities beyond the cost minimizing point.

Hence, it is very essential for the firms to assure that the strengths of the distribution network matches with the strategic position of the firm.

Q4. What are the Options and factors influencing Distribution Network Design ?

Ans :

Options in Distribution Network

Transportation refers to the movement of product from one location to another. It is an important issue, as it is often an important component in the final cost of the product. Transportation decisions can also affect customer service levels and inventory level. There are many important aspects to transportation decisions. They are affected by many factors for example vehicle related costs, fixed operating costs, inventory costs, facility costs, service level costs.

Managers can design their transportation in number of way for example they can use :

a) Direct Shipment Network

In this method supplier's supply directly to retailers. Routing of each shipment is already specified and the supply chain manager needs to decide only about the quantity and the mode of transportation.

Operation and coordination in this kind of network is very simple. Another advantage is elimination of intermediate warehouses as goods are shipped directly to the retailers.

b) Direct Shipping with Milk Runs

In this method a truck deliver products from single supplier to multiple retailers or from multiple retailers to single retailer.

In this method the supply chain manager has to decide the route of each run. This method also eliminates the need of intermediate warehouses. Further, this method lowers the transportation cost. Replenishment lot size at the retail store may require Less-than-Truckload (LTL), but with the use of this method, shipments can be consolidated for number of retailers. Toyota uses this method to implement its Just in time, shipping parts from single supplier to its many closely located assembly plants.

c) Shipments through Central Distribution Center

Under this method shipment to retailers are routed through a distribution center. The retail stores are divided into geographic regions served by a distribution center (DC), an extra layer between the supplier and the retailer serves two important functions: to store inventory and to act as transfer location.

Various Transportation Network Options

1. Direct shipment network

- Goods are shipped directly to retailers.
- Routing of each shipment is known; the supply chain manager needs to decide the shipment size and mode of transportation.
- Operation and coordination is very simple.
- Eliminate need for intermediate warehouses.

2. Direct shipping with Milk Runs :

- Delivery from single supplier to multiple retailers; from multiple retailers to single retailer
- Supply chain manager has to decide the route of each run.
- Also eliminate need for intermediate warehouses.
- Lowers the transportation cost.
- Replenishment of lot size at the retail store may require Less Than Truck Load (LTL), but with the use of this method, shipments can be consolidated for number of retailers.

3. Through Central Distribution Center

- Shipments routed through a distribution center.
- The retail stores are divided into geographic regions served by a Distribution Center (DC): an extra layer between the supplier and the retailer serves two important functions :
  - To store inventory
  - To act as transfer location
- DC are very useful if inbound supply is in large quantities and manufacturer is far from retailer.
- DC can store these materials and ship to retailers whenever they need in smaller quantities.

4. Cross Docking

- Take a finished good from the manufacturing plant and deliver it directly to the customer with little or no handling in between.
- Reduces handling and storage of inventory.

Q5. What are the Factors Affecting Distribution Network Effectiveness?

Ans :

1. Centralization Vs. Rationalization

In distribution network planning, there is a well-established relationship between the number of distribution points, transportation costs and customer service targets. In a graphical sense, the point at which these three entities merge is the optimum balance of facility and transportation costs to develop a low cost, high service distribution network.

Normally, as distribution networks become more centralized, so do the internal support structures such as facility management, order entry, customer service and data processing. Depending on the degree of centralization achieved in support staffs, it is not uncommon to see cost savings of 50 percent or higher over decentralized network. However, service levels, limitations on total facility size, risk mitigation and through peaks must be factored into the decision matrix.

2. Fuel Costs

Any significant shift in the cost of enemy – electricity, fuel, etc., - could have an impact on operating costs and, therefore, on distribution. Many distribution projects that are otherwise viable fail once the cost of energy becomes a factor. This is especially true for energy-intensive facilities such as refrigerated warehouses. For this reason, it is crucial to work with all energy providers to determine the load that a prospective operation would put on the local energy system and develop solutions that conserve energy while achieving goals. Rising fuel costs make this a very sensitive component of distribution costs regardless of whether transportation is handled via third party carriers or private fleet. Some strategies to consider mitigating this are:

3. Mode Assessment

Depending on service requirements, it may be possible to move from LTL services to truckload or from parcel to LTL. In general, each shift will result in reduced freight costs.

4. Transportation Management Systems (TMS)

Poor transportation performance often stems from poor transportation planning. A TMS can provide more efficient route planning and load tendering, and result in savings in the process.

5. Private Fleet Concerns

Private fleets can benefit from an in-house fuel supply program to gain control over fuel costs and usage. The investment can be offset by elimination of one or more fuel supply chain links, reducing operating costs and sometimes allowing fuel blends that are more efficient and economical.

6. Regional Vs. Centralized Networks

The costs of delivery using different modes of transportation, as well as service availability, can be directly impacted when fuel costs rise, understanding the modes used most often, the customer expectation and the risk associated play into the network structure decision.

7. Flexibility

In today's unpredictable business climate, flexibility is a key to continued success for some and survival for others. While designing a distribution facility, specifying versatile equipment is a critical requirement. The latest technology may look nice at start up, but if it can't keep pace with unpredictable events, it is simply a waste of money. Planning for likely (and unlikely) changes in the distribution profile should drive the warehouse design and equipment specifications. For the majority of distribution operations, flexible equipment is the more practical choice.

8. Information Systems

In today's e-enabled world, timely and accurate information is a requirement. The days of key punching in daily distribution activity and nightly updates to host financial systems are becoming a distant memory for successful distribution execution systems must be :

9. Real-time

Customer requirements are moving towards being able to instantly track an order through every step of the fulfillment process to delivery. Optimally, this information is linked to an Internet front-end where a customer can easily log in and see the exact status of their order. Real-time interfaces and host system updates enable this customer-focused initiative.

10. Paperless

The reality is that paper equates to errors. Language and educational barriers result in paper pick documents that are often misinterpreted, at best resulting in lost rupees within the distribution operation or, worse still, lost customers due to fulfillment issues that escape even the best inspection processes. The solution is paperless systems requiring operator validation that the right steps are followed and that the correct product is picked and packed.

11. Standardized

In the past, many companies developed proprietary, legacy systems to manage their distribution operations. With the high growth associated with a successful distribution operation, many of these companies are finding that the investment to develop and maintain an in-house system is no longer viable. Standardized, industry-tailored software is now the rule rather than the exception. Software companies leverage their client base to continually update their product, adding far more base functionally than inflexible legacy systems.

12. Variety

Special packaging, unitizing, pricing, labeling, kitting and delivery requirements are becoming the norm and must be addressed in any distribution plan. These tasks should be designed into the operation, not "tracked on" as a reactive afterthought. Many companies invest large amounts of capital setting up specialized packing or Value Added Services (VAS) lines with the mandate of gaining competitive advantages and in hindsight gain little except increased costs and headaches.

A simple review process involving a multi-criterion decision-making template can help resolve the above issues to make an effective distribution network.

To help manage the above-mentioned transportation and storage needs and concentrate more on their core activities, companies have started outsourcing logistics. Outsourcing logistics in short span of time has become a significant industry.

5.1.2 Channel Design - Factors Influencing Channel Design

Q6. What is channel design? How does logistics help in creating customer value.

Ans :

Channel design refers to the involvement of an organization in logistics, production, R and D, product launch, sales chan NEI design and other tasks. It mainly deals with the analyzing of customer needs, establishing channel objectives, identifying the major channel alternatives and then evaluating them. Channel desigrufollow's a structured approach by making use of the certain criteria which is used to evaluate optional channel structures.

