M.COM

SEMESTER - IV (CBCS)

BUSINESS STUDIES (MANAGEMENT)

SUPPLY CHAIN MANAGEMENT AND LOGISTICS

SUBJECT CODE : 67502

© UNIVERSITY OF MUMBAI

Prof. Suhas Pednekar
Vice Chancellor
University of Mumbai, Mumbai.

Prof. Ravindra D. Kulkarni
Pro Vice-Chancellor,
University of Mumbai.

Prof. Prakash Mahanwar
Director
IDOL, University of Mumbai.

Programe Co-ordinator : **Ms. Rajashree Pandit (PhD)**
Assistant Professor (Economics),
Head Faculty of Commerce & Management,
IDOL, University of Mumbai, Mumbai.

Course Co-ordinator & Editor : **Mr. Sambhaji Shivaji Shinde**
Asst. Prof. Commerce
IDOL, University of Mumbai, Mumbai.

Course Writers : **Dr. Pushpendu Rakshit**
Amity University of Maharashtra.

: **Dr Kiran Menghani**
IC principal,
SDT kalani college, Shahad.

: **Dr Vishal tomar**
MMK College, Bandra.

: **Mr. Nitin Dwivedi**
Assistant Professor,
Bunts Sangha's Anna Leela College of Commerce and Economics, Kurla.

August 2022, Print I,

Published by
Director
Institute of Distance and Open Learning, University of Mumbai,Vidyanagari, Mumbai - 400 098.

DTP COMPOSED AND PRINTED BY
Mumbai University Press,
Vidyanagari, Santacruz (E), Mumbai - 400098.

CONTENTS

*****

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester IV
(To be implemented from Academic Year- 2017-2018)

Group B: Business Studies (Management)

1. Supply chain management and logistics

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Supply Chain Management	15
2	Perspectives of SCM	15
3	Introduction to Logistics	15
4	Design of SCM, Logistics and Use of Internet	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Supply Chain Management (SCM)**
	• **Supply Chain Management:** Concept, Features, Evolution, Importance, Process and Barriers of Supply Chain Management. • **Principles and Strategies:** Principles, Supply Chain Strategies – Organizations, Coordination, Innovation and Forecasting. • **Participants in SCM:** Supply chain intermediaries- Concept and Types, Channels of Distribution for Industrial Goods and Consumer Goods, Channel of Distribution at Services Level, Factors for selection of suitable channels.
2	**Perspectives of Supply Chain Management**
	• **Global perspectives:** Measuring and analyzing the value and efficiency of global Supply Chain Networks, Global market forces, Types of global supply chain. • **Indian Perspectives:** Measuring and Analyzing the value and efficiency of domestic Supply Chain Networks, Economic effects of supply chains. • **Customer Perspectives:** Customer values, Role of customers and Ways of improving customer services in SCM.
3	**Introduction to Logistics**
	• **Logistics Management**: Concept and Process, Competitive Advantages and Three C's, Changing Logistics Environment, Reverse Logistics, Importance ofInventory Control**,** Bull-whip effect • **Transportation and Warehousing:** Transport Functions and Participants in Transportation Decisions, Transport Infrastructure- Forms, Warehouse Functions and Operations • **Packaging and Materials Management-** Consumer and Industrial Goods Packaging - Importance, Factors influencing Materials Planning, Preservation Safety and Measures of Materials Handling
4	**Design of SCM, Logistics and Use of Internet**
	• **SCM Plan**- Demand Planning, Source of Procurement, Production or Assembly Steps, Sales return of defective or excess goods • **Use of Internet in SCM**- E-market places, E-procurement, E-logistics, E-fulfilment, • **Operative Systems in SCM**: Enterprise Resource Planning (ERP), Performance Modelling of supply chains using Markov chains, Inventory Control-Importance, Pareto's Law

Scheme of Examination:

The performance of the learners will be evaluated in two components. One component will be the Internal Assessment component carrying 40% marks and the second component will be the Semester End Examination component carrying 60% marks.

Internal Assessment:

The Internal Assessment will consist of one class test of 40 marks for each course excluding projects. The question paper pattern will be shown as below:

Question Paper Pattern
(Internal Assessment)

Maximum Marks: 40 marks
Questions to be set: 03
Duration: 1 hours

Question No.	Particular	Marks
Q - 1	Objective Questions Students to answer 10 sub questions out of 15 sub questions. *(*Multiple choice/ True or False/ Match the columns/ Fill in the blanks)* ***OR*** Objective Questions A) Sub Questions to be asked 08 and to be answered any 05 *B)* Sub Questions to be asked 08 and to be answered any 05 *(*Multiple choice/ True or False/ Match the columns/ Fill in the blanks)*	10 Marks
Q - 2	Concept based short questions Students to answer 5 sub questions out of 8 sub questions.	10 Marks
Q - 3	Practical problems or short questions Students to answer 02 sub questions out of 03 sub questions	20 Marks

Question Paper Pattern
(Theoretical Courses)

Maximum Marks: 60
Questions to be set: 04
Duration: 2 hours
All Questions are Compulsory Carrying 15 Marks each.

Question No.	Particular	Marks
Q - 1	Full length Question OR	15 Marks
Q - 1	Full length Question	15 Marks
Q - 2	Full length Question OR Full length Question	15 Marks 15 Marks
Q - 3	Full length Question OR Full length Question	15 Marks 15 Marks
Q - 4	Objective Question (Multiple Choice/ True or False/ Fill in the Blanks/ Match the Columns/ Short Questions.) OR Short Notes (Any three out off Five)	15 Marks 15 Marks

Note :

Full length question of 15 marks may be divided into two sub questions of 08 and 07 marks.

Sr.	Particular
01	**Standard of Passing** The learner to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment & Semester End Examination. The learner shall obtain minimum of 40% marks (i.e. 16 out of 40) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 24 out of 60) separately, to pass the course and minimum of Grade E in the project component, wherever applicable to pass a particular semester. A learner will be said to have passed the course if the learner passes the Internal Assessment & Semester End Examination together.
02	**Allowed to Keep Terms (ATKT)** 1) A learner shall be allowed to keep term for Semester II irrespective of number of courses of failure in the semester I. 2) A learner shall be allowed to keep term for Semester III if he/she passes each of the semester I and Semester II OR a learner fails in not more than two courses of Semester I and not more than two courses of Semester II.

MODULE - I

1

INTRODUCTION TO SUPPLY CHAIN MANAGEMENT - I

Unit Structure

1.0 OBJECTIVES

1. The main objectives of Supply chain management are to reduce cost, improve the overall organization performance and customer satisfaction by improving product or service delivery to the consumer.

2. SCM's primary goal is to keep a firm afloat and ultimately to drive it to success. Other objectives of SCM include improving efficiency and quality, minimising costs, optimising delivery and distribution and providing the best possible experience to your customers.

3. To impart understanding on processes and operations associated with supply chain management.

1.1 INTRODUCTION

Store network the executives is the administration of the progression of labour and products and incorporates all cycles that change unrefined components into end results. It includes the dynamic smoothing out of a business' stock side exercises to expand client worth and gain an upper hand in the commercial center. Inventory network the executives (SCM) is the concentrated administration of the progression of labour and products and incorporates all cycles that change unrefined substances into eventual outcomes.

The five most basic components of SCM are fostering a system, obtaining natural substances, creation, dissemination, and returns. SCM depends on the possibility that virtually every item that comes to showcase results from the endeavors of different associations that make up an inventory network. Despite the fact that supply chains have existed for a long time, most organizations stand out enough to be noticed as a worthy addition to their tasks. Production network the board is the act of organizing the different exercises important to create and convey labour and products to a

business' clients. Instances of production network exercises can incorporate planning, cultivating, assembling, bundling, or transporting. SCM has come to zero in on the need to check out completely at the progression of significant worth conveyance to a client. Esteem is conveyed through the characterized business action of the association as labour and products.

Supply Chain Management incorporates, arranging, plan, control and execution of all business processes connected with obtainment, assembling, conveyance and deals request satisfaction elements of a business. In this way Supply Chain Management incorporates overseeing the organic market, obtaining unrefined components and parts, assembling and gathering, warehousing and stock following, request passage and request the executives, circulation across all channels, and conveyance to the client.

1.2 SUPPLY CHAIN MANAGEMENT

A store network comprises the relative multitude of exercises and substances that are engaged with separating, handling, fabricating, dispersing and offering the items to a definitive client. Notwithstanding, the idea of SCM is a lot more extensive than that of the showcasing channels as SCM returns to a far-off beginning stage/root and incorporates the unrefined substance providers. "Store network the board is the mix of organizations from end client through unique providers that give items, administrations, and data that add an incentive for clients."

"A store network is an organization of offices and dissemination choices that carries out the roles of obtaining materials, change of these materials into moderate and completed items, and the dispersion of these completed items to clients. "Supply chain management is the combination of art and science that goes into improving the way your company finds the raw components it needs to make a product or service, manufactures that product or service and delivers it to customers.

Planned operations are the spine on which the inventory chains are driven. Strategies alludes to the administration of stream of products and supplies including data, information and documentation between two elements or focuses. Operations assumes a significant part in the post obtainment capacity of conveyance of unrefined substance and supplies from the provider to the plant or creation focus and the dispatch of completed merchandise from the production line to the mark of conveyance to the client.

Whenever merchandise moves from provider to industrial facility to retail location they course through an organization of transportation by street, rail, boat or air. They might be put away in stockrooms prior to being moved to advanced areas. This whole movement includes different providers, specialists and offices including cargo forwarders, packers, customs division, merchants and Logistics specialist co-ops and so forth.

Planned operations in this manner is a vital part of Supply Chain Management.

By and large Supply fasten is frequently alluded to as Logistics as well as the other way around. However, operations and inventory networks are complicatedly connected, both don't mean something similar. Coordinated operations is a sub part and expansion of the store network. In recent decades, globalization, outsourcing, and information technology have enabled many organizations, such as Dell and Hewlett Packard, to successfully operate collaborative supply networks in which each specialized business partner focuses on only a few key strategic activities.

This inter-organisational supply network can be acknowledged as a new form of organisation. However, with the complicated interactions among the players, the network structure fits neither "market" nor "hierarchy" categories. It is not clear what kind of performance impacts different supply-network structures could have on firms, and little is known about the coordination conditions and trade-offs that may exist among the players. From a systems perspective, a complex network structure can be decomposed into individual component firms. Traditionally, companies in a supply network concentrate on the inputs and outputs of the processes, with little concern for the internal management working of other individual players. Therefore, the choice of an internal management control structure is known to impact local firm performance.

1.2.1 Features:

1. Ability to integrate throughout the supply chain:

Technology is an enabler, and a digital solution should introduce functionalities that span the entire supply chain, integrating multiple entities like suppliers, OEMs, shippers, warehouse centers, and customers. It should connect with all your other applications, including enterprise software, legacy systems, third-party applications, help desk, and email—regardless of the information source, operating system, or platform. This can eliminate connectivity issues and enable efficient information flow across a chain. For instance, the ability to create orders and bill customers from a single, central location simplifies the work of operations managers. It eliminates redundancies and the chance for miscommunication or wrong orders. Flexible features within the order management and billing function can be used to customize the system to suit different customer segments or product categories, and cater to unique requirements of chain.

2. Real-time and collaboration capabilities:

Real-time information is essential to avoiding things like bottlenecks, missing goods—and unhappy customers. With real-time capabilities, organizations are empowered to respond to changes in the supply chain immediately, as they arise. Effective supply chain management software should allow multiple stakeholders to work together on a project so that they’re on the same page, without the need for frequent back and forth communication or manual updates. For example, a fleet manager, a truck

driver, and a customer located in physically different places can stay connected and have the same visibility on an order, thus increasing collaboration and maintaining end-to-end transparency.

3. Process optimization abilities:

If routine, repetitive tasks are automated, it enables staff to work on more revenue-generating ones. Apart from automating operational tasks with custom rules, businesses can leverage AI and machine learning to optimize other tedious tasks, as well. For example, software can be trained to approve a product only if it's in its best-finished state, eliminating the need for manual intervention. This approach enables organizations to explore more agile ways of working, better manage high levels of complexity, and call in human intervention only in the case of exceptions. Optimization tools in logistics and transportation help companies move goods in an efficient manner, at the lowest cost possible. This is important in the face of rising fuel costs, as well as constantly evolving national and regional regulations that can introduce uncertainties or slow down the movement of shipments.

4. Analytics and forecasting:

Along with automating day-to-day tasks, good supply chain management software should help you evaluate your business, with built-in analytics and forecasting capabilities to help you:

- Understand the health and performance of your business
- Identify bottlenecks
- Capitalize on your current strengths
- Anticipate customer demand and plan future production
- Spot inefficiencies in your system
- Predict events which are likely to occur

Some advanced software has predictive analytics that help balance disparities between supply and demand by providing data on both internal (demand) and external (weather, industry, regulation) trends.

5. Customization:

Prebuilt components in the application and customized configuration of business rules introduce flexibility that helps businesses adapt to changes quickly and go to market faster, with customized solutions for consumers. Some supply chain solutions let developers extend their features with programming languages like Java and Python. Open architecture also encourages organizations to build their own applications to suit their unique requirements like developing multiple variations of a product to cater to different customer segments, thus maximizing profitability.

6. Cloud-based access and mobility:

With cloud-based supply chain software, businesses can be accessed by authorized users from anywhere, at any time, so they can continue to manage, track and monitor the progress of transactions on the move. An additional benefit is that businesses can set up a cloud-based solution at a lower cost, in less time, and with less risk than investing in an on-premise system.

Organizations that have access to a mobile app for managing their supply chain and logistics functions have a better chance of staying up to date on various activities, like order status or shipping. Real-time alerts can be sent directly to users' mobile phones, collaboration between different parties is enhanced, and immediate action can be taken in case of any issues.

7. Security:

Data security is the heart of any business software. While choosing a supply chain management solution, companies should evaluate:

- Data encryption
- Virus-scanning
- Network monitoring
- Audit trail
- Fault tolerance

They should also ensure the necessary standards for secure communications between authorized parties, and that all technology-related compliance is maintained.

8. Scalability:

Any software must grow with a business. And as organizations make inroads into new regions, expand their product portfolio, and acquire new customers, a supply chain solution should be able to handle the increasing volume that comes with it. It also needs to support multiple applications and additional channels without affecting the system's performance.

9. Supply-chain management:

It is a cross-functional approach that includes managing the movement of raw materials into an organization, certain aspects of the internal processing of materials into finished goods, and the movement of finished goods out of the organization and toward the end consumer. As organizations strive to focus on core competencies and become more flexible, they reduce ownership of raw materials sources and distribution channels. These functions are increasingly being outsourced to other firms that can perform the activities better or more cost effectively.

10. Personalization of customer:

The effect is to increase the number of organizations involved in satisfying customer demand, while reducing managerial control of daily logistics operations. Less control and more supply-chain partners lead to the creation of the concept of supply-chain management. The purpose of supply-chain management is to improve trust and collaboration among supply-chain partners thus improving inventory visibility and the velocity of inventory movement. We have to communicate with all the vendors, suppliers and after that we have to take some comparisons after that we have to place the order.

1.2.2 Evolution:

Six major movements can be observed in the evolution of supply - chain management studies: creation, integration, and globalization, specialization phases one and two, and SCM 2.0.

Creation era:

The term "supply chain management" was first coined by Keith Oliver in 1982. However, the concept of a supply chain in management was of great importance long before, in the early 20th century, especially with the creation of the assembly line. The characteristics of this era of supply-chain management include the need for large-scale changes, re-engineering, downsizing driven by cost reduction programs, and widespread attention to Japanese management practices. However, the term became widely adopted after the publication of the seminal book *Introduction to Supply Chain Management* in 1999 by Robert B. Handfield and Ernest L. Nichols, Jr., which published over 25,000 copies and was translated into Japanese, Korean, Chinese, and Russian.

Integration era:

This era of supply-chain-management studies was highlighted with the development of electronic data interchange (EDI) systems in the 1960s, and developed through the 1990s by the introduction of enterprise resource planning (ERP) systems. This era has continued to develop into the 21st century with the expansion of Internet-based collaborative systems. This era of supply-chain evolution is characterized by both increasing value-added and reducing costs through integration.