Creating Customer Value

Given that the purpose of any business is to increase the value of the business for the shareholders, it follows that this is only likely to occur if the business can create some level of sustainable competitive advantage by developing 'preferred supplier' status with customers. Added value may be created in a number of ways.

The illustration makes the assumption that generally we may assume them to be used interchangeably; thus added value and utility both have a similar effect on customer satisfaction, i.e., if we increase either added value or utility we increase customer satisfaction. Customer satisfaction will increase as manufacturing combines labour and raw material to create the product and thereby adds form utility.

Marketing activities create awareness of the product and of its characteristics. Marketing also facilitates transactions and in so doing adds possession.

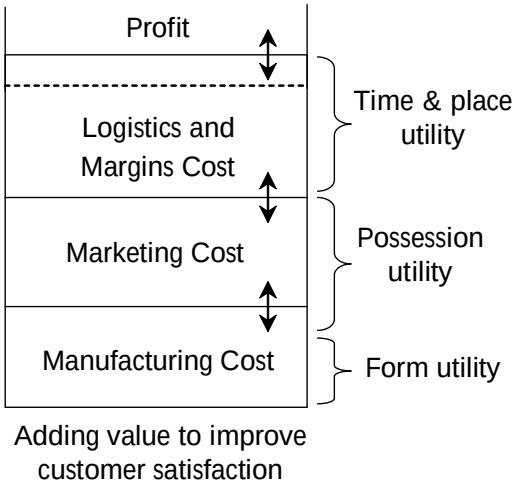


Figure: Adding Value to Improve Customer Satisfaction

As information technology applications expand, the two (awareness and transactions) coverage. First example, in the process of television/ home sales. The customers are able to make immediate purchases. However, this occurs for only a few products and typically both involve an intermediary and take time to process.

Finally time and place utilities are added by logistics process. The product is either made available at a specific location (an intermediary's show room) or may go directly to the customer. Thus the product is available where and when it is required.

Importance of Channel Design

1. Creating Customer Value

Channel design to increase the value of the business for shareholders. Business can create some level of sustainable competitive advantage by developing 'preferred suppliers' status with customers. Added value maybe created in number of ways.

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Finally time and place utilities are added by the logistics process. The product is either made available at a specific location or may go directly to the customer. Thus the product is available where and when it is required.

2. Channel Tasks

The reasons for the presence of intermediaries in markets have been questioned for sometime. Their existence has a long history. Trading intermediaries have existed for thousands of years. Channel task provides gaps between manufacturer and customer.

i) Time gaps

ii) Space gaps

iii) Quantity gaps

iv) Variety gaps

After 1972 they added some gap communication gaps.

3. Market Coverage

Market coverage is clearly an important consideration for any supplier. The nature of the channel intermediaries selected will match the product type with end user / customer expectations. Automatically they can increase sales and market share. Once total market covered, they can maintain different strategies for develop the sales.

i) Intensive distribution

ii) Exclusive distribution

iii) Outlet selection

4. Product Characteristics

There are a number of reasons why product characteristics may influence channel selection decisions. The value of product depends upon channel design. At the same time they can develop technology of a product.

5 Company Objectives

Every company has same objectives like sales volume, market share, probability cash flow and ROE. These are depends upon selection of channel design.

Q7. What are the Factors Influencing Network Design Decisions ?

Ans :

The following are the various factors that affects the supply chain network design decisions,

(a) Strategic factors deal with the competitive strategy of a firm which focus on cost leadership, high responsiveness, easy access to customers etc.

(b) Technological factors include economies of scale of production technology and flexibility of production technology.

(c) Macro economic factors include tax rates, tariffs, exchange rates, demand risk and other economic factors which are external to an individual firm.

(d) Political factors includes the political stability of the country and the legal systems of the countries.

(e) Infrastructure factors deal with the availability of good infrastructure facilities such as site, labor, transportation and local utilities.

(f) Competitive factors include the competitor's size, strategies and location of their facilities.

(g) Socioeconomic factors deal with the development of industrial policy and maintenance of balanced regional development.

(h) Operational factors include the logistics costs such as transportation, inventory and facility costs and the local presence of the facilities.

Q8. Define Channel Management. What are the factors influencing channel design.

Ans :

The channel management generally includes all the activities which are involved in the distribution function of a firm. For the purpose of decision making, distribution strategy provides guidelines. The distribution strategy of the firm.

1. Use of Power Bases

The power bases can be used for implementing and managing the channels. The channel system includes those players who are not motivated equally to execute the ideal channel design as their expectation from the channel might vary. Effective utilization of power bases helps in buying different channel partners in line for the execution and effectiveness of the channel.

2. Identifying and Resolving Channel Conflicts

A channel conflict mainly occurs when the specific actions of any channel member acts as an obstacle for the entire channel for attaining its objectives. There are mainly three reasons behind the occurrence of channel conflicts which are as follows,

(i) Goal Conflict

As different channel members understands the channel objectives in different ways, goal conflict occurs.

(ii) Domain Conflict

Domain conflict occurs when the channel members comprehends their responsibilities and authorities in different manner.

(iii) Perception Conflict

Perception conflict occurs when the channel members understands the market place differently and initiates the actions which do not match with the market.

In all the above cases, there is a mismatch in the channel members performance which in turn leads to conflict and influences the attainment of the ultimate goals of the channels. It is very essential for the sales manager who manages the channel to recognize the sources of the channel conflict and to take appropriate measures for setting the channel conflict.

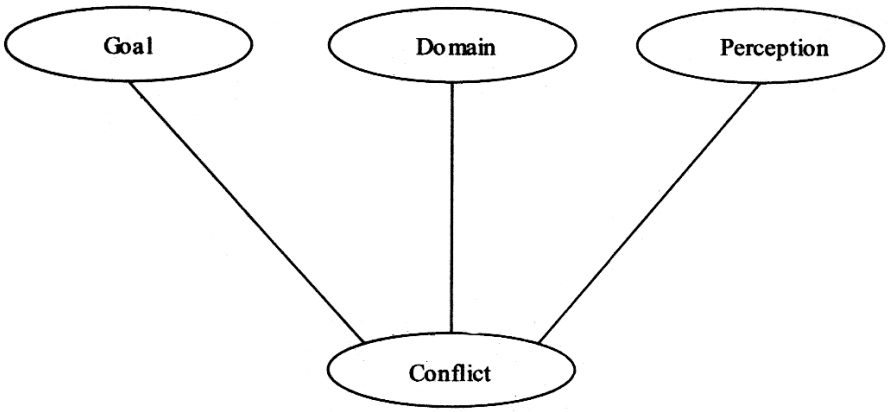


Fig : Types of Channel Conflict

Generally, either one (or) a combination of many channel powers can be used by the channel manager for setting the channel conflicts.

3. Channel Co-ordination

The sales manager needs to make sure that the channel system which he is operating is effectively coordinated particularly when the channel conflict occurs till the channels are in operation.

A channel system is considered to be effectively co-ordinated if each channel member comprehends his role more efficiency and performs it to assist the whole system to attain its customer services objectives. The coordinated channel protects the interests of each channel members, assures that the actions of all the members are in line with the objectives of the channel and streamlines the channel flows for delivering the customer service objectives as expected by the end customers.

The channel co-ordination is a continuous efforts which considers the customer requirements, the manner in which the markets and competition behave and the strengths and weakness of the channel partners.

5.2 Role and Importance of Distributors in SCM

Q9. Explain the Role of Distributors in SCM.

Ans : **(Oct.-20)**

Role of Distributors in Supply Chain Management

Distributors play a very important role in supply chain management as they can effectively carry out the following functions which holds a significant impact on the firm's value and profitability. The following are the functions of,

a) Selling and Promoting

Distributors play a significant role is selling the products with the help of different place and promotion strategies. Manufacturers cannot go each and every where and communicate their products to customers who are located in far away areas from the manufacturing plant. In order to avoid this, the firms can choose any one of the following strategies:

i) To hire sales staff and creating their own marketing channel in order to directly meet the customers who can control the products, price and marketing activities but cannot control the inventory's carrying cost, wages for sales staff, plant maintenance and so on.

ii) To use a wholesale distributor for direct selling. In this type of strategy the distributor needs to have complete knowledge about customer's needs and expectations in order to meet them effectively by enhancing the place, time and possession utilities. This facilitates the manufacturer to reach the customers of the for away areas, reduce costs and increase the emphasis on manufacturing processes. But it is not possible to control prices, promotions, direct information flow and may also fail to meet the customers' expectations.

b) Buying and Building Product Assortments

This function is quite essential for the retailers in order to offer or provide product assortments to best fit their merchandising strategy and to meet customer demand at low cost. Product assortment offers the benefit of sourcing different mix of materials from single supplier which would help in reducing the purchasing, transportation and merchandizing costs. Distributors play a major role in maintaining product assortment and can assemble different products from different sources according to the customer's requirements and provide value added delivery services at the minimal cost.

c) Bulk Breaking

The procedure of break bulk is completely opposite to the procedure of consolidation. It is found to be the most favorable mode for the storage of volume shipments. This method is applied for the transfer of goods when the quantity ordered by the customer is less and also when the distance between the customer and producer is more.

d) Value Added Processing

The present day distributors are greatly involved in converting the finished products derived from the manufacturers into their final form with the help of sorting, labeling, blending, kiting, repackaging, final assembly processes. All these functions are effectively carried out by the distributor in order to provide value added services to the customers or retailers.

The value added processing basically lies on the 'principle of postponement' which refers

to the process of reducing the risk of carrying the finished forms of inventory delaying the product differentiation in the supply chain channels in order to reduce the risk of carrying inventory along the whole supply chain. Value added processing would not only help in reducing the storage and transportation costs but also helps in reducing the product obsolescence.

e) Transportation

Transportation is the most important function of a distributor i.e., the movement of goods from source to destination (retailer). In order to have good transportation function, the distributors need to manage both time and place utilities for gaining higher customer satisfaction. Otherwise on the other hand it would result into loss of sale, increasing levels of customer dissatisfaction and increased order processing costs.

Firm can either maintain its own transportation fleets or make use of contract carriers for transportation of materials quickly at low cost and also at the time maintaining the consistency. These functions can be carried out effectively by the wholesale distributor who holds a close relationship with the customers, own fleet and expertise in transportation than that of manufacturers.

f) Warehousing

Distributor should maintain warehouses to possess required inventory to meet the customer demand and also a portion of buffer stock to meet unanticipated demand from customers. Warehouses can facilitate the distribution of products to potential customers located in wide geographical areas thereby reducing transportation costs. Distributor possessing logistics skills and a knowledge of customer needs and markets can better meet the customers than manufacturers and also reduce inventory levels in warehouses.

g) Sequencing

Distributors also carry out the function of sequencing when the finished goods get closer to the customers by sorting them into required lots or kits for the convenience of customer in order to receive the required goods in single delivery. Sequencing of materials can also help the manufacturers to receive different materials in sequential order of their usage for production process to adjust/ adopt to the assembly schedule. Sequencing helps is reducing the transportation costs. It also provides the customer with delivery services and cost effective process. Thus, it is most profitable to make use of the distributor's service who are experts in these i services

h) Merchandizing

Usually, in majority of the cases, the finished products delivered from the manufacturing site are not ready for the customer's delivery. They further need additional modifications such as bulk break, sequencing, packaging, repackaging, assembly and so on. Merchandizing can be carried out effectively by the distributor along with the retailers who provide the best product and service mix in order to match the promotion strategies.

i) Market Information

For a strong supply chain, the firms need to collect the adequate and reliable information with respect to the customer's needs and local markets. Distributors play a major role in gathering reliable marketing information for serving this purpose.

Q10. Explain the Importance of Distributors in SCM

Ans : **(June-18)**

In a strategic supply chain distributor acts as a supply chain coordinator who effectively manages the supply chain activities on the basis of the poor assessment of past data, it leads to unfamiliar results

of wholesaler - distributor role in future. However, the distributors of trade associations are involved engaged in the activity of preparing the reports inclusive the impact of the operational performance of the supply chain. The reason for the pessimistic preparation of reports with respect to the distributor's role is consolidation due to the increased impact of IT in distribution with the increase in changing customer needs and expectations. The firms need to utilize the sophisticated IT system for exploiting the economies of scale in order to match the high investments in the implementation process of IT systems.

Currently, most of the wholesaler distributors are getting vanished away due to the acquisition being made by the well established firm for the purpose of enhancing their business share. Eventhough, consolidation helps in reducing the number of distributors but still it helps in developing and improving wholesale distributors future in trade.

5.3 Role of Human Resource in SCM

Q11. Explain Role of Human Resources in SCM.

Ans : **(Oct.-20)**

Human resource plays a key role in supply chain management. Supply Chain Management (SCM) is the management of supply chain activities such as procurement, manufacturing, sourcing and other inventory management activities. Effective management of supply chain helps the organization in gaining competitive advantage over other competitors. The various parties involved in SCM are, suppliers, vendors, distributors, wholesalers and retailers. On the other hand, Human Resource Management (HRM) is all about managing people and it is also one of the way to achieve competitive advantage.

The role of HRM in SCM are as follows,

1. Training and development activities for supply chain professionals.
2. To initiate the role of incentive pay system in supply chain management.
3. To take up welfare measures in SCM.
4. Using HRM practices in supply chain management to work more efficiently.
5. To influence organizational culture and its impact on supply chain activities.
6. To use outsourcing strategy in supply chain to outsources the staffs of supply chain.
7. To enhance work force relationship among supply chain partners.
8. To facilitate retention programs in SCM.
9. To ensure health and safety measures in SCM.
10. To enable work force diversity in supply chain.
11. To face competitive challenges in SCM.

5.3.1 Linkage Between HRM and SCM

Q12. Explain the linkage between HRM and SCM.

(or)

What are the Linkage between HRM and SCM.

Ans : **(June-19)**

Linkage between HRM and SCM

HRM and SCM are inter linked with each other. The relationship between these two can be understood from the following points,

1. HR activities are a must in any firm. This forces the SCM partners to take up the HR practices which results in effective way of achieving competitive advantage.
2. HRM practices in SCM can also help in building productive relationship in the firm.
3. Both HRM and SCM activities goes side by side in carrying out the functions of the firm effectively.

5.4 Issues in Work Force Management

Q13. What is work force management? Explain the various issues in work force management.