A supply chain can be classified as a stage 1, 2 or 3 network. In a stage 1–type supply chain, systems such as production, storage, distribution, and material control are not linked and are independent of each other. In a stage 2 supply chain, these are integrated under one plan and enterprise resource planning (ERP) is enabled. A stage 3 supply chain is one that achieves vertical integration with upstream suppliers and downstream customers. An example of this kind of supply chain is Tesco.

Globalization era:

It is the third movement of supply-chain-management development, the globalization era, can be characterized by the attention given to global systems of supplier relationships and the expansion of supply chains beyond national boundaries and into other continents. Although the use of global sources in organisations' supply chains can be traced back several decades (e.g., in the oil industry), it was not until the late 1980s that a considerable number of organizations started to integrate global sources into their core business. This era is characterized by the globalization of supply-chain management in organizations with the goal of increasing their competitive advantage, adding value, and reducing costs through global sourcing.

Specialization era (phase I): outsourced manufacturing and distribution:

In the 1990s, companies began to focus on "core competencies" and specialization. They abandoned vertical integration, sold off non-core operations, and outsourced those functions to other companies. This changed management requirements, as the supply chain extended beyond the company walls and management was distributed across specialized supply-chain partnerships.

This transition also refocused the fundamental perspectives of each organization. Original equipment manufacturers (OEMs) became brand owners that required visibility deep into their supply base. They had to control the entire supply chain from above, instead of from within. Contract manufacturers had to manage bills of material with different part-numbering schemes from multiple OEMs and support customer requests for work-in-process visibility and vendor-managed inventory (VMI).

The specialization model creates manufacturing and distribution networks composed of several individual supply chains specific to producers, suppliers, and customers that work together to design, manufacture, distribute, market, sell, and service a product. This set of partners may change according to a given market, region, or channel, resulting in a proliferation of trading partner environments, each with its own unique characteristics and demands.

Specialization era (phase II): supply-chain management as a service:

Specialization within the supply chain began in the 1980s with the inception of transportation brokerages, warehouse management (storage and inventory), and non-asset-based carriers, and has matured beyond transportation and logistics into aspects of supply planning, collaboration, execution, and performance management.

Market forces sometimes demand rapid changes from suppliers, logistics providers, locations, or customers in their role as components of supply-chain networks. This variability has significant effects on supply-chain infrastructure, from the foundation layers of establishing and managing

electronic communication between trading partners to more complex requirements such as the configuration of processes and workflows that are essential to the management of the network itself.

Supply-chain specialization enables companies to improve their overall competencies in the same way that outsourced manufacturing and distribution has done; it allows them to focus on their core competencies and assemble networks of specific, best-in-class partners to contribute to the overall value chain itself, thereby increasing overall performance and efficiency. The ability to quickly obtain and deploy this domain-specific supply-chain expertise without developing and maintaining an entirely unique and complex competency in house is a leading reason why supply-chain specialization is gaining popularity.

Outsourced technology hosting for supply-chain solutions debuted in the late 1990s and has taken root primarily in transportation and collaboration categories. This has progressed from the application service provider (ASP) model from roughly 1998 through 2003 to the on-demand model from approximately 2003 through 2006, to the software as a service (SaaS) model currently in focus today.

Supply-chain management 2.0 (SCM 2.0):

Building on globalization and specialization, the term "SCM 2.0" has been coined to describe both changes within supply chains themselves as well as the evolution of processes, methods, and tools to manage them in this new "era". The growing popularity of collaborative platforms is highlighted by the rise of TradeCard's supply – chain - collaboration platform, which connects multiple buyers and suppliers with financial institutions, enabling them to conduct automated supply-chain finance transactions.

Web 2.0 is a trend in the use of the World Wide Web that is meant to increase creativity, information sharing, and collaboration among users. At its core, the common attribute of Web 2.0 is to help navigate the vast information available on the Web in order to find what is being bought. It is the notion of a usable pathway. SCM 2.0 replicates this notion in supply chain operations. It is the pathway to SCM results, a combination of processes, methodologies, tools, and delivery options to guide companies to their results quickly as the complexity and speed of the supply-chain increase due to global competition; rapid price fluctuations; changing oil prices; short product life cycles; expanded specialization; near-, far-, and off-shoring; and talent scarcity.

1.2.3 Importance:

1. Improved customer satisfaction:

Problems in your supply chain can lead to several customer-centric issues, including:

- Being unable to meet customer demand

- Sending part or incorrect orders to customers
- Extended waits for orders to arrive
- Products not being in the right place at the right time

Effective supply chain management and streamlining product flow will help you minimise such events and ensure customer satisfaction remains high. Supply chain management is important because it can help achieve several business objectives. For instance, controlling manufacturing processes can improve product quality, reducing the risk of recalls and lawsuits while helping to build a strong consumer brand. At the same time, controls over shipping procedures can improve customer service by avoiding costly shortages or periods of inventory oversupply.

2. Reduced operating costs:

Supply chain inefficiencies are potentially having an enormous impact on your bottom line. By conducting thorough reviews as part of your management process, you can reduce your supply chain costs and the time it takes for a finished product to arrive in your customer's hands. Don't just look for inefficiencies within operations, either. Look at your supply chain model yourself. For example, if you're able to migrate towards a just-in-time model, you can massively reduce warehousing and other storage costs.

3. Improved cash flow:

Efficient supply chains are efficient from end to end. As such, you can accurately forecast what you're going to sell and how much product you'll need to meet customer demand. So you end up with a seamless process where you're selling products while ordering efficiently, improving your cash flow and making it easier to analyse your financial metrics.

4. More efficient sourcing and procurement:

An efficient supply chain makes it easier for your sourcing and procurement teams to find new suppliers when necessary. Because you'll have a clear idea of what good looks like in terms of what you want from suppliers. As such, you can find suppliers that meet your expectations and needs or work with them to ensure they reach the required standard. Either way, by having excellence in your supply chain to start with, you'll know what you're looking for if you need to replace a part of it.

5. Safeguarding supply of raw materials:

It's vital to remember that supply chain management isn't just about business processes. It's about your relationships with your suppliers and how you work together. Suppose you have a robust and respectful relationship with your suppliers. In that case, you'll find you're at the front of the queue and given priority if there are issues like shortages of raw materials. Having robust relationships to mitigate these potential disruptions is an easy win, too.

6. Better inventory management:

If you could boil down the objective of your supply chain into one phrase, what would you say?

"Right product, right place, right time" would be a pretty good starting point.

A well-managed supply chain will achieve this as it'll enable your inventory management to be much more effective. So, whether your supply chain management process helps you move towards a just-in-time supply chain strategy, improves your forecasting, or sees you provide suppliers with better warehousing solutions, there are benefits to realise wherever you look.

7. Better partnerships with distributors:

Many businesses make the mistake of thinking a product arriving in-store or at their distribution centre is the end of their supply chain. Consequently, those same businesses don't have much in the way of a relationship with the distributors they rely upon to get the final product into their customers' hands. Remember that your supply chain ends successfully when your customers - not you - receive a product. Make distributor partnerships a crucial part of your supply chain management strategy.

8. Ensure adherence to legal and ethical standards:

The nature of modern global supply chains means that you're held accountable for your suppliers' adherence to legal and ethical standards as much as you are your own. Supply chain sustainability and transparency has become increasingly vital in recent years and will continue to do so. By closely managing your supply chains and working with your suppliers, you can ensure you meet the required standards both at home and wherever your suppliers are.

9. A competitive advantage in your industry:

Every supply chain has unique complexities and challenges. While it's often easy to identify inefficiencies and areas for improvement, the truth is that many businesses fail to deal with these as effectively as they potentially could. Overall, supply chain management provides several opportunities for companies to improve their profit margins and is especially important for companies with large and international operations. Organizations increasingly find that they must rely on effective supply chains, or networks, to compete in the global market and networked economy. In Peter Drucker's (1998) new management paradigms, this concept of business relationships extends beyond traditional enterprise boundaries and seeks to organize entire business processes throughout a value chain of multiple companies.

1.2.4 Process of supply chain management:

The supply chain management process is composed of four main parts: demand management, supply management, S&OP, and product portfolio management.

1. Demand management:

Demand management consists of three parts: demand planning, merchandise planning, and trade promotion planning.

- Demand planning is the process of forecasting demand to make sure products can be reliably delivered. Effective demand planning can improve the accuracy of revenue forecasts, align inventory levels with peaks and troughs in demand, and enhance profitability for a particular channel or product.
- Merchandise planning is a systematic approach to planning, buying, and selling merchandise to maximize the return on investment (ROI) while simultaneously making merchandise available at the places, times, prices, and quantities that the market demands.
- Trade promotion planning is a marketing technique to increase demand for products in retail stores based on special pricing, display fixtures, demonstrations, value-added bonuses, no-obligation gifts, and other promotions. Trade promotions help drive short-term consumer demand for products normally sold in retail environments.

2. Supply management:

Supply management is made up of five areas: supply planning, production planning, inventory planning, capacity planning, and distribution planning.

- Supply planning determines how best to fulfil the requirements created from the demand plan. The objective is to balance supply and demand in a manner that achieves the financial and service objectives of the enterprise.
- Production planning addresses the production and manufacturing modules within a company. It considers the resource allocation of employees, materials, and production capacity.
- Production/supply planning consists of:
- Supplier management and collaboration
- Production scheduling
- Inventory planning determines the optimal quantity and timing of inventory to align it with sales and production needs.
- Capacity planning determines the production staff and equipment needed to meet the demand for products.

- Distribution planning and network planning oversees the movement of goods from a supplier or manufacturer to the point of sale. Distribution management is an overarching term that refers to processes such as packaging, inventory, warehousing, Supply chain, and logistics.

3. Sales and operations planning (S&OP):

- Sales and operations planning (S&OP) is a monthly integrated business management process that empowers leadership to focus on key supply chain drivers, including sales, marketing, demand management, production, inventory management, and new product introduction.
- With an eye on financial and business impact, the goal of S&OP is to enable executives to make better-informed decisions through a dynamic connection of plans and strategies across the business. Often repeated on a monthly basis, S&OP enables effective supply chain management and focuses the resources of an organization on delivering what their customers need while staying profitable.

4. Product portfolio management:

Product portfolio management is the process from creating a product idea creation to market introduction. A company must have an exit strategy for its product when it reaches the end of its profitable life or in case the product doesn't sell well.

Product portfolio management includes:

- New product introduction
- End-of-life planning
- Cannibalization planning
- Commercialization and ramp planning
- Contribution margin analysis
- Portfolio management
- Brand, portfolio, and platform planning

5. Supply chain management best practices:

To succeed in a growing global market, you need a supply chain that's connected from start to finish, across your enterprise and beyond. Here are five steps we recommend to achieve connected supply chain planning.

1. Make the move to real-time supply chain planning:

When using ERP systems and spreadsheets for planning, companies typically rely only on historical data, resulting in little wiggle room for changes should any disruptions occur in demand or supply. For example,

based on the previous year's numbers, a company can estimate the number of products it will sell in the next quarter. But what if a massive hurricane destroys a key distribution center, leading to too little supply on the shelves? With Anaplan's real-time connected supply chain planning solution, you can create "what-if" scenarios and plan more effectively so you're ready when disruptions occur.

2. Unify supply chain planning with enterprise planning:

A vital second step is connecting traditionally siloed supply chain planning to sales and operations planning and financial planning. Companies can benefit from synchronizing their short-term operational planning with their wider business planning processes to make real-time updates to inventory forecasts and supply. Deploying real-time S&OP solutions that enable enterprise-wide collaboration means that key stakeholders across the business can create new scenarios and quickly assess how to use their resources to optimize profitability when an unforeseen event happens.

3. Anticipate the demand of the end customer:

For consumer packaged-goods companies, anticipating what customers want and when they want it is an ongoing challenge. A solution like Anaplan allows end-to-end visibility across the supply chain and beyond an existing network of wholesalers and retailers to sense demand signals from customers. When changing consumer sentiments can be rapidly identified and changes to demand for the product assessed, the company, partners, and customers benefit from improved profitability, margins, and lead time.

4. Leverage real-time data across all points of the supply chain:

Because supply chain planning typically involves a myriad of suppliers, channels, customers, and pricing schemes, models can become large and potentially unwieldy—especially when spreadsheets are the primary planning tools. Incorporating a solution that uses real-time data allows planning with great accuracy and reduces the risk of stock-outs or surplus inventory.

5. Ensure the flexibility to cope with change:

When technology facilitates efficient planning and quick reactions, disruptions aren't disruptive because re-planning and re-forecasting is easy—resulting in time and money saved and increased profitability.

One could suggest other critical supply business processes that combine these processes stated by Lambert, such as:

6. Customer service management process:

Customer relationship management concerns the relationship between an organization and its customers. Customer service is the source of customer information. It also provides the customer with real-time information on

scheduling and product availability through interfaces with the company's production and distribution operations. Successful organizations use the following steps to build customer relationships:

- determine mutually satisfying goals for organization and customers
- establish and maintain customer rapport
- induce positive feelings in the organization and the customers

7. Inventory management:

Inventory management is concerned with ensuring the right stock at the right levels, in the right place, at the right time and the right cost. Inventory management entails inventory planning and forecasting: forecasting helps planning inventory.

8. Procurement process:

Strategic plans are drawn up with suppliers to support the manufacturing flow management process and the development of new products.[56] In firms whose operations extend globally, sourcing may be managed on a global basis. The desired outcome is a relationship where both parties benefit and a reduction in the time required for the product's design and development.

The purchasing function may also develop rapid communication systems, such as electronic data interchange (EDI) and internet linkage, to convey possible requirements more rapidly. Activities related to obtaining products and materials from outside suppliers involve resource planning, supply sourcing, negotiation, order placement, inbound transportation, storage, handling, and quality assurance, many of which include the responsibility to coordinate with suppliers on matters of scheduling, supply continuity (inventory), hedging, and research into new sources or programs. Procurement has recently been recognized as a core source of value, driven largely by the increasing trends to outsource products and services, and the changes in the global ecosystem requiring stronger relationships between buyers and sellers.

9. Product development and commercialization:

Here, customers and suppliers must be integrated into the product development process in order to reduce the time to market. As product life cycles shorten, the appropriate products must be developed and successfully launched with ever-shorter time schedules in order for firms to remain competitive. According to Lambert and Cooper (2000), managers of the product development and commercialization process must:

1. Coordinate with customer relationship management to identify customer-articulated needs;
2. Select materials and suppliers in conjunction with procurement; and

3. Develop production technology in manufacturing flow to manufacture and integrate into the best supply chain flow for the given combination of product and markets.

Integration of suppliers into the new product development process was shown to have a major impact on product target cost, quality, delivery, and market share. Tapping into suppliers as a source of innovation requires an extensive process characterized by development of technology sharing, but also involves managing intellectual property issues.

10. Manufacturing flow management process:

The manufacturing process produces and supplies products to the distribution channels based on past forecasts. Manufacturing processes must be flexible in order to respond to market changes and must accommodate mass customization. Orders are processes operating on a just-in-time (JIT) basis in minimum lot sizes. Changes in the manufacturing flow process led to shorter cycle times, meaning improved responsiveness and efficiency in meeting customer demand. This process manages activities related to planning, scheduling, and supporting manufacturing operations, such as work-in-process storage, handling, transportation, and time phasing of components, inventory at manufacturing sites, and maximum flexibility in the coordination of geographical and final assemblies' postponement of physical distribution operations.

11. Physical distribution:

This concerns the movement of a finished product or service to customers. In physical distribution, the customer is the final destination of a marketing channel, and the availability of the product or service is a vital part of each channel participant's marketing effort. It is also through the physical distribution process that the time and space of customer service become an integral part of marketing. Thus, it links a marketing channel with its customers (i.e., it links manufacturers, wholesalers, and retailers).