Ans : **(June-18)**

Workforce management is a process which is used by a public or private entity to optimize the productivity of employees at all the levels of the organization. It helps in staff planning and optimization. It is usually applied to staffing the customer support center. WFM deals with optimizing staffing levels in terms of both numbers and skill sets. Workforce management tools can analyze historical call types and volumes and help suggest optimal call center staffing. It quantify the amount and type of labour required to do a particular job on a hourly or daily basis.//

Workforce management can also encompass field service management. This provides software to optimally plan and dispatch field service technicians and their properly stocked vehicles to a customer's location in a timely manner in order to deliver against their service commitments. Field service management will itself include elements of :

- **Demand management –** to help forecast work orders to plan the number and expertise of staff that will be needed
- **Workforce scheduler –** using predefined rules to automatically optimize the schedule and use of resources (people, parts, vehicles)
- **Workforce dispatcher –** automatically assigning work orders within predefined zones to particular technicians
- **Mobile solutions –** allowing dispatchers and technicians to communicate in real time

Issues in Workforce Management

Although, the issues involved in labour relations management are almost same in all the countries, the solutions to these issues/problems differ from one country to another.

From the past few years, a number of changes have been taken place in the labour market. Some of the changes were, shift from full-time employment to part time employment, more importance was given to service sectors than manufacturing sectors, changes in the nature of work force, working patterns, structure of an industry, etc.

Apart from the above changes, the other important changes that have been taken place in the labour market are,

(a) The percentage of women employees in the organization is found to be increasing day-by-day.

(b) Labour-intensive manufacturing firms started using IT (Information Technology) in their day to day operations.

(c) An increased growth rate is new employment patterns i.e., working in night shifts and week ends.

(d) An increasing demand for part-time/casual employments resulted in an introduction of a secondary labour market, where individuals started working according to the requirements of an organization.

The following are the responses to the above changes/trends in the labour market.

1. Early retirement schemes are started in the government organizations.
2. Political debate arises on account of privatization of public sectors.
3. Legislative protection is low in case of employment.
4. Eligibility criteria with reference to age-limit is given due to importance in recruitments.
5. Increased negotiations with respect to deregulation in the labour market.

6. Negotiations with respect to immigration policies.
7. Increasing employment in night shifts, lengthy working hours with minimum penalties. Issues in labour relations/industrial relations.

Some of the modern issues concerning labour relations management are,

1. Increase in the growth rate of service sectors such as banking, travel and tourism sector etc.
2. The functioning of the manufacturing firms are restricted only to the domestic markets.
3. Shift in the employment pattern from full-time employment to part-time employment, lengthy working hours, work shifts, temporary jobs etc.
4. Low birth rate.
5. Reduced participants of the trade unions during the resolution of work related issues.
6. The percentage of women employee is increasing.
7. Changing demand patterns need flexibility in the workforce.
8. The states which are providing welfare measures to their citizens during difficult/ employing situation. Thus, the trends discussed above will have an impact on the various institutions of labour relations management. For example, employers workforce/labourers, Government and trade unions.

5.5 Relationship Management with Suppliers, Customers and Employees

Q14. What is supplier Relationship Management ? Explain the Need for Supplier Relationship Management.

Ans : **(Imp.)**

Supplier Relationship Management (SRM)

Supplier relationship management is about how the firm manages its relationships with suppliers. It includes extended processes, sourcing execution, performance of supply chain etc.

Supplier relationship management consists of those processes which emphasis on upstream interface between the firm and its suppliers.

Need for SRM

Supplier act as the bridge for distribution of finished goods are of the prime importance. An organization should maintain good relationships with the suppliers. SRM when executed and managed properly fulfills the firm requirements. The need for SRM arises,

(i) When goods are to be physically sent to the market.

(ii) When products are aimed to a particular target population.

(iii) When new products are to reach the market.

Q15. Explain the Importance of SRM

Ans : **(Imp.)**

SRM serves the following benefits,

(i) To design the product in collaboration with suppliers.

(ii) To develop a increased valued of the product through the process of design collaboration.

(iii) To meet the requirements of suppliers and facilitate in selection and evaluation of suppliers and helps in contract management.

(iv) To negotiate the contract with suppliers and describe price and delivery parameters with respect to organizational goals.

(v) To develop a common plan with suppliers through supply collaboration.

Q16. Outline the Process of Supplier Relationship Management.

Ans :

The following are the main SRM process

1. Design Collaboration

Design collaboration deals with designing of the product in collaboration with suppliers. The manufacturer and its suppliers use sharing of engineering change order for design collaboration activities to avoid costly delays.

In the design stage, if there is good collaboration it increases the value of product.

2. Source

The source process meet the requirements of suppliers and facilitate in selection and evaluation of suppliers and helps in contract management. Contract management is a key element of sourcing which helps in recording important information.

On the following elements,

- Lead time
- Reliability
- Quality and price

This evaluation is of utmost important for improving the performance of supplier.

3. Negotiate

The negotiation is a lengthy process which begins with request for quote (RFQ) and involves design and execution of auctions. The contract is negotiated with suppliers in such a way that describes price and delivery parameters which are in accordance with organizational goals.

4. Buy

The buying process of materials involves acquiring material from suppliers which involves,

(i) Creation

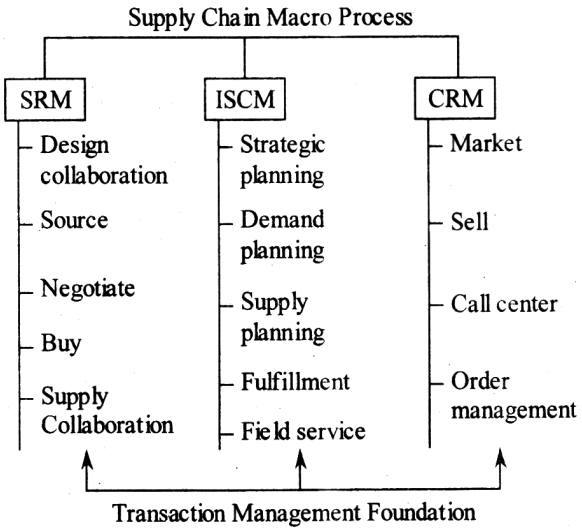
(ii) Management

(iii) Approval of purchase orders.

5. Supply Collaboration

When the agreement between enterprise and supplier is final it focuses on forecasts, production plans and inventory levels. The ultimate aim of collaboration is 'Common plan' in the entire supply chain.

For a supply chain to be successful the three macro processes, SRM, ISCM and CRM should be well integrated.



SRM - Supplier Relationship management

ISCM - Internal supply chain management

CRM - Customer relationship management

SRM process include sourcing, negotiate buy etc. ISCM processes include strategic planning and meeting customer needs etc., and CRM process involves market price, order management etc. All these processes are inter linked and essential for proper functional of supply chain performance.

The four grouping of competitors for SRM are, 1 and 2. Two best of breed groups of the two groups one deals with design collaboration and other with procurement. 3. Best-of-breed 15 cm vendor 4. ERP players.

SRM's big players are ISCM and ERP. To gain competitive position in the market, SRM player should possess superior integration and superior ecosystems.

Q17. What is customer relationship management ?

Ans :

CRM (Customer Relationship Management) intends to provide technological solutions which make it possible to strengthen the communication between the company and its clients in order to improve the relationship with the clientele through atomization of the different components of the client relationship:

Pre-sales

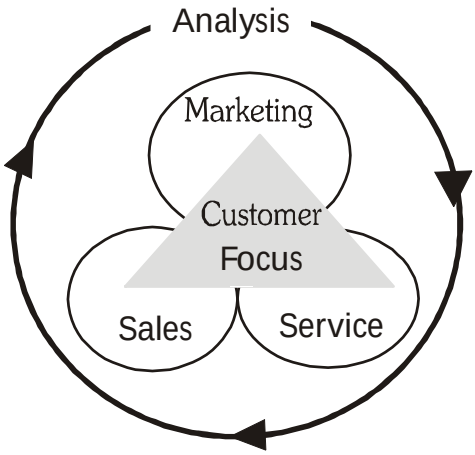
Refers to marketing, consisting in studying the market, i.e. the needs of clients and identifying prospects. Analyzing the client information collected allow the enterprise to revise its product selection to more closely match expectations. Enterprise Marketing Automation (EMA) consists in automating marketing campaigns.

Sales

Sales forces automation (SFA), consists in providing piloting tools to businesses to assist them in their prospecting measures (contact management, sales meeting management, relaunch management, but also assistance with the preparation of business proposals, etc).

Client service management:

clients loved to feel known to and acknowledged by the enterprise and cannot stand having to recount, upon every contact, the history of its relationship with the enterprise.



After-sales

consisting in providing assistance to the client, in particular through the implementation of call centers (also Help Desk or Hot-Line) and the online provision of technical support information.

The purpose of CRM is improved proximity to clients to respond to their needs and turn them into loyal customers. A CRM project therefore includes providing each sector of the company with access to the information system to get to know the client better and provide him with products and services which meet his expectations in the best possible way.

Q18. Explain the need and importance of CRM.

Ans :

Need for CRM

Need for CRM arises when,

1. It becomes essential for the management to develop sound customer relations.
2. To retain the customers by concentrating on their requirements and rendering valuable services.

Importance of CRM

CRM serves the following purposes,

(i) CRM enables in customer segmentation to select specified markets and render unique service to each customer.

(ii) It helps to develop relationship marketing to provide product related information to the customers.

(iii) CRM facilitates to forecast the customer preferences and pricing policies.

(iv) To render best customer service by providing the right product to the right customer in the right time.

Q19. What are the Components of CRM?

Ans :

Following are the components of CRM

1. Customers Segmentation

Customer segmentation is the basic principle of CRM intended to facilitate unique service to each customer. Segmentation undertaken by considering geographic region, customer preference, sales history, product attributes and profitability. This enables to select specified markets and render service which saves time and costs to the firm. Markets can be targeted by two ways, namely permission marketing and cross-selling.

(a) Permission Marketing

In this type of marketing customers have the facility to select the time mode of interaction with organization i.e., either through conventional or by electronic method. It is also called as 'relationship marketing'. It helps in providing product related information to the customers.

(b) Cross-Selling

When firms are able to maintain more profits by selling additional products rather than original or primary products then it is termed as 'cross-selling'.

2. Predicting Customer Behaviours

To operate the business smoothly for a long period of time every firm needs to outline certain predictions with regard of future. This constitute to forecast about customer preferences, pricing policies. One such technique is customer defection analysis. Firms apply this technique to know the perspective of customer with regard to purchase and their capacity to pay for the product after this firm adopt new policies to attract customers.

3. Evaluating Customer Profitability

Earlier identifying customer profitability was a difficult task and also involves huge investment. At present, even though it is possible to evaluate the profitable proportion, but it may lead to inadequate decisions.

This could be on account of the customers who are beneficial in later stage prove to be unprofitable in initial stages and vice-versa.

4. Customize Customer Communications

Firms try to communicate with customers individually by considering their preferences and behaviour. To operate their business continuously with customers, firms design each customer profile in their website and deliver the information with regard to current products, ads, discounts and future schemes. One such techniques of individualized communication is event-based marketing. Firms render event-based marketing is to render suitable product at suitable time to the right kind of customers.

5. Automated Sales Force Tools

These tool are applied to monitor the sales continuously and record field activities, review sales history to the firms who are away from office, ultimate India is to rectify the ineffective policies and implement new policies wherever possible to increase sales productivity. Some of the tools of sales force are listed below.

i) Sale Activity Management

Sales activity management tools are useful in guiding a sales personnel throughout the sales process. This enable to proper sales activities and to maintain uniform sales process. Sales personnel interact with active as well as inactive customers through mailing and enhance the productivity.

ii) Sales Territory Management

This techniques ensures sales manager to know about the salesperson's activities with regard to customers and their performance. With the help of these tools, sales manager develops sales teams which are suitable to customer requirement, record performance of salespersons, etc.

iii) Lead Management

Every salesperson while closing contracts with the customers abide to certain sales tactics sales tactics in order to gain deals at high rates within less time.

iv) Knowledge Management

To operate the business successfully, salesperson have to obtain various types of information in the whole selling process. This information is subjected to rules and regulations, corporate policies, term of contracts, details of customers, etc. Knowledge management tool facilitates in providing customer service and making quick decisions.

6. Attributes of Best Customer Service

In general, a customer obtains best service if the receives a qualitative goods within time at reasonable prices and classification of his queries continuously by the firm.

Customer service definition also includes "Seven Rs. Rule". The seven Rs are right product, in the right quantity, in right condition, at right place, at right time, for the right customer, at the right cost.

The components of customer service is classified into three parts - transaction, transaction and post transaction.

(i) Pre-transaction

Service rendered before the sale of the products such as framing the hierarchy of organization policies, customer service policies, system flexibility etc.

(ii) Transaction

Service rendered at the time of selling the products like transporting the qualitative products in time.

(iii) Post Transaction

The services that are offered after selling of product or service in the form of product return or warranty, complaint resolution, operating information etc., then it is termed as post transaction.

Firms try to provide better customer service, in turn the customers are retained. Firms take into consideration seven Rs. rule in order to be successful. Organization use call centres, website self-service, field service management etc., to enhance both the function such as performance of supply chain and improvement of customer service.

Q20. Compare and contrast CRM and SCM.

Ans :

Customer Relationship Management (CRM) helps companies maximize the value of every customer interaction and drive superior corporate performance. And the value of CRM grows considerably when it is tightly integrated with supply chain functionality. A "customer is king" approach is replacing the factory-based push supply chains of the 20th century. Today, a small but growing number of companies are successfully challenging this traditional "push" paradigm. They link the front end of their business - customer management and demand - with the back end - supply chain management.

As forward-thinking companies learn to operate customer-centered businesses, this is the essence of Customer Relationship Management (CRM). Businesses successfully linking CRM with Supply Chain Management (SCM) achieve remarkable results. Indeed, they are twice as profitable as their competitors that do not link CRM to SCM. They are also two to five times more likely to achieve superior performance in sales, market share and customer service. The following strategies help businesses move toward that goal :

1) Accelerate investments in initiatives that accommodate immediate, consistently delivered access to product information, inventory availability and order tracking.

2) Integrate customer information - including purchase histoues, preferences and transact'oral data - across., all channels.

3) Build a uniform customer data repository for integrated marketing campaign planning, execution and effectiveness analysis.

4) Extend multi-channel sales and service to delivery. Today's multi-channel customers want to make purchases, arrange delivery and obtain customer service where, when and how they choose.

Organizations to manage and co-ordinate customer interactions across multiple channels, departments, lines of business and geographies, CRM helps maximize the value of every customer interaction and drives superior corporate performance.

SCM Applications	CRM Applications
Design Collaboration	Market Analysis
Sourcing Decisions	Sell Process
Negotiations	Order Management
Buy Process	Call/Service Center Management
Customer Orientation	Supply Process Orientation

Q21. Define Employee Relationship Management. Explain the need and importance of ERM.

Ans :

Employee Relationship Management

Employee Relationship Management (ERM) plays a key role in developing organization's value when compared to customer relationship management. Because, when the customers are not satisfied with the service rendered by one organization then they can easily switch to an other organization, whereas employees do not have such option. Customers are exposed to experiences only of certain facts. Whereas, employees hold a long-term relationship with the organizations.