12. Outsourcing/partnerships:

This includes not just the outsourcing of the procurement of materials and components, but also the outsourcing of services that traditionally have been provided in-house. The logic of this trend is that the company will increasingly focus on those activities in the value chain in which it has a distinctive advantage and outsource everything else. This movement has been particularly evident in logistics, where the provision of transport, storage, and inventory control is increasingly subcontracted to specialists or logistics partners. Also, managing and controlling this network of partners and suppliers requires a blend of central and local involvement: strategic decisions are taken centrally, while the monitoring and control of supplier performance and day-to-day liaison with logistics partners are best managed locally.

13. Performance measurement:

Experts found a strong relationship from the largest arcs of supplier and customer integration to market share and profitability. Taking advantage of supplier capabilities and emphasizing a long-term supply-chain perspective in customer relationships can both be correlated with a firm's performance. As logistics competency becomes a critical factor in creating and maintaining competitive advantage, measuring logistics performance becomes increasingly important, because the difference between profitable and unprofitable operations becomes narrower..

14. Warehousing management:

To reduce a company's cost and expenses, warehousing management is concerned with storage, reducing manpower cost, dispatching authority with on time delivery, loading & unloading facilities with proper area, inventory management system etc.

15. Workflow management:

Integrating suppliers and customers tightly into a workflow (or business process) and thereby achieving an efficient and effective supply chain is a key goal of workflow management.

Let us have a look into this use case of Wal-Mart for better understanding of the process.

Wal-Mart strategic sourcing approaches:

In 2010, Wal-Mart announced a big change in its sourcing strategy. Initially, Wal-Mart relied on intermediaries in the sourcing process. It bought only 20% of its stock directly, but the rest were bought through the intermediaries. Therefore, the company came to realize that the presence of many intermediaries in the product sourcing was actually increasing the costs in the supply chain. To cut these costs, Wal-Mart decided to do away with intermediaries in the supply chain and started direct sourcing of its goods from the suppliers. Eduardo Castro-Wright, the then Vice President of Wal-Mart, set an ambitious goal of buying 80% of all Wal-Mart goods directly from the suppliers.

Walmart started purchasing fruits and vegetables on a global scale, where it interacted directly with the suppliers of these goods. The company later engaged the suppliers of other goods, such as cloth and home electronics appliances, directly and eliminated the importing agents. The purchaser, in this case Wal-Mart, can easily direct the suppliers on how to manufacture certain products so that they can be acceptable to the consumers. Thus, Wal-Mart, through direct sourcing, manages to get the exact product quality as it expects, since it engages the suppliers in the producing of these products, hence quality consistency. Using agents in the sourcing process in most cases leads to inconsistency in the quality of the products, since the agent's source the products from different manufacturers that have varying qualities.

Wal-Mart managed to source directly 80% profit from its stock; this has greatly eliminated the intermediaries and cut down the costs between 5-15%, as markups that are introduced by these middlemen in the supply chain are cut. This saves approximately $4–15 billion. This strategy of direct sourcing not only helped Wal-Mart in reducing the costs in the supply chain but also helped in the improvement of supply chain activities through boosting efficiency throughout the entire process. In other words, direct sourcing reduces the time that takes the company to source and stock the products in its stock.

The presence of the intermediaries elongated the time in the process of procurement, which sometimes led to delays in the supply of the commodities in the stores, thus, customers finding empty shelves. Wal-Mart adopted this strategy of sourcing through centralizing the entire process of procurement and sourcing by setting up four global merchandising points for general goods and clothing. The company instructed all the suppliers to bring their products to these central points that are located in different markets. The procurement team assesses the quality brought by the suppliers, buys the goods, and distributes them to various regional markets. The procurement and sourcing at centralized places helped the company to consolidate the suppliers.

The company has established four centralized points, including an office in Mexico City and Canada. Just a mere piloting test on combining the purchase of fresh apples across the United States, Mexico, and Canada led to the savings of about 10%. As a result, the company intended to increase centralization of its procurement in North America for all its fresh fruits and vegetables. Thus, centralization of the procurement process to various points where the suppliers would be meeting with the procurement team is the latest strategy which the company is implementing, and signs show that this strategy is going to cut costs and also improve the efficiency of the procurement process.

Strategic vendor partnerships are another strategy the company is using in the sourcing process. Wal-Mart realized that in order for it to ensure consistency in the quality of the products it offers to the consumers and also maintain a steady supply of goods in its stores at a lower cost, it had to create strategic vendor partnerships with the suppliers. Wal-Mart identified and selected the suppliers who met its demand and at the same time offered it the best prices for the goods. It then made a strategic relationship with these vendors by offering and assuring the long-term and high volume of purchases in exchange for the lowest possible prices. Thus, the company has managed to source its products from the same suppliers as bulks, but at lower prices. This enables the company to offer competitive prices for its products in its stores, hence, maintaining a competitive advantage over its competitors whose goods are more expensive in comparison.

Another sourcing strategy Wal-Mart uses is implementing efficient communication relationships with the vendor networks; this is necessary to improve the material flow. The company has all the contacts with the

suppliers whom they communicate regularly and make dates on when the goods would be needed, so that the suppliers get ready to deliver the goods in time. The efficient communication between the company's procurement team and the inventory management team enables the company to source goods and fill its shelves on time, without causing delays and empty shelves. In other words, the company realized that in ensuring a steady flow of the goods into the store, the suppliers have to be informed early enough, so that they can act accordingly to avoid delays in the delivery of goods. Thus, efficient communication is another tool which Wal-Mart is using to make the supply chain more efficient and to cut costs.

Cross-docking is another strategy that Wal-Mart is using to cut costs in its supply chain. Cross-docking is the process of transferring goods directly from inbound trucks to outbound trucks. When the trucks from the suppliers arrive at the distribution centers, most of the trucks are not offloaded to keep the goods in the distribution centers or warehouses; they are transferred directly to another truck designated to deliver goods to specific retail stores for sale. Cross-docking helps in saving the storage costs. Initially, the company was incurring considerable costs of storing the suppliers from the suppliers in its warehouses and the distributions centers to await the distribution trucks to the retail stores in various regions.

1.2.5 Barriers to supply chain management:

Managerial barriers:

These barriers arise because the managers dealing with supply chains do not realize the real benefits of information sharing and do not have confidence in the information sharing system. These senior executives do not wish to invest in innovation and culture, conducive to information sharing.

The emphasis should be given on co-ordinated managerial guidance rather than imposing the hierarchy of top to down leadership. Lack of training and experience and low literacy about the new technology is also considered as one of the barriers of information sharing. Ives *et al*. (2002) have suggested that training and ongoing support with clear guidelines are prerequisite for effective information sharing on all the levels of organizations. Fawcett *et al*. (2008) concluded that lack of trust makes it difficult to share sensitive information because supply chain managers feel that they cannot afford to share sensitive proprietary information without ensuring that other members of the chain will protect it from misuse.

Organizational barriers:

Organizational barriers are categorized as those barriers that are originated from attitudes of the organizations towards the implementation of information sharing. These barriers are due to the organizational structure and the groups involved in information sharing. The process of information sharing may become complicated because of organizational barriers. Information sharing initiatives require radical changes in process

and behavior of individuals as well as organizations. Normally the organizations and individuals resist the changes because of structural conflicts and managerial practices of different organizations in the supply chain. The delay to address these embedded barriers lead to disappointment and failures.

Organizational factors that are deeply embedded in institutional and professional realities also create barriers to inter-organizational information sharing. Tsai (2002) reported that organizations with centralization in strong hierarchical structure have a significant negative impact on sharing of information in a supply chain. The interests of employees to share information are greatly reduced when they do not enjoy the freedom due to limited autonomy and when they are required to seek permission from their superior for every decision.

Willem and Buelens (2007) have mentioned that horizontal departmentisation in bureaucracy could also constitute barriers for information sharing. Gil-Garcia *et al*. (2007) found that the complexity of information sharing gradually increases from the organizational level to the inter-organizational level. Small to medium organizations associated in the supply chain feel that information sharing is suited only to big companies and that it is an additional financial burden that will not bring any major returns on investment to their businesses.

The organizations with high levels of bureaucracy and strict administrative control lack the information sharing spirit in the supply chain. They have also reported that less formalized organization structure and voluntary information sharing arrangements can lead to more flexible and open interactions among employees and seem to create a more beneficial environment for information sharing in the supply chain. Barson *et al*. (2000) has concluded that some organizations fear losing company stability/market position in case they share technical information with other chain members.

Caudle et al. (1991) has shown that without support from the top management, an innovation in information sharing system is less likely to be adopted. Top management support has been consistently found to play an important role in the adoption and implementation of information sharing systems and is treated as an organizational barrier.

Financial barriers:

Financial constraints are a key barrier to Information sharing in the supply chain. Cost considerations are the prime challenges to support the infrastructure and man-power requirements of the information system. Information and technological systems require more funds because without this efficient information sharing cannot take place in the supply chain.

Large amounts of financial resources are needed for redesigning internal organizational and technical processes, changing traditional and fundamental product distribution channels, customer service procedures

and training of staff to achieve efficient information sharing in the supply chain. Cragg et al. (2002) has reported that lack of resources inhibits organizations to adopt information sharing using **information technology**. It is because of difficulties in raising finance to invest in information sharing systems.

Clark and Hammond (1997) reported that implementation of transparent information sharing systems has become very expensive in supply chains with many members. They have concluded that most chain members such as retailers show unwillingness to invest in sophisticated infrastructure for using information technology tools for the purpose of ordering and business processing. The financing of feasibility studies, systems design and management efforts to start up new supply chain communication channels becomes a substantial barrier to implement the efficient information sharing system.

Technological barriers:

The advancement of information technology has increased the ease of information sharing and has provided better methods to share and integrate information. Technological linkages across organizational units as well as up and down the supply chain are particularly critical to sharing information.

Study has shown that complexity of a technology is a major factor that affects the adoption of information sharing. Different organizations may use various types of hardware, software, data standards and definitions, as well as programming languages and the task of integrating them could be very challenging. Hoffman and Mehra (2000) stated that the technological factors can cause the failure of any information system in the supply chain so that technological barriers need to be tackled at the earliest.

Monczka and Morgan (1997) termed poor IT infrastructure as a barrier in the supply chain integration. However, poor IT infrastructure may be attributed to lack of funds and lack of awareness and commitment of top management about the use of IT tools in a supply chain. The deployment of IT tools in a supply chain is also not free from barriers. Some of these barriers are due to lack of trust in information technology tools, fear of information system breakdown etc. Lack of ability of professionals to maintain adequate levels of knowledge and expertise due to the fast pace of rapidly and radically changing technology used in information sharing systems is one of the major barriers of information sharing.

Individual barriers:

Barriers originating from behavior and actions of either individuals or groups within or between various business functions are considered individual barriers. Information is scattered among individuals and across groups or among group members. The information that other chain members might need may be available with any individual or group in the chain. Constant *et al*. (1994) concluded that organizations' effort to encourage and facilitate the sharing of information by investing in

collaborative information and communication technology becomes useless if employees are not willing to share the information.

They have also stated that individuals are more willing to share information when they are happy in their organizations and unsatisfied individuals always hesitate or refuse to share information. They have suggested that it is important to explore people's attitudes toward sharing information and to see whether there are significant factors that can influence people's attitudes. Many employees are reluctant to share and contribute their own information to shared databases. Thorpe and Mead (2001) concluded that some individuals may feel that they are already having an overload of information sharing. Information overload is described as having more relevant information than one can assimilate. Johnson and Payne (1985) demonstrated that information overload can even worsen the effectiveness of decisions because more information sometimes only confuses and distracts the decision maker.

Individuals feel that power, ownership and privilege of possessing crucial information are lost when they share the information. Some employees regard information as a symbol of power. Sharing information is viewed as losing power and social influence among all. These factors inhibit information sharing and can result in something that has been termed as information pathologies e.g., preservation of information from co-workers to show superiority. Pendlebury *et al*. (1998) has cited lack of training as one of the barriers to information sharing. In his study, the majority of respondents have reported that no formal training was provided with regard to the use of the information communication systems.

Social-cultural barriers:

Kamal and The mistocleous (2006) regarded misinterpretation or misuse of shared information as one of the barriers of inter-organizational information sharing. The proprietary information shared with collaborators may be either intentionally or unintentionally revealed to competitors. Bures (2003) has regarded lack of coherence between the personal intents of employees and the organization missions as one of the barriers to information sharing.

One of the major barriers to information sharing is the failure to recognize the cultural gap between different stakeholders within an organization. Working methods, techniques and corporate culture may vary from organization to organization and this may become a barrier of information sharing in the supply chain. The information culture within an organization must be conducive to information management. This means a culture that secures the support, enthusiasm and co-operation of staff and management alike.

Low level of technological literacy of some participating individuals and supply chain members is also treated as another barrier for implementing information sharing. There may be differences of opinions among different departments due to differences in their working style. Lack of a harmonious environment and lack of commitment/involvement of

employees is also a major social barrier for information sharing in the supply chain.

1.3 Principles of Supply Chain Management

The concept of the chain is important because each link is connected in a specific direction and order, and the next link cannot be reached without going through the previous one. Each link adds time and costs, and may involve labour, parts, and transportation. Every product a business carries may have its own supply chain, though they may use certain suppliers for multiple products.

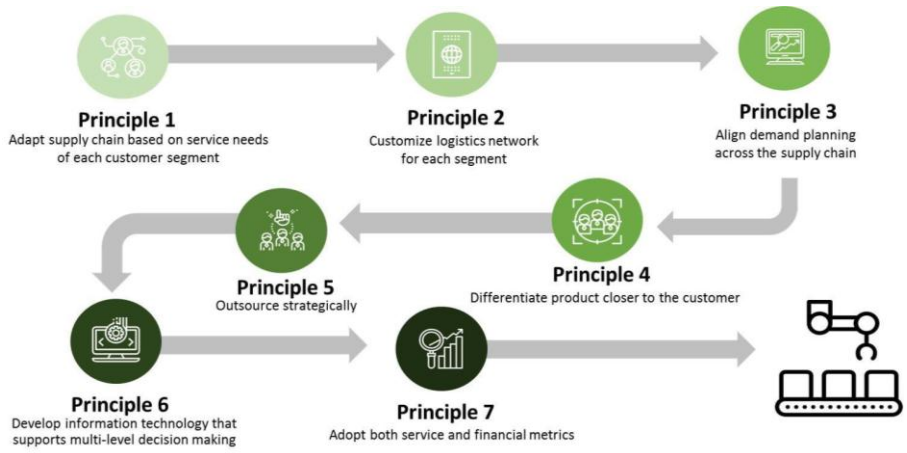


Exhibit – Principles of SCM

Source: www.landzmanagement.com

1. Adapt Supply Chain to Customer's Needs:

The businesses and supply chain professionals understand customer's needs. Customers are divided into different groups called 'segments' in order to understand them better. On the basis of sales volume or profitability, the primitive way to segment customer is ABC analysis. It can also be done by product, trade channel and industry. Anticipating the customer's needs is also very important. Once the needs of the customers are anticipated, the supply chain should be aligned to cater to the needs.

2. Customize Logistics Network:

After the segmentation of the customers based on different requirements, SCM managers have to tailor logistics networks to serve different segments. The SCM manager has to prioritize the deliveries and make suitable provisions to quickly distribute those goods that are marked as urgent.

3. Align Demand Planning Across Supply Chain:

Supply chain professionals are trained to share data with trading partners in order to avoid the unnecessary stock. The demand data must be used wisely by the SCM managers.

4. Differentiate Products Close to Customers:

Standardization and differentiation are two completely opposite things. Some cosmetic companies manufacture only 1 SKU that can be sold throughout Asia instead of 1 SKU per country. Due to the economy of the sales, standardization can drastically bring down the cost.

5. Outsources Strategically:

Though outsourcing is all the rage, the managers must outsource strategically. The core expertise should not be outsourced ever. This principle stands the test of time.

6. Develop IT that Support Multi-Level Decision Making:

The IT projects should not be done in isolation and before IT projects, the business process reengineering should be done. This provides a proper understanding of process insufficiencies and helps to determine the kind of innovation needed.

7. Adapt Both Services and Financial Metrics:

The activity-based costing (ABC) is applied to determine the customer's profitability. It is even better to exploit Time Driven Activity Based Costing in order to understand changes in activities, process, product and customers.