Need for ERM

The need for a ERM relationship arises,

i) When they communicate with each other

ii) When they are empathetic towards each other

iii) Continuous interaction with each other

iv) Mutual understanding between both the parties

v) One party comfortable with other party.

Ultimately equal commitment from both the parties would enable in establishing a smooth functioning of relationship.

In order to improve the relationship between management and employee technology can be made use. Technology is one of the important constituents in developing the relationship. Some of the facilities offered by technology are as follows,

i) Technology of knowledge management facilitates the employee to be aware of events occurring in the firm.

ii) Firms offer bonus schemes in order to improve the performance of employees.

iii) Technology of work flow systems ensure proper coor-dination and continuous flow of work.

iv) Firms utilize payroll system to make accurate and on time payment of salaries to employees.

v) To have direct interaction with employees, management exchanges its ideas, views and opinions with the employees.

vi) Analyzing each employee's capability and knowledge to place them in a suitable position.

vii) Providing feedback to the employees to improve their performance further in order to meet organizational goals.

viii) It also provides the opportunity of online self-training for employees in order to stay up-to-date and enhance the ability of the employees.

ix) The tools such as e-mail, company portals and electronic calendars help employees in knowing the status of the company and to contribute their ideas effectively through this advanced technology.

Employee relationship management will enhance productivity by enhancing employee morale, loyalty etc. Thus, employee relationship management is an essential element of the management and it is possible through the mutual understanding of both the management and the employees.

Importance of ERM

ERM the key part of relationship management provides following advantages,

i) Enhances employee morale and commitment towards the organization.

ii) Increases productivity by enhanced performances

iii) Develops a mutual understanding and goal sharing between employees and organizations.

iv) Develops a long-run relationships facilitating for smooth functioning of the organization.

Short Question and Answers

1. Define Supply Chain Network Design.

Ans :

Chain Network Design

Supply chain network design is a process of determining the number of suppliers, the locations of facilities determining the product flow within the supply chain and location of distribution centres to effectively meet up the customer demand.

2. Objectives of Supply Chain Network Design.

Ans :

i) To optimize the facilities located in the supply chain,

ii) To allocate optimum capacities and technical requirements to each facility.

iii) To assign the sources and markets to facilitate the transportation of materials to minimum distances.

iv) To minimize the overall costs of logistics and transportation.

Supply chain network design decisions should support the following strategic activities of the firm :

a) Introduction of new product in the market.

b) Optimal sourcing of materials

c) Location of manufacturing plants

d) Selection of target customers and location of facilities and

e) Number of distribution centres to be located by considering the customer convenience and cost benefits.

3. What is channel design?

Ans :

Channel design refers to the involvement of an organization in logistics, production, R and D, product launch, sales chan NEI design and other tasks. It mainly deals with the analyzing of customer needs, establishing channel objectives, identifying the major channel alternatives and then evaluating them. Channel desigrufollow's a structured approach by making use of the certain criteria which is used to evaluate optional channel structures.

Creating Customer Value

Given that the purpose of any business is to increase the value of the business for the shareholders, it follows that this is only likely to occur if the business can create some level of sustainable competitive advantage by developing 'preferred supplier' status with customers. Added value may be created in a number of ways.

4. Factors Influencing Network Design Decisions ?

Ans :

The following are the various factors that affects the supply chain network design decisions,

(a) Strategic factors deal with the competitive strategy of a firm which focus on cost leadership, high responsiveness, easy access to customers etc.

(b) Technological factors include economies of scale of production technology and flexibility of production technology.

(c) Macro economic factors include tax rates, tariffs, exchange rates, demand risk and other economic factors which are external to an individual firm.

5. What is work force management?

Ans :

Workforce management is a process which is used by a public or private entity to optimize the productivity of employees at all the levels of the organization. It helps in staff planning and optimization. It is usually applied to staffing the

customer support center. WFM deals with optimizing staffing levels in terms of both numbers and skill sets. Workforce management tools can analyze historical call types and volumes and help suggest optimal call center staffing. It quantify the amount and type of labour required to do a particular job on a hourly or daily basis.//

Workforce management can also encompass field service management. This provides software to optimally plan and dispatch field service technicians and their properly stocked vehicles to a customer's location in a timely manner in order to deliver against their service commitments. Field service management will itself include elements of :

- **Demand management –** to help forecast work orders to plan the number and expertise of staff that will be needed
- **Workforce scheduler –** using predefined rules to automatically optimize the schedule and use of resources (people, parts, vehicles)

6. Need for SRM.

Ans :

Supplier act as the bridge for distribution of finished goods are of the prime importance. An organization should maintain good relationships with the suppliers. SRM when executed and managed properly fulfills the firm requirements. The need for SRM arises,

(i) When goods are to be physically sent to the market.

(ii) When products are aimed to a particular target population.

(iii) When new products are to reach the market.

7. Importance of CRM.

Ans :

CRM serves the following purposes,

(i) CRM enables in customer segmentation to select specified markets and render unique service to each customer.

(ii) It helps to develop relationship marketing to provide product related information to the customers.

(iii) CRM facilitates to forecast the customer preferences and pricing policies.

(iv) To render best customer service by providing the right product to the right customer in the right time.

8. Need for ERM.

Ans :

The need for a ERM relationship arises,

i) When they communicate with each other

ii) When they are empathetic towards each other

iii) Continuous interaction with each other

iv) Mutual understanding between both the parties

v) One party comfortable with other party.

Ultimately equal commitment from both the parties would enable in establishing a smooth functioning of relationship.

9. Importance of ERM.

Ans :

ERM the key part of relationship management provides following advantages,

i) Enhances employee morale and commitment towards the organization.

ii) Increases productivity by enhanced performances

iii) Develops a mutual understanding and goal sharing between employees and organizations.

iv) Develops a long-run relationships facilitating for smooth functioning of the organization.

Choose the Correct Answers

1. Type of inventory. [d]
   (a) Safety stock (b) Seasonal stock
   (c) Dead stock (d) All
2. _____ means the variety of products which are offered by the distribution network. [b]
   (a) Brand variety (b) Product variety
   (c) Product availability (d) Order visibility
3. Component of CRM _____ [b]
   (a) Market segmentation (b) SRM
   (c) Management (d) All
4. What factors affect the transportation selection decision? [a]
   (a) Characteristics of the customer (b) Branding
   (c) Organization structure (d) All the above
5. ERM stands for [a]
   (a) Employment Relationship Management (b) HRM
   (c) GHRM (d) All
6. _____ are the logistics costs. [d]
   (a) Inventory cost (b) Transportation cost
   (c) Facility cost (d) All the above
7. CRM Stands for [a]
   (a) Customer Relationship Management (b) HRM
   (c) Customer service strategy (d) Alll
8. Tax rates, tariffs, exchange rates, demand risk etc are the _____ factors. [c]
   (a) Socio economic (b) Political
   (c) Macro economic (d) Legal
9. _____ will enhance productivity by enhancing employee morale and loyalty. [a]
   (a) ERM (b) SRM
   (c) SCM (d) CRM
10. _____ play a major role in gathering reliable marketing information. [a]
    (a) Distributors (b) Suppliers
    (c) Customers (d) None of the above

Fill in the Blanks

1. Supplier relationship management consists of those processes which emphasis on upstream interface between _____ and _____.
2. _____ aims to build and sustain economic relationship between customers and organizations for a long period of time.
3. Component of Market Structure _____
4. _____ refers to the involvement of an organization in logistics, production, R&D, product launch etc.
5. Political factors includes _____ and _____ of the countries.
6. Safety stock is like an emergency stock which is maintained to face the _____ situations.
7. _____ is all about managing people and is one of the way to achieve competitive advantage.
8. _____ occupies the top most position in the supply chain pyramid.
9. Factor of Channel Design decision _____ .
10. _____ stock is maintained before the occurrence of a particular season in order to avoid the inventory shortages.