1.3.1 SCM strategies:

It's no secret that today's supply chains have become more complex than ever, with socioeconomic and market dynamics underscoring organizations' need to respond to an outside-in, demand-driven world. But companies must now factor in a host of new variables, such as rising protectionism and nationalism across the political landscape. This is forcing many to re-examine their business-continuity risks and embrace new sourcing strategies. Here are six supply-chain strategies designed to help enterprises thrive in the current environment.

Strategy No. 1: Adopt a demand-driven planning and business operating model based on real-time demand insights and demand shaping:

Demand-prediction capabilities continue to mature as supply chain management teams utilize ever-more powerful digital tools. Artificial intelligence technologies and internet of things (IoT) networks have gotten even better, allowing SCM teams to take action more quickly, and automatically adjust their supply chains based on real-time insights to match expected demand.

The cloud continues to play a growing role in the new supply chain. More companies are moving data and apps to the cloud, allowing the creation of unified data models that are augmented by external sources. This is

driving a new level of predictive capability and planning accuracy not available just two years ago.

Validating the trend, more companies are seeing their supply-chain modernization investments bear fruit. Based on our recent research, companies utilizing the cloud improved delivery performance and increased revenues by 20%-30% on average. They also cut logistics costs by 5%-25% and slashed inventories, lowering working-capital requirements by 25%-60%. Asset utilization jumped by 30-35%.

Strategy No. 2: Build an adaptive and agile supply chain with rapid planning and integrated production:

Agility is still the name of the game this year when it comes to supply-chain management. In fact, companies are getting even better at aligning planning with manufacturing, driving greater operational speed and flexibility.

Yet a fully integrated solution still seems beyond the reach of some companies. A 2014 study found that 55% of businesses have only "modestly integrated planning across the company." A mere 9% said they had a "highly integrated supply-chain planning environment." Companies still struggle with these issues to this day.

The problem might be the sheer volume of data and analytics required to properly integrate planning with execution in real time. But this barrier is now falling, with the introduction of cloud-based platforms that link financial and materials-planning tasks to business-execution activities such as procurement, manufacturing, and inventory management — and do it directly across a common online interface. For the first time, companies can create a zero-latency plan-to-produce process, allowing them to act faster and adapt seamlessly to the dynamics of their markets.

Strategy No. 3: Optimize product design and management for supply, manufacturing, and sustainability, to accelerate profitable innovation:

The days when companies ran product development and supply-chain planning as separate functions are coming to an end. To stay competitive, the tradition of "throwing product designs over the wall" to supply chain planners — the ones who figure out how to source and build the products — is no longer fast or efficient enough.

Consider the market for mobile phones, where competition is driving manufacturers to develop and launch new models every year. Increasingly the only way to do this is by merging design teams with supply-chain planners on a single (usually cloud-based) platform. These new collaborative systems, as well as smart procurement practices such as supplier prequalification, can help product developers source the right components up front, based on factors such as parts availability, quality, and cost.

Strategy No. 4: Align your supply chain with business goals by integrating sales and operations planning with corporate business planning:

Business risks for companies have risen significantly in the last couple of years. From Brexit to tariff wars, leaders are facing a growing array of market uncertainties. This is why companies need to integrate their tactical sales and operations planning (S&OP) programs with their strategic budget and forecasting efforts. The goal is to create a planning capability that translates macro business priorities and risks into a set of on-the-ground execution tasks that are continually updated to reflect changing market conditions.

Integrating business planning, S&OP, and supply-and-demand planning improves business agility by creating an efficient closed loop from planning to execution to performance management.

Strategy No. 5: Embed sustainability into supply chain operations:

Sustainability in all its forms, both social and environmental, has joined growth and profitability as a top priority in the C-suite. And for good reason: sustainability and the bottom line are no longer mutually exclusive. Just this past year, the Business Roundtable released its Statement on the Purpose of a Corporation, declaring that sustainability should be a key priority for companies, in addition to generating profits for shareholders.

Putting a spotlight on sustainability places a new focus on supply-chain practices, many of which can have a sizable impact on environmental health in areas ranging from carbon emissions to industrial waste and pollution. Today there are myriad strategies companies can use to optimize their supply chains for sustainability:

- Supply-chain teams can develop long-term targets that improve key measures of sustainability such as the company's carbon footprint, energy usage, and recycling efforts.
- Teams can deploy new technologies to ensure responsible environmental practices such as optimizing truck routes to reduce fuel consumption and carbon emissions across the supply chain.
- Companies can move to a shared data model to provide the end-to-end visibility and real-time insights needed to optimize supply chains and ensure they are sustainable.

Strategy No. 6: Adopt emerging technologies to ensure a reliable and predictable supply:

Businesses need a buffer to deal with unexpected shifts in demand, but too much inventory can raise costs. By improving demand accuracy, new technology can reduce inventory requirements and speed reaction times, creating a nimbler and more reliable supply network.

With today's global trade volatility and ongoing tariff wars, it's essential to make the right decisions about where to source materials, make products, and deliver goods in order to minimize costs and ensure compliance. What's also new is that AI, machine learning, and IoT are no longer just buzzwords. Today they're market-proven technologies that are streamlining supply chains and driving business agility in companies worldwide. With these capabilities now being built directly into cloud solutions, customers can harness their potential right out of the box. This means you can get started with truly business-changing technologies without the need to invest in complex projects or costly, hard-to-find skillsets.

1.3.2 Organizing:

Organizing includes developing a structure for the people, positions, departments, and activities within the firm. Managers can arrange the structural elements of the firm to maximize the flow of information and the efficiency of work processes. They accomplish this by doing the following:

- Dividing up tasks (division of labor)
- Grouping jobs and employees (departmentalization)
- Assigning authority and responsibilities (delegation)

A manager performs organizing function with the help of following steps:

1. Identification of activities:

All the activities which have to be performed in a concern have to be identified first. For example, preparation of accounts, making sales, record keeping, quality control, inventory control, etc. All these activities have to be grouped and classified into units.

2. Departmentally organizing the activities:

In this step, the manager tries to combine and group similar and related activities into units or departments. This organization of dividing the whole concern into independent units and departments is called departmentation.

3. Classifying the authority:

Once the departments are made, the manager likes to classify the powers and its extent to the managers. This activity of giving a rank in order to the managerial positions is called hierarchy. The top management is into formulation of policies, the middle level management into departmental supervision and lower level management into supervision of foremen. The clarification of authority helps in bringing efficiency in the running of a concern. This helps in achieving efficiency in the running of a concern. This helps in avoiding wastage of time, money, effort, in avoidance of

duplication or overlapping of efforts and this helps in bringing smoothness in a concern's working.

4. Coordination between authority and responsibility:

Relationships are established among various groups to enable smooth interaction toward the achievement of the organizational goal. Each individual is made aware of his authority and he/she knows whom they have to take orders from and to whom they are accountable and to whom they have to report. A clear organizational structure is drawn and all the employees are made aware of it.

5. Effective administration:

The organization structure is helpful in defining the jobs positions. The roles to be performed by different managers are clarified. Specialization is achieved through division of work. This all leads to efficient and effective administration.

6. Growth and diversification:

A company's growth is totally dependent on how efficiently and smoothly a concern works. Efficiency can be brought about by clarifying the role positions to the managers, coordination between authority and responsibility and concentrating on specialization. In addition to this, a company can diversify if its potential grows. This is possible only when the organization structure is well- defined. This is possible through a set of formal structures.

7. Sense of security:

Organizational structure clarifies the job positions. The roles assigned to every manager are clear. Coordination is possible. Therefore, clarity of powers helps automatically in increasing mental satisfaction and thereby a sense of security in a concern. This is very important for job- satisfaction.

8. Scope for new changes:

Where the roles and activities to be performed are clear and every person gets independence in his working, this provides enough space to a manager to develop his talents and flourish his knowledge. A manager gets ready for taking independent decisions which can be a road or path to adoption of new techniques of production. This scope for bringing new changes into the running of an enterprise is possible only through a set of organizational structure.

1.3.3 Coordination:

- Coordination is the function of management which ensures that different departments and groups work in sync.
- Therefore, there is unity of action among the employees, groups, and departments.

- It also brings harmony in carrying out the different tasks and activities to achieve the organization's objectives efficiently.
- Production Network Coordination or Supply Chain Coordination (PNC / SCC) is a viable way to deal with further develop inventory network (SC) execution.
- The coordination can be accomplished when associated elements cooperate by sharing assets and data to accomplish normal targets adjusted to expand client an incentive for the whole SC.
- There are various systems by which the SC individuals can organize, for example contracts, data sharing, data innovation and cooperative drives.
- To convey regularly and actually, the accomplices are expected to have great data frameworks and ability to share data.
- To arrange with one another the SC individuals are expected to have abilities to successfully carry out coordination components.

Features of coordination:

Coordination is the integration, unification, synchronization of the efforts of the departments to provide unity of action for pursuing common goals.

- A force that binds all the other functions of management. It is relevant for group efforts and not for individual efforts. Coordination involves an orderly pattern of group efforts. In the case of individual efforts, since the performance of the individual does not affect the functioning of others, the need for coordination does not arise.
- It is a continuous and dynamic process. Continuous because it is achieved through the performance of different functions.
- Also, it is dynamic since functions can change according to the stage of work. Most organizations have some sort of coordination in place.
- However, the management can always make special efforts to improve it. Coordination emphasizes the unity of efforts.
- This involves fixing the time and manner in which the various functions are performed in the organization. This allows individuals to integrate with the overall process.
- A higher degree of coordination happens when the degree of integration in the performance of various functions increases. It is the responsibility of every manager in the organization.
- In fact, this is integral to the role of a manager because he synchronizes the efforts of his subordinates with others.

Types of coordination:

1. Vertical Coordination:

Vertical coordination is the coordination between different levels of the organization to ensure that all levels of organization are in harmony with the organizational policies and programmes. This is achieved through delegation of authority by directing and by controlling.

2. Horizontal Coordination:

Horizontal coordination is the coordination between departments on the same level of managerial hierarchy. Coordination between production and marketing departments at the same level or organizational hierarchy is an example of horizontal coordination. This is achieved by forming cross-functional teams and self-managed teams.

3. Internal Coordination:

Vertical and horizontal types of coordination, if carried out within an organization, are called internal coordination. Internal coordination is achieved through following techniques:

4. External Coordination:

Success or failure of an organization also depends on number of external forces. No organization can operate in isolation, it has to continuously interact with dynamic environmental forces and devise its strategies to respond to such forces to survive.

1.4 SUMMARY

In the 21st century, changes in the business environment have contributed to the development of supply-chain networks. First, as an outcome of globalization and the proliferation of multinational companies, joint ventures, strategic alliances, and business partnerships, significant success factors were identified, complementing the earlier "just-in-time", lean manufacturing, and agile manufacturing practices. Second, technological changes, particularly the dramatic fall in communication costs (a significant component of transaction costs), have led to changes in coordination among the members of the supply chain network. The importance of supply chain management proved crucial in the 2019-2020 fight against the coronavirus (COVID-19) pandemic that swept across the world.

During the pandemic period, governments in countries which had in place effective domestic supply chain management had enough medical supplies to support their needs and enough to donate their surplus to front-line health workers in other jurisdictions. The devastating COVID-19 crisis in US has turned many sectors of the local economy upside down, including the country’s storied logistics industry. Some organizations were able to quickly develop foreign supply chains in order to import much needed medical supplies.

1.5 EXERCISE

A. Fill the blanks:

1. ___ provides a low-cost service for export production. (Pick the right option)

   a) Source facility

   b) Offshore facility

   c) Contributor facility

   d) Outpost facility

Ans. b) Offshore facility

2. If facilities have lower fixed costs many local facilities can be established because this reduces ___

   a) Fixed costs

   b) Exchange rates

   c) Transportation costs

   d) Taxes

Ans. c) Transportation costs

3. The factors such as ___, costs, and also the situations of technology change must be considered while selecting a location. (Pick the right option)

   a) Future demand

   b) Cultural independence

   c) Taxes

   d) Workforce

Ans. a) Future demand

4. A ___ adds details to the mission.

   a) Business strategy

   b) Corporate strategy

   c) Functional strategy

   d) Vision

Ans. b) Corporate strategy

5. Moving goods from producer to the distributor is called as.....

   a) Downstream

   b) Upstream

   c) Horizontal stream

   d) None of these

Ans. a) Downstream

B. True/False:

1. JIT delivery, i.e. frequent deliveries of small shipments, actually results in an increase in the transportation cost per unit.

Ans. TRUE

2. The materials in the supply chain flow toward the end of the chain, while the information and the dollars move toward the beginning of the chain.

Ans. FALSE

3. Supply chains are sometimes referred to as value chains because they reflect the concept that value is added as goods and services progress through the chain.

Ans. TRUE

4. The goal of supply chain management is to synchronize supply and demand of all of the organizations that are part of the chain.

Ans. TRUE

5. The need for supply chain management increases as globalization increases.

Ans. TRUE

C. Short Notes:

1. Explain in detail the concept of supply chain management.
2. Define the role of supply chain management in business.
3. Explain the importance of supply chain management.
4. Provide a detailed explanation on the evolution of SCM.
5. Explain barriers to SCM.

D. Answer in brief:

1. Explain the concept of organizing in SCM in detail.
2. Explain in detail the process of SCM in contemporary business scenario.
3. Explain the concept of organizing with reference to SCM.
4. Explain the features of SCM in detail.
5. Explain the principles of SCM in detail.

*****

2

INTRODUCTION TO SUPPLY CHAIN MANAGEMENT - II

Unit Structure

2.0 OBJECTIVES

1. Develop a sound understanding of the important role of supply chain management in today's business environment.

2. Become familiar with current supply chain management trends Understand and apply the current supply chain theories, practices and concepts utilizing case problems and problem-based learning situations.

3. Learn to use and apply computer-based supply chain optimization tools including the use of selected state of the art supply chain software suites currently used in business.

4. Develop and utilize critical management skills such as negotiating, working effectively within a diverse business environment, ethical decision making and use of information technology.

2.1 INTRODUCTION

Supply chains have existed since ancient times, beginning with the very first product or service created and sold. With the advent of industrialization, SCM became more sophisticated, allowing companies to do a more efficient job of producing and delivering goods and services. For example, Henry Ford's standardization of automobile parts was a game-changer that allowed for the mass production of goods to meet the demands of a growing customer base. Over time, incremental changes (such as the invention of computers) have brought additional levels of sophistication to SCM systems. However, for generations, SCM essentially remained a linear, siloed function that was managed by supply chain specialists.

The internet, technology innovation, and the explosion of the demand-driven global economy has changed all that. Today's supply chain is no

longer a linear entity. Rather, it's a complex collection of disparate networks that can be accessed 24 hours a day. At the center of these networks are consumers expecting their orders to be fulfilled—when they want them, the way they want them. Today's supply chain is broad, deep, and continually evolving, which means that it must be agile to be effective. In the past, supply chains met enterprise and customer needs through a beginning-to-end model that was largely unaffected by change. Consumers now have multiple choices in how they purchase products—in stores, online, and more. They've also come to expect increasing levels of customization. An agile supply chain can deliver on those expectations.

Commonly accepted definitions of supply-chain management include:

- The management of upstream and downstream value-added flows of materials, final goods, and related information among suppliers, companies, resellers, and final consumers.
- The systematic, strategic coordination of traditional business functions and tactics across all business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.
- The integration of key business processes across the supply chain for the purpose of creating value for customers and stakeholders.
- According to the Council of Supply Chain Management Professionals (CSCMP), supply-chain management encompasses the planning and management of all activities involved in sourcing, procurement, conversion, and logistics management. It also includes coordination and collaboration with channel partners, which may be suppliers, intermediaries, third-party service providers, or customers. Supply-chain management integrates supply and demand management within and across companies. More recently, the loosely coupled, self-organizing network of businesses that cooperate to provide product and service offerings has been called the *Extended Enterprise*.

2.2 INNOVATION

- Business innovation is when an organisation introduces new processes, services, or products to affect positive change in their business.
- This can include improving existing methods or practices, or starting from scratch. Ultimately the goal is to reinvigorate a business, creating new value and boosting growth and/or productivity.
- Business innovation matters for one simple reason: value.
- In order for your business to thrive, it is crucial to be continually innovating and improving.