ANSWERS

1. Firm, suppliers
2. Customer relationship management.
3. Territorial
4. Channel design
5. Political stability, legal systems
6. Unpredictable
7. HRM
8. Supply chain network design
9. Cost
10. Seasonal

FACULTY OF MANAGEMENT

M.B.A IV - Semester (CBCS) Examination

September / October - 2020

SUPPLY CHAIN MANAGEMENT

Time : 2 Hours] [Max. Marks : 80

PART - A (4 × 5 = 20 Marks)

Note: Answer any four questions.

ANSWERS

1. Bull-Whip Effect **(Unit-I, SQA.8)**

2. Reserve Logistics **(Unit-II, SQA.9)**

3. Containerization

Ans :

Containerization is a system of intermodal freight transport using intermodal containers (also called shipping containers and ISO containers). The containers have standardized dimensions. They can be loaded and unloaded, stacked, transported efficiently over long distances, and transferred from one mode of transport to another container ships, rail transport flatcars, and semi-trailer trucks without being opened. The handling system is completely mechanized so that all handling is done with cranes and special forklift trucks. All containers are numbered and tracked using computerized systems.

4. Recycling

Ans :

Recycling is the processing of waste materials into new products. Recycling aims to limit the loss of potentially useful materials, reduce the consumption of new materials, lower energy usage, reduce potential air pollution from the incineration of garbage, reduce water pollution produced by landfill by reducing the need for 'conventional' waste disposal methods, and lower the emissions of greenhouse gases in comparison to the potential emissions created in the production of new goods. The fourth component of the 'waste hierarchy', the others being 'avoid', 'reduce' and 'reuse', recycling is a key component in modern waste reduction.

5. Role of Human Resources in SCM **(Unit-V, Q.No. 11)**

PART - B (4 × 15 = 60 Marks)

[Essay Answer type]

Note : Answer any four questions.

6. What is Supply Chain Management? State its functions. In what way do supply chain flows affect the success or failure of a firm like Amazon ? Support your answer with proper justification. **(Unit-I, Q.No.1,7)**

7. The primal focus of -SCM is "Customer-Centric Demand Planning"- Comment.

Ans :

They are not the same, and the delivery of a demand-driven strategy does not mean the company will enable a customer-centric supply chain, or build/implement outside-in processes. These are three different, but complementary, concepts. It requires awareness and conscious choice.

Demand Networks : A demand network translates demand across multiple parties. The focus is on channel data: price; inventory positions; and policies. The use of advanced analytics enables the sensing of out-of-stocks.

- **Social Listening**

  The use of unstructured text mining, and sentiment analysis, to understand and listen to customer responses to products and services in near real-timeMarket Drivers. To become outside-in, the primary signal for demand becomes a market signal. The value network is triggering off of market signals which represent independent demand. In contrast, the traditional supply chain forecasts using historical orders and adjusts based on sales forecasting. This introduces demand latency into the supply chain. (The order translation from the channel based on replenishment points is order latency. For most companies it is weeks and months, but can be multiple quarters.)

- **Channel Sensing**

  Channel sensing enables the use of channel consumption, and the modeling of inventory across channels, to understand global and regional trends to maximize opportunity and mitigate risk. Channel sensing combines VMI, CPFR, and the use of channel signals into a holistic demand signal.

- **Cross-Channel Management**

  The corporate ability to understand the customer across channels. An example is the understanding of the shopper across the moments of truth in Omni channel strategies.

- **Customer Segmentation**

  Rationalization of customers and the translation into priorities for orders, Available-to-Promise (ATP), production scheduling, and inventory allocation.

- **Order Policy**

  The use of customer segmentation strategies to define order policies for lead times, discounts, allocation, and shipping priorities.

- **Cost-to-Serve**

  Analysis of the relative costs to serve customers and a data-driven process to reduce and manage costs at specific customers.

- **Customer-Driven Available-to-Promise**

  The use of customer segmentation to determine priority in matching inventory with orders during the order cycle.

- **Use of Channel Data**

  The harmonization and synchronization of channel data to be used in forecasting, replenishment, and inventory planning.

- **Demand Sensing**

  The use of pattern recognition and advanced analytics to analyze order patterns to translate tactical demand planning (forecast) into a short-term, and more accurate demand signal for replenishment.

- **Demand Shaping**

  The use of price, promotion, sales/distributor incentives, new product launch, marketing campaigns, or positioning to elevate and improve baseline demand.

- **Demand Translation**

  The translation of independent demand into cycle stock reduction in production planning and material buying in demand-driven MRP.

- **Attribute-Based Planning**

  Modeling based on attributes (abstraction from item/location logic termed SKUs) to better see patterns in demand and supply planning.

- **Push/Pull Decoupling Points**

  Choices on when to push, and when to pull, with translation into inventory policy and decoupling points. This requires modeling and continued refinement

8. What is Vendor Managed Inventory? Discuss the key things that need to be done to implement VMI in the organization.

Ans :

Vendor managed inventory (VMI) is defined as inventory which is managed by the supplier / vendor. Vendor Managed Inventory (VMI) involves another party, other than customer, taking responsibility for elements of inventory management, including setting and managing inventory levels, re-ordering, and replenishing.

When Customer needs product, they place an order against a supplier. Customer should be in total control of the timing and size of the order being placed, based on one of the examples above. Customer maintains the inventory plan.

The supplier receives electronic data (usually EDI or via the internet) that tells supplier customer's sales and stock levels. The supplier can view every item that customer carries as well as true point of sale data in most cases. The supplier is responsible for creating and maintaining the inventory plan. Under VMI, the supplier generates the order for replenishment VMI inventory, not customer. Hence, the term Vendor Manage Inventory!

Benefits

(i) Customer Benefits :

- Better visibility will make it possible to change from Air- to sea freight
- The goal is to have an improvement in Fill Rates from the supplier and to the end customer. Also, a decrease in stock outs and a decrease in inventory levels.
- Planning and ordering cost will decrease due to the responsibility being shifted to the supplier.
- The overall service level is improved by having the right product at the right time.
- The supplier is more focused than ever in providing great service.

(ii) Suppliers Benefits :

- Visibility to the customers Point of Sale data makes forecasting easier.
- Promotions can be more easily incorporated into the inventory plan.
- A reduction in customer ordering errors (which in the past would probably lead to a return)
- Visibility to Stock Levels helps to identify priorities (replenishing for stock or a stockout?). Before VMI, a supplier has no visibility to the quantity and the products that are ordered. With VMI, the supplier can see the potential need for an item before the item is ordered

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9. What do you mean by Inbound and Outbound Logistics? Explain in detail. **(Unit-II, Q.No.10, 12)**

10. Explain various modes of transportation. On what basis one should decide the best mode of transport ? **(Unit-III, Q.No. 3)**

11. Explain Warehousing Operations. Also discuss the advantages and limitations of Third Party Warehousing. **(Unit-III, Q.No.12, 15)**

12 Discuss the role of IT in Supply Chain. What is the impact of e-Business in SC? Give an example to support of your answer. **(Unit-IV, Q.No.4)**

13 "Successful IT implementation is the outgrowth of the participation of knowledge workers" - Comment.

Ans :

The implementation of success factor of KM is considered as practical validation of the model elements in this research. The authors developed the training materials and conducted KM training as well as encouraged the employee participation in KM implementation.