- Successful business innovation means finding new revenue opportunities, optimising existing channels and, ultimately, generating higher profits.
- It should also give companies an advantage over their competitors.

Innovation can greatly impact supply chain performance. Here are five aspects of the supply chain that can be innovated to meet consumers' needs and save on costs:

1. Design for Manufacture:

Design the product to make it easy to produce, thereby reducing the costs of manufacturing.

2. Design for Assembly:

Design the product to minimize the number of components, easing the assembly process. Often, this results in building subsystems that are easier to put together.

3. Design for Product Serviceability:

Design the product for ease of assembly, disassembly and component reuse. These products are often easier to repair, compared to products that are assembled with bigger components, making individual parts more difficult to access.

4. Design for Six Sigma:

Design the product to eliminate failures, improve consistency and reduce costs. For example, an appliance manufacturer decides to use one type of electric cord – instead of a dozen types – across all of its products. Standardizing parts throughout the supply chain is a good example of design for Six Sigma.

5. Design for Environment:

Design the product to reduce its environmental impact throughout its lifecycle. This might be accomplished through less packaging, a more efficient supply chain or by recycling waste along the way.

2.3 FORECASTING

- Forecasting is the process of making predictions based on past and present data. Later these can be compared (resolved) against what happens.
- For example, a company might estimate their revenue in the next year, then compare it against the actual results. Prediction is a similar, but more general term.
- Forecasting might refer to specific formal statistical methods employing time series, cross-sectional or longitudinal data, or

alternatively to less formal judgmental methods or the process of prediction and resolution itself.

- Usage can differ between areas of application: for example, in hydrology the terms "forecast" and "forecasting" are sometimes reserved for estimates of values at certain specific future times, while the term "prediction" is used for more general estimates, such as the number of times floods will occur over a long period.
- Risk and uncertainty are central to forecasting and prediction; it is generally considered good practice to indicate the degree of uncertainty attaching to forecasts.
- In any case, the data must be up to date in order for the forecast to be as accurate as possible. In some cases the data used to predict the variable of interest is itself forecast.
- Data-driven forecasting provides more accurate predictions, but qualitative data also plays a significant role in supply chain forecasting and has proven to be just as effective.
- In many cases, ecommerce brands use a combination of both quantitative and qualitative forecasting methods to get as close to accurate predictions as possible.
- However, qualitative forecasting methods come in handy when there is a lack of data. Oftentimes, new businesses or innovative products rely on qualitative forecasting methods to make predictions.

Here are the most common qualitative forecasting methods used in ecommerce supply chain forecasting.

1. Market research:

Market research is a best practice for any business, whether it's selling a product or even a service.

For ecommerce sales, market research can be used to predict supply and demand, and help determine whether or not there is strong demand for a product that will support profit goals.

Market research can be executed internally by marketing or sales experts, or businesses can hire a third-party that specialize in market research.

There are different tactics used, from developing stakeholder surveys, conducting a thorough competitive analysis, or even interviewing experts in a specific field or industry.

2. Delphi method:

The Delphi method consists of market orientation and judgments within a small group of experts or advisors, which is then sorted, grouped, and analyzed by third-party experts.

The opinions of the experts are gathered individually to avoid the influence of others' options, which differs from a panel discussion or focus group. The gathering of opinions is outsourced to a third-party, which analyzes the opinions and information shared.

Once reviewed closely, the information is then summarized with an emphasis on different patterns or trends before handing the findings over to the business to review.

This method has proved effective and dependable for long-term forecasting.

3. Historical analysis:

Historical analysis uses the sales history of a product having a parallel relationship with a present product to predict future sales.

It can be utilized to predict the market's response to a new product or product line. For instance, if you sell vacuums, you would look at past performance on your highest selling vacuum models. Then, you would compare whether or not the features for the new vacuum are similar yet offer something new and improved in terms of settings and options.

Historical data can also be collected by looking at your competition's high-selling products and comparing similar products in your line to determine demand when possible.

4. Panel consensus:

The panel consensus method brings together members of a business across all levels to establish its forecast. It is an open process that allows all the participants to express their opinions and predictions based on what they know.

For example, you could work with your ecommerce customer service team to identify which products are being returned most often and why, or work with your sales team to get insights on what customers are asking for.

2.4 SUPPLY CHAIN INTERMEDIARIES

Intermediaries or middlemen reference the groups that work between farmers, processors, distributors and retailers and fulfil a variety of connecting and facilitating roles. These groups usually take the name of wholesaler, trader, distributor, importer or broker. *Producers Market is not against intermediaries.* In fact, there are many examples out there of value chains that require intermediary roles to facilitate farmers' access to local, regional or diverse market channels. Intermediaries in the supply chain can take risks, provide financing, set up sales, and manage complex relationships with downstream buyers, distributors, and other stakeholders.

2.4.1 Types:

There are four commonly known types of intermediaries, namely marketing agents, wholesalers, distributors, and retailers.

Marketing Agents:

Marketing agents, sometimes also known as brokers, are private individuals or firms that facilitate the selling of a product. They usually act as marketers or representatives on behalf of the sellers and don't actually own the product that is being sold. The role of these agents can be better understood by observing the role of a real estate broker. Such intermediaries are paid a cut from the transaction, and they act only to connect the buyer to the seller.

Marketing agents are not only limited to the field of real estate. Their services are commonly used across the international trade scene, particularly in travel services. When companies cannot reach the desired customers directly, they employ a marketing agency to help them make sales.

Wholesalers:

A wholesaler buys goods in bulk from the producer and then sells them to retailers in smaller quantities, but these quantities are still quite large for the individual consumers. The wholesale business works on the simple principle that bulk buying results in a lower per-unit cost. A wholesaler buys goods in bulk from a factory at cheaper rates and sells them to retailers at a higher one, the cost difference constitutes the wholesaler's profit. For instance, a wholesaler purchases 5000 units of a product from a producer at $1 each. A retailer only needs 500 pieces at a time, but they'll purchase it at $1.25 per unit from the wholesaler.

Wholesalers are fully independent intermediaries purchasing and selling all kinds of products. They have no associations with particular companies. However, it's up to the wholesaler to choose whether they deal in a wide range of products or focus on a specific niche.

A key point about wholesalers is that they buy in bulk and sell in bulk, only that their selling quantities are lesser than buying quantities. Rarely do wholesalers sell directly to end consumers unless they require an unusually large amount of goods.

Distributors:

A distributor works much in the same way as a wholesaler. The only difference is that while a wholesaler does not have any association with producers, a distributor aims to promote and sell the goods from a specific producer only.

It could be said the distributor is a hybrid of a wholesaler and a marketing agent. That is, they're hired to market a company's products and are paid a

commission for the sales they make. But their mode of operation is in bulk, just like a wholesaler.

Retailers:

The retailer is the last intermediary link in the supply chain that leads up to the consumer. These are the individuals or firms that customers go to buy products for day-to-day use. Retailers source large quantities of goods from wholesalers and sell them to customers in whatever quantity the average person buys a specific good.

Yet again, the sequence of increasing per-unit costs continues as the retailer sells each unit at a higher price to the customers. The retail business is all about advertising products to the wider population and making it easier for them to buy conveniently.

2.4.2 Channels of Distribution for Industrial goods:

A distribution channel is a chain of businesses or intermediaries through which a goo**d** or service passes until it reaches the final buyer or the end consumer. Distribution channels can include wholesalers, retailers, distributors, and even the internet.

A distribution channel is a path by which all goods and services must travel to arrive at the intended consumer. Conversely, it also describes the pathway payments make from the end consumer to the original vendor. Distribution channels can be short or long, and depend on the number of intermediaries required to deliver a product or service.

1. The first channel is the longest because it includes all four: producer, wholesaler, retailer, and consumer. The wine and adult beverage industry is a perfect example of this long distribution channel. In this industry—thanks to laws born out of prohibition—a winery cannot sell directly to a retailer. It operates in the three-tier system, meaning the law requires the winery to first sell its product to a wholesaler who then sells to a retailer. The retailer then sells the product to the end consumer.

2. The second channel cuts out the wholesaler—where the producer sells directly to a retailer who sells the product to the end consumer. This means the second channel contains only one intermediary. Dell, for example, is large enough to sell its products directly to reputable retailers such as Best Buy.

3. The third and final channel is a direct-to-consumer model where the producer sells its product directly to the end consumer. Amazon, which uses its own platform to sell Kindles to its customers, is an example of a direct model. This is the shortest distribution channel possible, cutting out both the wholesaler and the retailer.

4. Manufacturer to industrial customers:

This is a common channel for expensive industrial products like heavy equipment and machines. There needs to be a close relationship between the manufacturer and the customer, because the product affects the operations of the buyer. The seller has to participate in many activities like installation, commissioning, quality control and maintenance jointly with the buyer. The seller is responsible for many aspects of the operations of the product long after the product is sold. The nature of the product requires a continuing relationship between the seller and the buyer. The large size of the order makes direct selling and distribution economical.

5. Manufacturer to agent to industrial customer:

A company that sells industrial products can employ the services of an agent who may sell a range of products from several producers on a commission basis. Such an arrangement spreads selling costs and is beneficial to companies who do not have the resources to set up their oThe arrangement allows the seller to reach a large number of customers without having to invest in a sales team. But the company does not have much control over the agent, who does not devote the same amount of time and attention as a company's dedicated sales team.

6. Manufacturer to distributor to industrial customer:

For less expensive, more frequently purchased products, distributors are used. The company has both internal and field sales staff. Internal staff deals with customer and distributor generated enquiries and order placing, order follow-up and checking inventory levels. Outside sales staff are proactive. They find new customers, get product specifications, distribute catalogues and gather market information. They also visit distributors to address their problems and keep them motivated to sell the company's products. Distributors enable customers to buy small quantities locally.

7. Manufacturer to agent to distributor to industrial customers:

The manufacturer employs an agent rather than a dedicated sales force to serve distributors mainly because it is less expensive to do so. The agent may sell the goods of several suppliers to an industrial distributor, who further sells it to the business user. This type of channel may be required when business customers require goods rapidly, and when an industrial distributor can provide storage facilities.

2.4.3 Channels of distribution for consumer goods:

Manufacturers and industrial customers interact extensively during the buying process, and even afterwards, as most industrial products need to be routinely serviced. Consumer channels are normally longer because a large number of geographically dispersed customers have to be reached. The consumers buy in small quantities. The information needed to arrive at a purchase decision is limited because the products are not very sophisticated.

Manufacturers may reach out to consumers either directly, i.e., without using distribution channels, or by use.

1. Manufacturer to consumer:

Direct marketing includes use of personal selling, direct mail, telephone selling and internet. Avon cosmetics, Tupperware, Aqua guard and Amazon.com are examples of companies engaged primarily in direct marketing. The company contacts customers directly through salespersons, mail, telephone, or internet and makes sales. The products are sent directly to customers by the manufacturers.

2. Manufacturer to retailer to consumer:

Retailers have grown in size. Growth in retailer size means that it has become economic for manufacturers to supply directly to retailers rather than through wholesalers. Supermarket chains and corporate retailers exercise considerable power over manufacturers because of their enormous buying capabilities. Wal-Mart uses its enormous retail sales to pressurize manufacturers to supply products at frequent intervals directly to their store at concessional prices.

3. Manufacturer to wholesaler to retailer to consumer:

For small retailers with limited order quantities the use of wholesalers makes economic sense. Wholesalers buy in bulk from producers and sell smaller quantities to numerous retailers. But large retailers in some markets have the power to buy directly from manufacturers and thus cut out the wholesalers. These big retailers are also able to sell at a cheaper rate to consumers than retailers who buy from the wholesaler. Wholesalers dominate where retail oligopolies or monopolies are not dominant.

4. Manufacturer to agent to wholesaler to retailer to consumers:

A company uses this channel when it enters foreign markets. It does not have enough sales to warrant the setting up of a sales and distribution infrastructure, and therefore, it delegates the task of selling its product to an agent who does not take title to the goods. The agent contacts wholesalers in the foreign market and receives commission on sales.

Companies want to sell to a larger number of customers, and hence are increasingly using multiple channels to distribute their products. A company's product may be found in a company-owned store, an exclusive store, a multi-brand store and a discount store simultaneously. Companies have realized that all customers of a product do not buy from the same retailer.

2.4.4 Channel of distribution at service level:

1. Direct Sales Method:

Some of the best examples of distribution channels in marketing are direct sales, which enable you to contact customers and prospects, without using

an intermediary. Direct sales involve personal visits, mail order and online solicitation such as newsletters and email subscription. It gives you complete control over how you present your offers and the prices you can offer to your customers. Direct interaction means direct feedback, which lets you adjust your marketing strategy accordingly.

2. Virtual Service Distribution:

One of the newest examples of distribution channels in marketing is offering virtual service. For example, a sales consultant could offer his services through a combination of phone, email, or video conferences that would make use of software available on cloud platforms. Remote service delivery is also available to artists and writers who create content on a freelance basis. For example, if you're a website content writer, you can create content for clients and deliver them on platforms such as Basecamp, which enable you to post content and maintain milestones without ever having to speak to your clients. By exclusively distributing your services online, you can save the costs of owning an office that requires a monthly rental payment for space.

3. Agents or Referrals:

Using an agent or a referral is one of the best examples that channels of distribution are different for different products. Let's say that you make a living as a marketing guru who attends conferences and training sessions. However, you may not enjoy the marketing effort it takes to gain profitable clients. You can take advantage of professional agents whose job is to find work that matches your talents. These agents would take a commission off the work you book, and can even keep your name relevant within the industry through marketing. You can also take advantage of referrals through industry professionals. For example, if you're a wedding planner, you could establish a referral program with a wedding photographer or a wedding gown boutique in which you offer cross-promotions that benefit both your service businesses.

4. Distribution Through Publication:

Many service customers have become used to the proliferation of publications that provides them with exactly what they need. In an on-demand world, for example, you can deliver your service through a blog that amplifies and explains various services that you offer, a website that not only sells your service but also offers written and visual content that answers questions and concerns related to your service, or an e-book that customers can order directly online. Keeping in mind that channels of distribution are different for different products, you may choose to monetize your publications or offer them as an incentive for your customers to buy a service. For example, if you own a customer-relationship management software company, you may choose to offer a specialized white paper about customer service marketing that prospects can download off your website. Once they download that white paper, you could offer a discount for them to purchase your software, or offer a free 7-day trial.

5. Service provider to consumer or industrial customer:

Close relationship between service provider and customer means that service supply has to be direct, for instance, healthcare. The service provider operates several outlets to reach out to the final consumer or to the industrial buyer. Many service providers such as banks, retail outlets, service centers operate via this distribution channel.

6. Service provider to agent to consumer or industrial customer:

Agents are used when the service provider is geographically away from customers and when it is not economical for the provider to establish its own local sales team. For instance, many financial institutions are using this distribution channel to cross sell their services to customers by using a database of existing or potential customers.

7. Service provider via internet to consumer or industrial customer:

Increasingly, services like music, software solutions and financial information are being distributed via the internet. This distribution channel is successful in case of products which can be downloaded. It is a very useful channel for information products. Nowadays, e-tickets have become very popular.

2.4.5 Factors for selection of suitable channels:

Various constituents of the marketing mix like promotion etc., are closely related to the channels of distribution. A wrong choice of distribution channel ultimately increases the price of the product. Deciding a proper channel of distribution is not an easy task. It involves a careful study and consideration of many factors stated below. Some of the factors to consider while selecting a channel of distribution are: (1) The Nature of the Product (2) The Nature of the market (3) The Nature of Middlemen (4) The nature and size of the manufacturing unit (5) Government Regulations and Policies and (6) Competition.

1) The Nature of the Product:

These factors include physical characteristics of a product and their impact on the selection of a particular channel of distribution.

Various factors under this category are:

(a) Perishability:

Products which are perishable in nature are distributed by employing a shorter channel of distribution so that goods could be delivered to the consumers without delay. Delay in distribution of these products will deteriorate their quality.

(b) Size and weight of product:

Bulky and heavy products like coal and food grains etc. are directly distributed to the users involving heavy transportation costs. In order to minimise these costs a short and direct distribution channel is suitable.