The following activities were implemented: KM Awareness Training

1) Implementation of success factor (employee participation) of KM

2) Measurement through Structured Interviews–Result.

   i) Employees have and continue to participate in their own job design and evaluation. Employees do the self-evaluation. A knowledge-need analysis has been carried out by their own in order to identify the knowledge gap of individuals.

   ii) Employees have and continue to participate in problem-solving and the decision-making process. They are empowered to involve themselves in problem-solving and the decision-making process.

   iii) Employees have and continue to participate in knowledge management activities such as training, discussion, knowledge sharing etc. They are encouraged to go to training such as teacher education workshops, knowledge sharing activities, conferences, seminar etc.

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14 Discuss the role of distributors in SC. Also explain the design options for a distribution network. **(Unit-V, Q.No.9,2)**

15 Discuss the issues in Workforce Management and Relationship Management with customers and employees. **(Unit-V, Q.No.13, 14)**

FACULTY OF MANAGEMENT

M.B.A IV - Semester (CBCS) Examination

May / June - 2019

SUPPLY CHAIN MANAGEMENT

Time : 3 Hours] [Max. Marks : 80

PART - A (5 × 4 = 20 Marks)

[Short Answer type]

Note : Answer all the questions from Part - A and Part - B.

Each question carries 4 marks in Part - A and 12 marks in Part - B.

ANSWERS

1. Bull-whip effect **(Unit-I, SQA. 8)**
2. Inbound logistics **(Unit-II, SQA. 5)**
3. Multi model transport **(Unit-III, SQA. 3)**
4. Retail SCM **(Unit-IV, SQA. 6)**
5. Channel design **(Unit-V, SQA 3)**

PART - B (5 × 12 = 60 Marks)

[Essay Answer type]

6. (a) What are the objectives of supply chain management ? **(Unit-I, Q.No. 5)**

OR

(b) Explain strategies in global supply chain management. **(Unit-I, Q.No. 17)**

7. (a) Explain the merits and demerits of integrated logistics management. **(Unit-II, Q.No. 11)**

OR

(b) Briefly explain steps involved in logistics planning. **(Unit-II, Q.No. 13)**

8. (a) Write a brief note on ware housing operations. **(Unit-III, Q.No. 12)**

OR

(b) Explain the role and importance of handling systems in ware housing. **(Unit-III, Q.No. 16, 18)**

9. (a) Explain the significance of communication technology in supply chain management. **(Unit-IV, Q.No. 1)**

OR

(b) Explain the role of packaging in supply chain management. **(Unit-IV, Q.No. 16)**

10. (a) What are the factors influencing the supply chain network ? **(Unit-V, Q.No. 3)**

OR

(b) Explain in detail the relationship between HRM and SCM. **(Unit-V, Q.No. 12)**

FACULTY OF MANAGEMENT

M.B.A IV - Semester (CBCS) Examination

May / June - 2018

SUPPLY CHAIN MANAGEMENT

Time : 3 Hours] [Max. Marks : 80

PART - A (5 × 4 = 20 Marks)

[Short Answer type]

ANSWERS

1. Value Chain **(Unit - I, SQA. 6)**
2. Reverse Logistics **(Unit - II, SQA. 9)**
3. Third Party Warehouse **(Unit - III, SQA. 7)**
4. Bar Coding **(Unit - IV, SQA. 4)**
5. Network Design **(Unit - V, SQA.1)**

PART - B (5 × 12 = 60 Marks)

[Essay Answer type]

6. (a) What are the functions of supply chain management? **(Unit - I, Q.No. 7)**

OR

(b) Explain in detail the conceptual frame work for supply chain management. **(Unit - I, Q.No. 10)**

7. (a) What is integrated logistics management? What are its advantages? **(Unit - II, Q.No. 10,11)**

OR

(b) Explain the role of inventory management in customer service. **(Unit - II, Q.No. 26)**

8. (a) Explain the importance of transportation in supply chain management. **(Unit - III, Q.No. 1)**

OR

(b) Discuss the factors affecting the choice of a transport format. **(Unit - III, Q.No. 6)**

9. (a) Explain the role of IT in supply chain management. **(Unit - IV, Q.No. 1)**

OR

(b) Explain the problems and prospects in retail SCM. **(Unit - IV, Q.No. 15)**

10. (a) Explain the importance of distributors in supply chain management. **(Unit - V, Q.No. 10)**

OR

(b) Explain the issues involved in work force management in SCM. **(Unit - V, Q.No. 13)**

FACULTY OF MANAGEMENT

M.B.A IV - Semester (CBCS) Examination

Model Paper

SUPPLY CHAIN MANAGEMENT

Time : 3 Hours] [Max. Marks : 80

PART - A (5 × 4 = 20 Marks)

[Short Answer type]

ANSWERS

1. Define Supply chain management. **(Unit - I, SQA. 1)**
2. Inbound Logistics. **(Unit - II, SQA. 5)**
3. Define Warehouse Management Systems? **(Unit - III, SQA.5)**
4. Define Retail supply chain management. **(Unit - IV, SQA.6)**
5. What is channel design? **(Unit - V, SQA. 3)**

PART - B (5 × 12 = 60 Marks)

[Essay Answer type]

6. (a) What are the objectives of Supply chain management ? **(Unit - I, Q.No.5)**

OR

(b) Explain the concept of value chain in the achivement of supply chain management objective. **(Unit - I, Q.No.20)**

7. (a) Explain briefly about Integrated Logistics Management. **(Unit - II, Q.No.10)**

OR

(b) Explain the role of Inventory Manage- ment in Customer Service. **(Unit - II, Q.No.26)**

8. (a) Describe the role of transportation in supply chain management ? **(Unit - III, Q.No.1)**

OR

(b) "Public warehouses are much more beneficial than private warehouses". Discuss. **(Unit - III, Q.No.13)**

9. (a) Discuss the role of Information and Communication Technology (ICT) in development of SCM in India. **(Unit - IV, Q.No. 1)**

OR

(b) Explain in detail about radio frequency identification device (RFID). **(Unit - IV, Q.No. 7)**

10. (a) Define Supply Chain Network Design. State its objectives and challanges of supply. **(Unit - V, Q.No. 1)**

OR

(b) What is channel design? How does logistics help in creating customer value. **(Unit - V, Q.No.6)**

FACULTY OF MANAGEMENT

M.B.A IV - Semester (CBCS) Examination

July / August - 2021

SUPPLY CHAIN MANAGEMENT

Time : 2 Hours] [Max. Marks : 80

PART - A (4 × 5 = 20 Marks)

Note: Answer any four questions.

1. Value Chain
2. Reverse Logistics
3. Multi Modal Transportation
4. Bar Coding
5. Direct Shipping

PART - B (4 × 15 = 60 Marks)

Note: Answer any four questions.

6. Explain in brief the objectives of Supply Chain Management.
7. Compare and contrast between the supply chains of a product sold through a retail outlet with that of a product sold online.
8. Logistics is an integral part of Supply Chain Management, explain the role and importance of Logistics Management in Supply Chains.
9 Describe in brief the various Inventory Management Techniques that aide in Supply Chain Management.
10. Using suitable examples of products, describe the appropriate type of warehouses that needs to be chosen for the products to be stored.
11. Describe Automated Material Handling and the equipment that is used for material handling.
12. What is the role and benefits of Information Technology in Supply Chain Management?
13. Briefly describe the latest trends in Packaging.
14. Explain in brief the concept of Distribution Network Design in Supply Chains.
15. Describe in brief the issues related to workforce management in Supply Chains.