(c) Products with lesser:

Unit value and high turnover are distributed by employing longer channels of distribution. Household products like utensils, cloth, cosmetics etc. take a longer time to reach the consumers. On the other hand, products like jewellery having high product value are directly sold to the consumers by the jewellers.

(d) Standardisation:

Products of standard size and quality usually take longer by adopting longer channels of distribution. For example, machine tools and automobile products which are of standard size reach the consumer through the wholesalers and retailers. Un-standardised articles take less time and pass-through shorter channels of distribution.

(e) Technical Nature of Products:

Industrial products which are highly technical in nature are usually distributed directly to the industrial users and take lesser time and adopt shorter channels of distribution. In this case after sales service and technical advice is provided by the manufacturer to the consumers.

On the other hand, consumer products of technical nature are usually sold through wholesalers and retailers. In this manner a longer channel of distribution is employed for their sales. After sales services are provided by the wholesalers and retailers. Examples of such products are televisions, scooters, refrigerators, etc.

(f) Product Lines:

A manufacturer producing different products in the same lines sells directly or through retailers and less time is consumed in their distribution. For example, in automobile rubber products this practice is followed. On the other hand, a manufacturer dealing only in one item appoints sole selling agents, wholesalers and retailers for selling the product. For example, in the case of ‘Vanaspati Ghee’, a longer distribution channel is undertaken.

2) The Nature of the market:

This is another factor influencing the choice of a proper channel of distribution. In the words of Lazo and Corbin “Marketing managements select channels on the basis of customer wants-how, where and under what circumstances. The number of buyers of the product affects the choice of a f channel of distribution.

Following factors are considered in this regard:

(a) Consumer of industrial market:

In the case of industrial markets, the number of buyers is less; a shorter channel of distribution can be adopted. These buyers usually directly purchase from the manufacturers. Marketing intermediaries are not needed in this case.

But in the case of consumer markets, where there are a large number of buyers, a longer channel of distribution is employed. Distribution process cannot be effectively carried out without the services of wholesalers and retailers.

(b) Number of prospective buyers:

If the number of buyers is likely to be more, the distribution channel will be long. On the other hand, if the number of consumers is expected to be less, the manufacturer can effectively sell directly to the consumers by appointing salesmen.

(c) Size of the order:

If the size of the order placed by the customers is big, direct selling can be undertaken by the manufacturer as in the case of industrial goods. But where the size of the order is small, middlemen are appointed to distribute the products.

(d) Geographic concentration of market:

Where the customers are concentrated at one particular place or market, the distribution channel will be short and the manufacturer can directly supply the goods in that area by opening his own shops or sales depot. In cases where buyers are widely scattered, it is very difficult for the manufacturer to establish a direct link with the consumers, services of wholesalers and retailers will be used.

(e) Buying habits of customers:

This includes tastes, preferences, likes and dislikes of customers. Customers also expect certain services like credit and personal attention and after sales services etc. All these factors greatly influence the choice of distribution channel.

3) The Nature of Middlemen:

Marketing intermediaries are vital components in the distribution of goods. They greatly influence the marketing of goods.

Important factors relating to the selection of a particular middleman are explained as under:

(a) Cost of distribution of goods:

Cost of distribution through middlemen is one of the main considerations to be taken into account by the manufacturer. Higher cost of distribution will result in the increased cost of product. The manufacturer should select the most economical distribution channel.

In finalising the channel of distribution, services provided by the intermediaries must be kept in mind. It may be pointed out that the manufacturer can select an expensive marketing intermediary because that may ensure various marketing services which cannot be offered by others.

(b) Availability of desired middlemen:

Sometimes desired middlemen may not be available for the distribution of goods. They may be busy dealing with competitive products. Under such circumstances the manufacturer has to make his own arrangements by opening his branches or sales depots to distribute the goods to the consumers.

(c) Unsuitable marketing policies for middlemen:

The marketing policies of the manufacturer may not be welcomed by the middlemen the terms and conditions may not favour the middlemen. For example, some wholesalers or retailers would like to act as sole selling agents for the product in a particular area or region.

(d) Services provided by middlemen:

The manufacturer should select those middlemen who provide various marketing services viz, storage, credit and packing etc. At the same time the middlemen should ensure various services to customers.

(e) Ensuring greater volume of sales:

A manufacturer would like to appoint middlemen who assure greater sales volume over the long run.

(f) Reputation and financial soundness:

In appointing a middleman, the manufacturer must take into consideration the financial stability and reputation of the middleman. A financially sound middleman can provide credit facilities to customers and make prompt payment to the manufacturer.

4) The nature and size of the manufacturing unit:

The nature and size of the manufacturing unit has a great impact on the selection of a distribution channel.

The various considerations in this regard are as follows:

(A) Manufacturer Reputation and Financial Stability:

Reputed and financially sound manufacturing concerns can easily engage middlemen as compared to lesser reputed and newly established units. Usually, a manufacturing unit having a sound financial base can easily distribute the goods without appointing middlemen by opening their own sales depots and branches. A financially weaker unit cannot operate without the help of middlemen.

(B) Ability and Experience of the Undertaking:

Industrial undertakings having ample marketing ability and experience can effectively manage their distribution activities themselves. They have lesser dependence on intermediaries. On the other hand, marketing units possessing lesser marketing ability and experience depend more on middlemen for the distribution of goods.

(C) Desire for Control of Channel:

A manufacturer may resort to a shorter distribution channel in order to exercise effective control over distribution. This is suitable in case of perishable goods and is helpful in establishing direct link between the manufacturer and the consumer. The cost of distribution may be more by adopting such a channel of distribution.

(D) Industrial Conventions:

Industrial conventions followed influence the selection of distribution channel. If a particular mode of distribution is adopted in an industry, the same will be followed by every manufacturing unit in that industry in distribution their products.

(E) Services Provided By the Manufacturers:

The selection of marketing intermediaries is also influenced by various services provided by the manufacturer. These services include extensive advertisement for the product, after sales services and facilities of credit. The manufacturers providing these services can easily avail the services of reputed retailers and wholesalers.

5) Government Regulations and Policies:

Government policies and regulations also influence the choice of distribution channels. The Government may impose certain restrictions on the wholesale trade of a particular product and takeover the distribution of certain products. All these restrictions have a direct impact in selecting the channel of distribution.

6) Competition:

The nature and extent of competition prevalent in an industry is another detrimental consideration in selecting a distribution channel. Different manufacturers producing similar products may employ the same channels of distribution.

2.5 SUMMARY

A Supply Chain encompasses all activities associated with the flow and transformation of goods and services from the raw materials stage through to the end-user, as well as the associated information flows. The management of supply chain requires effort to integrate the processes in the supply chain. To obtain a valuable chain with satisfied customers it is necessary to have an effective coordination and integration of materials throughout the supply chain. Simultaneously, attention can be paid to reduction of costs. Supply chain management (SCM) is the centralized management of the flow of goods and services and includes all processes that transform raw materials into final products. By managing the supply chain, companies can cut excess costs and deliver products to the consumer faster.

2.6 EXERCISE

A. Multiple Choice Questions:

1. At ___ level, the decisions are made with long-term objectives. (Pick the right option)

   a) Performance

   b) Strategic

   c) Tactical

   d) Operational

Ans. b) Strategic

2. ___ modes of transportation suit high quantity shipments. (Pick the right option)

   a) Air transportation

   b) Water transportation

   c) Rail transportation

   d) Intermodal transportation

Ans. b) Water transportation

3. Which of the following is the cost involved in holding goods in a warehouse?

   a) Facility cost

   b) Processing cost

   c) Inventory cost

   d) Transportation cost

Ans. c) Inventory cost

4. Which of the following are true with respect to traffic assignment?

   a) Estimating the volume of traffic on a network

   b) Estimating the turning movements at intersections

   c) Both a) and b)

   d) None of the above

Ans. c) Both a) and b)

5. ___ modes of transportation best suit time-sensitive and emergency shipments. (Pick the right option)

   a) Air

   b) Truck

   c) Pipeline

   d) Water transportation

Ans. a) Air

B. True/False:

1. A company's supply chain involves the flow of materials and information from suppliers, through production, to the end users.

Ans. TRUE

2. In supply chain organizations, functions must operate independently of each other.

Ans. FALSE

3. CPFR is the use of e-mail between vendors and purchasing to place orders.

Ans. FALSE

4. Distribution requirements planning (DRP) is an expanded concept of MRP which incorporates multinational inventory management.

Ans. FALSE

5. Every business organization is part of at least one supply chain.

Ans. TRUE

C. Short Notes:

1. Explain Principles of SCM which provide better perspective to business growth.
2. Explain the needs of SCM in contemporary business.
3. Explain channels for distribution of goods at consumer level.
4. Explain channels for distribution of goods at service level.
5. Explain innovation management on SCM.

D. Answer in brief:

1. Explain in detail forecasting in SCM and the need for the same in business.
2. Explain supply chain intermediaries in SCM in detail.
3. Explain the factors for selecting a suitable channel in a business scenario.
4. Explain the role of supply chain management to satisfy customer needs on ontime delivery.
5. Explain the channels of distribution of industrial goods.

*****

MODULE - II

3

PERSPECTIVES OF SUPPLY CHAIN MANAGEMENT - I

Unit Structure

3.0 OBJECTIVES

1. To understand the Global Perspective of SCM
2. Understanding measures to evaluate efficiency in global supply chain management.
3. Understanding Different approaches in Global SCM
4. To understand global market forces
5. Identifying and understanding the form of network models

3.1 INTRODUCTION

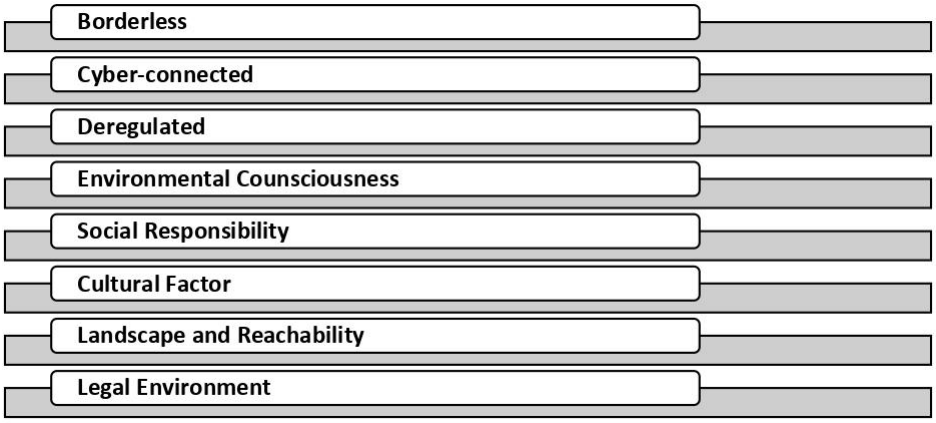
In the process of creating supply chains, globalization has raised risk while also providing enormous opportunities. Several supply chains have discovered that they are unprepared for the elevated risk that has come along with globalization. Therefore, when planning long-term strategies, managers must take both opportunities and uncertainty into consideration in the global network of supply chains. Managers address risk in this chapter and identify potential sources for it in global supply chains, describe the procedures used to assess network design decisions in the face of uncertainty and demonstrate how they influence global supply chain choices.

Because of the unstoppable expansion of global mass media, such as the Internet, TVs, radios, news media, and movies, our globe has effectively shrunk into a small global village, which is one of the causes of the global market convergence.

Going global makes perfect sense for businesses and their supply chains from an economic standpoint. They are only looking for growth chances by enlarging their markets to places where there are more opportunities for

profit-making as well as to areas where resources are less expensive to lower the expenses associated with the entire supply chain. Interorganizational partnerships at the cutting edge of technology and market presence in marketplaces that are primarily non-homogeneous can also be significant forces at work.

3.1.1 Characteristics of Global Supply Chain:



1. Borderless:

The evolution of the supply chain is no longer constrained by national boundaries in terms of sourcing, marketing, manufacturing, and delivery. The obvious material flows of the globalized supply chain are a very small part of this phenomenon without borders. In terms of intangible aspects of global development like brands, services, technical collaboration, and funding, it is as strongly manifested. Borders between countries are much less restrictive now than they always were. It might be argued that technological advancements, regional and bilateral trade agreements, and facilitation by international organizations like the WTO, WB, GATT, OECD, OPEC, and so on are to blame for this.

2. Cyber-connected:

The global business environment has evolved into an interconnected one market through primary and increasingly significant cyber links rather than a collection of numerous indigenous independent local marketplaces. Because of this, the interconnectedness of our global corporate environment is essentially "invisible," spontaneous, less under our control, and unquestionably irreversible. Without cyber technology, which makes it possible for huge volumes of data to be sent very fast and reliably, globally dispersed international supply chains would not be feasible or even understandable.

3. Deregulated:

Trade restrictions have been eliminated or at least greatly reduced globally. A level playing field on the international stage has been created, albeit imperfectly, through economic and free-trade zones around the world. The rules and regulations that impede the operation of market

forces are made simpler and eliminated through deregulatory measures. More specifically, it has focused on promoting international trade and the expansion of the world economy. The European Union, the zone covered by the North American Free Trade Agreement, the Association of Southeast Asian Nations, and others are examples of typical deregulated zones. Deregulation moves society closer to a laissez-faire and free market economy by reducing the amount of government control over how business is conducted.

4. Environmental Concerns:

Concerns about the damaging effects of business and economic development on the environment have grown over the past ten years. The evolution of today's global supply chain is significantly influenced by the global drive for greener and more environmentally friendly corporate practices. Additionally, this is influenced by the decisions made by legislators and regulatory bodies like the Environmental Protection Agency (EPA). Leading economies' governments are getting more active in promoting green business practices and formalizing more legislation and regulation to impose on businesses in the future. One important performance indicator of the sustainability of many international supply chains is the carbon footprint.

5. Social Responsibility:

Additionally, there is a broader socio economic consequence. Fairtrade and business ethics are increasingly being used as benchmarks for measuring a company's social responsibility and as deciding elements in business decisions. The consumer's perception of a company's brand is shattered by social pressure. A sizable portion of consumers has started basing their purchases on the supply chain's moral standards and social responsibilities. Another crucial business environmental issue that can make or fail a corporation is global corporate citizenship and social responsibility.

6. Socio-cultural Factor:

“Culture plays an integral part in the decision-making process of operations and supply chain managers”. Strategic decisions are not always based on economic factors, according to the Behavioral Theory of the Firm approach, an economics-based concept for understanding the motives of a corporation. Instead, strategic decisions are dependent on managers' and decision-makers levels of aspiration. The research of Weingarten and Durach strengthens and expands this behavioral theory and includes national culture as an additional external force.

7. Landscape and Reachability:

There doesn't appear to be a barrier due to time or location between providers and customers. Geographical restrictions still exist for some businesses, limiting their supply chain options and decisions. For instance, due to political and economic sanctions on Russia, a company in that

country could be unable to combine its supply chain with the supply networks of companies in the US. Since there is currently a trade war between China and the US, the same holds for businesses based in China. The most recent example of how geographic location might affect a decision to integrate supply chains comes from Huawei.

8. Legal Environment:

Legal and contractual risks frequently originate from disagreements about the terms of a contract, different interpretations of those terms, or noncompliance with those terms. Use or abuse of intellectual property can also be seen as a legal risk, especially when the prospect of patent infringement exists. In this category, lawbreaking and civil lawsuits are also acceptable.

Instilling a zero-tolerance mentality toward any illegal action and educating employees and management at all levels about the law are wise strategies for avoiding legal liability.

3.2 GLOBAL PERSPECTIVE

According to Slack and Lewis (2011), global supply entails the identification, evaluation, negotiation, and configuration of resources across multiple geographies. Companies are increasingly looking for suppliers in outlying areas. According to these authors, working with suppliers from low-cost countries has enabled many companies to save anywhere from 10% to 35% on costs. Given this scenario, global supply chain management (GSCM) is a major focus for many businesses and business schools today (MENTZER et al., 2007a).

Today's global supply chain practices face several issues that are directly related to market instability, economic downturns, and uncertain repossession phases. These issues can either negatively or positively affect how businesses manage their distribution systems, manufacturing systems, invoicing processes, and resource acquisition processes. Enterprises must improve their supply chain strategy to stay competitive in this challenging business environment because of the multiple elements that are emerging (Swartz, 2013).

3.2.1 Measuring the Value and Effectiveness of the Global Supply Chain Network:

The whole discussion is related to the problem of designing and implementing logistics-oriented performance measurement and control systems in the context of global supply chain management. Management and decision-makers can determine the effectiveness and potential of management initiatives with the use of performance measurement, which also helps them grasp the situation. Performance measuring also aids in focusing management efforts, updating corporate objectives, and re-engineering business procedures. The continual enhancement of SCM benefits from the use of SC performance measurement. The following

section will discuss the fundamental conceptual, instrumental, and application-related ideas of these control systems

1. Conceptual Aspects:

If a logistics performance describes the execution of a logistics process, it is considered process type related. It is directly concerned with the execution of transport, handling, storing, order processing, packaging, or signing process. When referring to the capacity throughput, intensity, number of process items, place, duration, and date of process execution, the demand for such a logistics performance can be captured in greater detail. An output- or results-oriented analysis of logistics performance focuses on the performed change of an object's time- or space-related characteristics. This could be a fulfilled delivery of a specific number of products to a specific customer. Finally, logistics performance is the outcome- or effect-related if it refers to the impact or benefit of a completed process on the customer. It thus concerns the delivery service, an important component of the marketing mix, and consists of at least the four components listed below.

A. Delivery time:

The time it takes between receiving a customer order and receiving the goods.

B. Delivery dependability:

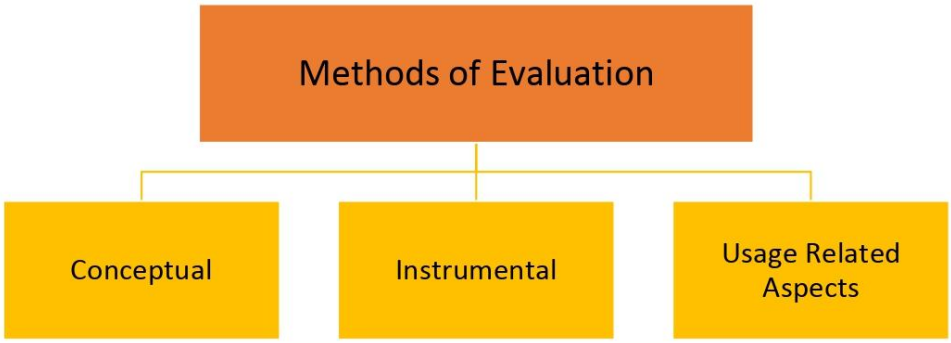
The ability to meet agreed-upon delivery dates.

C. Delivery constitution:

A constitution that specifies how far the delivery itself is a cause for complaint. It is determined by the accuracy of delivery in terms of type and quantity, as well as the state of delivery, which is determined by the extent to which the packing performs its security function.

D. Flexibility of delivery:

The ability to describe the extent to which the order processing system can meet specific customer demands.



Goals and functions of performance measurement:

Performance measurement in global supply chains aims to support problem-solving and decision-making processes by providing empirical information about supply chain processes. It simplifies and refines the communication of information about supply chain performance between people who are interested in the supply chain's value creation because it can make its processes and effects visible from various perspectives and provides the terms and results of measuring. As a result, it provides a foundation for assessing the consequences of supply chain decisions and their premises. It supports global supply chain planning, coordination, organisation, and control by constructing a transparent picture using relevant performance dimensions. The following functions can be distinguished in greater detail.

a. Provision of information and transparency

b. Support of monitoring and attention directing

c. Problem recognition and early warning

d. Analysis of cause-and-effect relationships

e. Support of control activities

f. Support of research and development activities

g. The basis is for the performance evaluation of managers and employees.

2. Instrumental Framework:

This fundamental concept can also be applied to performance measurement in the global supply chain, as demonstrated by Kaplan and Norton's balanced scorecard concept. The balanced scorecard is balanced in the manner that it combines multiple perspectives, dimensions, and measures into a single tool. Strategic and operational aspects can be balanced, as internal and external, financial and non-financial, cooperative and competitive, and integrated and non-integrated ones. The balanced scorecard approach to designing a performance measurement system corresponds to the critical success factor approach in essence.

3. Usage-Related Aspects:

The ability to use performance measures for management purposes is largely dependent on the user's thorough understanding of the process for which the measurement system must be designed. The measurement system can be used to operationalize and control critical success factors in a well-known process, or it can be used to investigate new, poorly understood problems. SIMONS distinguishes between a diagnostic and interactive use of performance measurement systems.

a. Diagnostic Use of Measures:

Diagnostic control systems are formal information systems that allow managers and employees to ensure that the goals that have been translated from strategy into concrete performance objectives are met. Diagnostic use of performance measurement systems in global supply chains is used to monitor the efficiency and effectiveness of supply chain processes by comparing actual values to defined standards and taking standardized corrective action in the event of deviations from the predetermined course.

This type of use, however, requires a thorough understanding of the process as well as the relevant data, alternatives, and cause-and-effect relationships of the problem. If one of these parameters is unclear or missing, using rigid, predetermined rules and programmes to answer a deviation is deceptive. In such cases, management lacks the necessary knowledge about how to improve performance and questions whether the previously defined measures and objectives can still be used. The mode of use must then be changed from exploitative diagnostic use to more explorative interactive use.

b. Interactive Use of Measures:

In contrast to diagnostic control systems, interactive information systems are those formal information systems used by managers and employees to deal with new, unique, and complex situations. The interactive use of performance measurement systems in global supply chains allows for an examination of the status quo and its underlying assumptions. Furthermore, new possible developments and action plans utilizing the measures to engage in a creative dialogue between managers and employees must be investigated.

This interactive use does not necessitate the addition of new performance metrics. Rather, the system should be highly flexible, allowing users to question the situation's data, premises, and action plans, as well as create new scenarios about possible cause-and-effect relationships and new courses of action. Employees' active participation can not only enrich the required information base but also improve their motivation.

	Diagnostic Use	Interactive Use
Process-type	Routine process: Existence of sufficient problem-solving - knowledge	Innovative process: Incomplete or unknown problem-solving-knowledge
Process-planning	Analytical:Translating strategies into action, i.e. goals and measures	Creative, dialogue-oriented: Search for new goals and action-concepts
Process-coordination	Formal and standardised	Informal, self-coordinating
Process-control	Measurement of actual values, comparison with standards and initiation of corrective action	Trigger debates between management and employees, support learning processes.

Source: Diagnostic and interactive use of performance measurement systems in global supply hains (SIMONS1995, p.124)

3.2.2 Method and Criteria for Developing an Integrated Performance Measurement System:

Supply chain processes are created along the entire value chain, from suppliers, logistics service providers, and manufacturers to retailers and consumers. The division of labour within and between these supply chain network members creates functional and organisational interfaces that organizationally separate interdependent operational and logistical activities.

The development process of a meaningful performance measurement system can be described by the following steps:

a. Problem recognition

b. Goal setting for the performance measurement system

c. Determination of the supply chain processor, respectively the object of measurement

d. Deduction of performance perspectives, dimensions and measures from the strategy (top-down) and the operational processes (bottom-up)

e. Formulation of hypotheses about cause-and-effect-relationships to select and assemble the relevant performance measures

f. Determination of the measuring modalities (techniques, periodicity, addressees etc.) and the documentation

g. Adaptation of the incentive systems

h. Continuous examination of the validity and further development or reconstruction of the performance measurement system.

These steps should be guided by some normative criteria that can assist the manager or employee in building the performance measurement system as well as evaluating its current state and potential alternatives. The following section will compile these requirements.

3.2.3 Criteria for an Active Management of Performance Measurement Systems:

The single performance measures are the foundation of any global supply chain performance measurement system. The problem is not so much the creation of new metrics as it is the fact that theory and practice have already produced many of them. Rather, active management of performance measurement systems should attempt to evaluate and consistently arrange the measures, keeping in mind that organizations frequently have a large amount of data and information for these purposes. The criteria in the table can be helpful to evaluate the quality of supply chain performance metrics.

Criterion	Explanation
Behavioural Soundness	The metric minimises incentives for counter-productive acts such as programme-playing and is presented in a useful form.
Compatibility	The metricis compatible with the existing information, material, cash flows and systems in the organisation.
Economy	The benefits of using the metric outweigh the cost of data collection, analysis, and reporting.
Integration	The metric includes all relevant aspects of the process and promotes coordination across functions and divisions.
Level of detail	The metric provides a sufficient degree of granularity or aggregation for the user.
Robustness	The metric is interpreted similarly by the users, is comparable across time, location, and organisations, and isrepeatable.
Usefulness	The metricis readily understandable by the decision maker and provides a guide for action to be taken.
Validity	The metric accurately captures the events and activities being measured and controls for any exogenous factors.

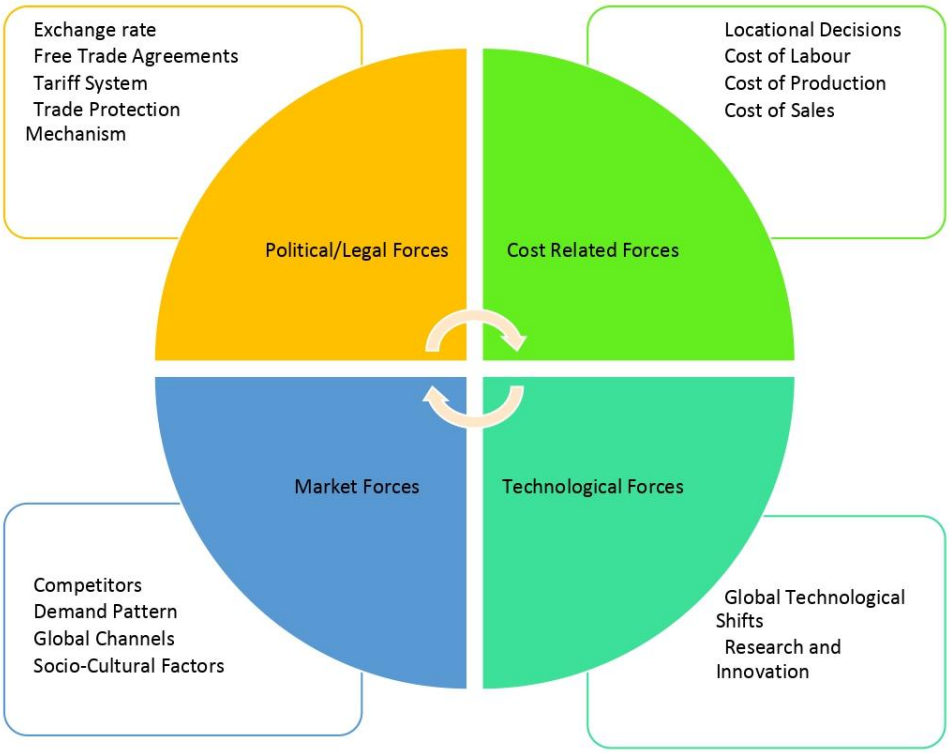
Source: Criteria for the qualities of supply chain performance metrics (CAPRICE/SHEFF1994, p.14)

3.2.4. Factors and Forces Affecting Global Supply Chain Management:

When discussing the globalization process, the most frequently mentioned market factor is the homogenization of customer needs. As a result, dispersed production facilities that consider a variety of regional differences are no longer required and are being replaced by fewer and larger production sites that take advantage of economies of scale.

A. Political and Legal Forces:

Political systems research is extensive and complex. A political system is a country's system of politics and government. It oversees a comprehensive set of rules, regulations, institutions, and attitudes. The philosophy of each political system on individual and group rights, as well as the role of government, is a key differentiator. The philosophy of each political system influences the policies that govern the local economy and business environment. Governments intervene in international trade to protect their country's economy and industry, as well as to promote and preserve their social, cultural, political, and economic structures and philosophies. Tariffs, subsidies, import quotas and VER, currency controls, local content requirements, antidumping rules, export financing, free-trade zones, and administrative policies are some of the key policy areas in which governments can create rules and regulations to control and manage the trade.



Governments have several key policy areas that can be used to create rules and regulations to control and manage the trade.

a. Tariffs:

Tariffs are taxes levied on imported goods. Tariffs are classified into two types: specific tariffs, which are levied as a flat fee, and ad valorem tariffs, which are calculated as a percentage of the value. Many governments continue to levy ad valorem tariffs to regulate imports and raise revenue.

b. Subsidies:

A subsidy is a government payment made to a producer. Subsidies can take the form of tax breaks or low-interest loans, both of which are common. Subsidies can also take the form of cash grants or government-equity participation, which are less common because they necessitate the use of government resources directly.

c. Free Trade Agreements:

Many countries establish free-trade zones in specific geographic areas. Tariffs, taxes, customs, procedures, and restrictions are reduced in these areas to encourage trade with other countries.

d. Trade Protection Mechanism:

Many countries still require that a certain percentage of a product or item be manufactured or "assembled" in their country. To conduct business in some countries, a local firm must be used as the domestic partner.

B. Cost-Related Factors:

Doing business abroad necessitates several different cost considerations than doing business at home. Aside from obvious costs like shipping and monitoring technology for its logistical operations, the company must also pay for costs associated with its marketing, finance, and economic divisions.

a. A Locational Decision:

The location of a facility has a significant impact on various types of costs. Direct, indirect, fixed, and variable costs are all included. The organisation strives to provide its customers with products at the lowest possible cost. As a result, industrialists are taking a strategic and logical approach to selecting the best location.

b. Cost of Labour:

As the economy begins to improve, increased demand will put additional strain on already stressed industries. Customers expect their local supermarket to have what they need in stock, but shelves will be empty more frequently. Suppliers will struggle to keep up with rising consumer product demand.

3.2.5 Global Market Forces:

Market Forces:

The rise and success of multinational corporations have already been mentioned. It is obvious that these companies, in the role of customers, are also globally present. The coordinated or even centralized purchase of materials or services for decentralized use is a characteristic of the global customer. Consider the global advertising industry. Most of their clients are expanding internationally and focus their advertising budgets on one or two globally present agencies. This pattern can also be seen in logistical service providers. Companies prefer dealing with fewer partners as logistics activities are increasingly outsourced. As a result, globally present logistics service providers have preferred partners of globally operating businesses. The globalization of customers is mirrored by the globalization of channels on the distribution side.

a. Competitive Forces:

The competitive environment is defined as the level of competition that a company faces. The Merriam-Webster dictionary defines business competition as "active demand by two or more organisms or kinds of organisms for some environmental resource in short supply." Competition in supply chain management refers to the match between demand and supply in a competitive environment.

b. Demand Pattern:

Demand pattern analysis is a new area of supply chain management (SCM) that analyses customer and demand data to better predict demand across multiple time horizons in a demand-driven value network.

c. Global Channel:

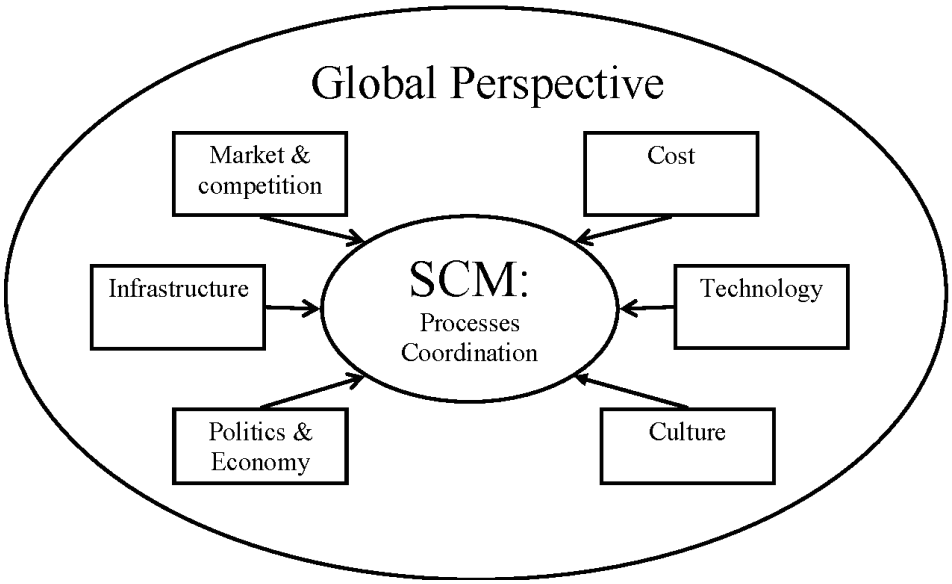
Top-performing supply chains share three characteristics. First off, they are quick to respond to sudden changes in demand or supply. Second, as market structures and environmental conditions change, they adapt. Third, they align the interests of all supply-chain network members to optimize performance.

d. Socio-Cultural Factors:

When developing and implementing a company's marketing strategy, social and cultural factors must be considered. These frequently linked but somewhat disparate factors have varying effects on consumer and buyer decisions. Customs, lifestyles, and values that define a society are examples of sociocultural factors. Aesthetics, education, language, law and politics, religion, social organizations, technology and material culture, values and attitudes are all examples of cultural aspects.

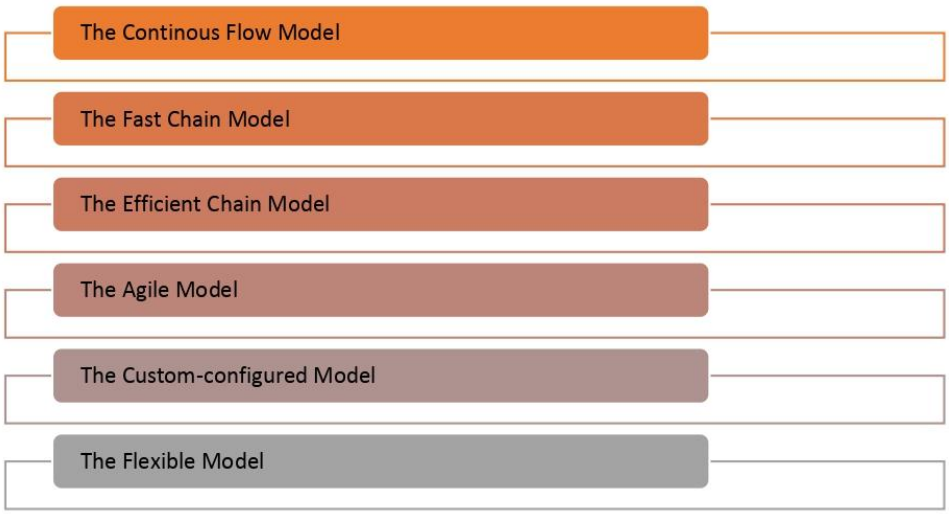
e. Technological Factors:

The application of information technology in supply chain management improves visibility and accountability. To improve overall production efficiency, a manufacturing company must have a clear view of the current stage of in-production products, anticipate any potential problems or delays, and be able to align production schedules accordingly.



3.2.6 Types of Global Supply Chain:

The truth is that every supply chain management philosophy involves aspects of responsiveness and efficiency. And when you think about it, that makes sense. Your supply chain won't be able to respond to a disturbance if it is exceedingly efficient. On the other side, the supply chain won't be very effective at producing a lot of volume if all it does is respond to individual or tiny requests.



The Continuous Flow Model:

The continuous flow approach is centered on productivity. It provides stability in settings with high traffic. The firms who consistently provide the same product with little design variation or adjustment are best suited for this traditional model. This type is excellent for manufacturing commodities. Low product prices indicate its high level of efficacy. Prices of raw materials serve as the foundation for manufacturing margins.

The Fast Chain Model:

The responsiveness of the fast chain concept is designed in. It's perfect for producers who often alter their product lineup. This style works best for trending goods with brief shelf lives. The manufacturer that can flood the market in this instance before the trend cycle is over is the winner.

The Efficient Chain Model:

In highly competitive businesses where end-to-end efficiency is the ultimate goal, the efficient chain model is appropriate. To adequately burden and sweat machinery assets, this approach primarily relies on production predictions.

The cost of raw materials and commodities has a significant role in the efficient model. Capacity issues are a problem for efficient chains in the post-pandemic era. Labor shortages, material shortages, and delays are the main causes of this.

The Agile Model:

The agile model is excellent for producers who deal in specialized items. This model has been precisely adjusted for production in small batches. Less automation and more skill are needed for that. And because of that extra value, companies utilizing this model may charge more for their products.

Businesses using an agile methodology can increase volume. But once the volume reaches a certain point, they frequently lose their competitive edge. Agile firms blast efficient-chain-model enterprises out of the water in terms of pricing at bigger volumes.

The Custom Configured Model:

The goal of the custom configuration model is to offer unique setups for production and assembly. This preparation period typically starts at the beginning of a more drawn-out production and assembly run process. For instance, some limited-production models or prototypes fall within custom-configured manufacturing.

The Flexible Model:

To achieve the best of all worlds, the flexible model. It can respond to peaks in volume demand. Businesses with flexible models, on the other hand, can adapt to and withstand periods of low or no demand. This design resembles a light switch.

3.2.7 forms of network in global supply chain

The supply chain network design determines its physical arrangement, design, structural layout, and infrastructure. The major decisions to be made here include the number, location, and size of manufacturing plants and warehouses, as well as the assignment of retail outlets to warehouses, among other things. Other major sourcing decisions are also made during this stage. The basic time horizon for planning is a few years.

Many important decisions encompassing long-term location, capacity, technology, and supplier selection must be made while considering the likely uncertainties present in market development, as well as changing economic and legal conditions. The development of multi-stage stochastic optimization methods required for decision support under demand, freight rate, and exchange rate uncertainty is the primary focus of supply chain network design. In this section, we will go over various strategies for studying uncertainty and scenario modelling.

A. Warehouse Location:

Companies that expand their branches into new locations require new storage facilities. The company is dealing with a warehouse location issue. Within the set of possible locations, the one with the lowest fixed and operational costs while meeting the required demand is chosen.

B. Traffic Network Design:

Cities' traffic is becoming more congested as their populations grow. Because of increased transportation demand, traffic networks must be expanded. Because budgets are usually limited, the main issue is deciding which projects should be built to improve traffic flow within a traffic network.

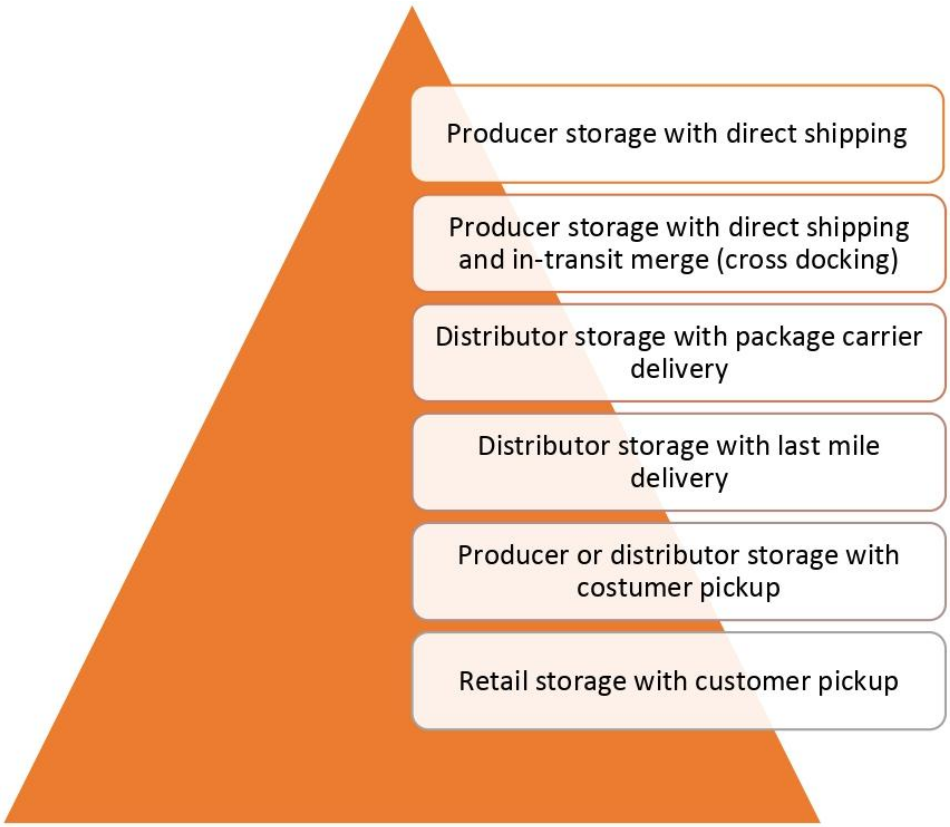
C. Reshoring:

This phenomenon has recently emerged as a result of rising costs and other factors. It is the process of returning outsourced products and services to the point where they were originally shipped. It describes the process of returning some or all production to its original location.

Network Models:

Supply chain networks exhibit various models that aid in understanding the various optimization methods used for studying uncertainty and

scenario modelling. As shown below, there are six distinct supply chain network models.



1. **Producer Storage with Direct Shipping:**

In this model, goods are transported directly from the manufacturer's starting point to the end customer's destination point, bypassing the retailer. The retailer accepts the order and initiates the delivery request. This is also known as drop-shipping because the product is delivered directly from the manufacturer's location to the customer's location.

2. **Producer storage with direct shipping and in-transit merge (cross-docking):**

It is like pure drop-shipping or moving, but the difference is that pieces of the order come from various locations and are merged into one so that the customer receives a single delivery.

3. **Distributor storage with package carrier delivery:**

When inventory is not owned by the manufacturers at the plants, but rather by merchants/retailers in intermediate warehouses, package carriers are used to ship goods from the intermediate location to the final customer.

4. **Distributor storage with last-mile delivery:**

When a merchant/retailer delivers the goods ordered by the customer to the customer's home rather than using a package carrier, this type occurs.

5. Producer or distributor storage with customer pickup:

The inventory is stored at the manufacturer's or producer's warehouse, but customers place their orders online or by phone and then come to pick-up points designated for collecting their orders.

6. Retail Storage with Customer Pickup:

This is mostly used when inventory is kept locally at retail stores; customers walk into the store or order something online or over the phone and pick it up at the store.

Customers' preferences are used to make distribution system decisions. This, in turn, affects the demand for the product or products as well as the cost of the distribution arrangement.

3.3 SUMMARY

Individual companies no longer compete as autonomous entities in today's globally competitive environment, but as supply-chain networks. It is increasingly suppliers-brand-company versus suppliers-brand-company rather than brand versus brand or company versus a company. In this new competitive world, the ability of management to integrate the company's intricate network of business relationships is increasingly important. Supply-chain management (SCM) allows you to capitalize on the synergy of intra- and inter-company integration and management. SCM is concerned with total business-process excellence and represents a new way of managing business and relationships with other supply chain members.

Raw material suppliers define one end of the supply chain in the traditional supply chain model. They were linked to manufacturers and distributors, who in turn were linked to retailers and end users. Although the customer is the source of profits in this "push" model, they are only one part of the equation. Customers, retailers, distributors, and manufacturers were all involved in the order and promotion process, which took time.

3.4 EXERCISE

1. Fill in the blanks:

a. At ___ level, the decisions are made with long-term objectives.

(Performance, Strategic, Tactical, Operational)

b. The initial stage of the supply chain process is the ……

(Sourcing stage, Organizing Stage, Planning Stage, Directing Stage)

c. In supply chain Management, after planning the next steps involves……

(Developing, Building a strong relationship, Sourcing, All the above)

d. …….. is the primary activity in the supply chain

(Demand Management, Supply Planning, Analytic workbench, all the above)

Answers: (1-B, 2- C, 3-D, 4-D)

2. True or False:

a. Mass transportation is expensive than transporting goods in small quantities.

b. Trip-related cost and quantity-related costs remain the same with all carriers.

c. Higher service levels and fast delivery cost more.

d. All-or-none assignment model deals with different paths for every O-D pair

e. As the degree of inventory aggregation increases, the cost of transportation goes up

Answers: (a- False, b-False, c-True, d-False, e- True)

3. Write short notes:

a. Global Supply chain

b. Factors affecting Global Networks

c. Characteristics of efficient network

d. Quality control

e. Global Market Forces

4. Answer in brief:

a. Explain the concept of global supply chain management

b. Explain the methods of measuring the efficiency and value of supply chain networks.

c. Write a brief note on forms of supply chain networks

3.5 REFERENCES

- Dubey, R., Singh, T., & Tiwari, S. (2012). Supply Chain Innovation is a Key to Superior Firm Performance an Insight from Indian Cement

Manufacturing. International Journal of Innovation Science, 4(4), pp. 217-230.

- Eng, T. Y. (2004), "The role of e-marketplaces in supply chain management", International Marketing Management, Volume 33, pp. 97-105.
- Feller, A., Shunk, D., &Callarman, T. (2006). Value chains versus supply chains. BP Trends, March, pp. 1-7.
- Giunipero C L. ET. al (2005), "A longitudinal examination of JIT purchasing practices", The International Journal of Logistics Management, Vol. 16 No. 1, pp. 51-70.
- Giunipero.L. &KetchenJr.D. (2004), "The intersection of strategic management and supply chain management", Industrial Marketing Management, 33, pp. 51– 56.
- Gunasekaran A. & McGaughey R. E. (2003) TQM Magazine Volume 15 · Number 6 pp. 361-363
- Halldorsson, A. (2002), "Third party logistics: a means to configure logistics resources and competencies", PhD Series No. 25.2002, Copenhagen Business School, Frederiksberg
- Lee, H. L., & Billington, C. (1993). Material management in decentralized supply chains. Operations research, 41(5), 835-847.
- Hoejmose, S., Brammer, S. and Millington, A. (2012), "Green supply chain management: The role of trust and top management in B2B and B2C markets", Industrial Marketing Management, Volume 41, pp. 609-620

*****

4

PERSPECTIVE OF SUPPLY CHAIN MANAGEMENT - II

Unit Structure

4.0 OBJECTIVES

1. To understand the Indian Perspectives of Supply chain Management
2. To understand the methods and factors for measuring and analyzing the value and efficiency of the Indian Supply chain Mechanism
3. To understand the Economic Effects of the Supply chain
4. To identify customer Values affecting the Supply chain
5. To measure the role of customers in improving the supply chain networks

4.1 INTRODUCTION

The Supply Chain Management concept is founded on two fundamental ideas. The first is that almost every product that reaches an end user is the result of the combined efforts of multiple organizations. The supply chain is the collective name for these organizations. The second idea is that, while supply chains have been around for a long time, most organizations have only focused on what happens within their "four walls." Few businesses comprehended, let alone managed, the entire chain of events that resulted in the delivery of products to the final customer. As a result, supply chains became disjointed and frequently ineffective.

According to Aswathappa (2008), nearly all business enterprises, large and small, are motivated to conduct global operations. This may entail acquiring raw materials from foreign suppliers, assembling products from components manufactured in various countries, or selling goods or services to customers in other countries. One of the most significant trends in the late twentieth century was the reduction of barriers to facilitate the free movement of goods and services across national borders. Globalization is often used interchangeably with international business.

Domestic logistics entails tracking and coordinating the flow of goods and services from their origin to the customer's destination within the same country. All production and transportation occur within a single set of national borders when managing domestic supply lines (McDunnigan, 2017).

When it comes to SCM, performance measurements are becoming increasingly important. Neely (1999) identifies seven reasons for the growing interest in performance measurements.

a. The changing nature of work. The cost of direct labour related to the cost of material has dropped rapidly since the 1950s

b. Increased competition

c. Specific improvements initiatives ex JIT, TQM, BQR (Business process reengineering)

d. National and international quality awards

e. Changing organizational roles changing from control to empowering employees by management by objectives

f. Changing external demands. Firms in the public sector must present information about their performance.

g. The power of information technology

4.2 INDIAN PERSPECTIVE

India's supply chain and logistics practices demonstrate the still-limited visibility. Companies share information only when it is necessary because they are realistic about the benefits and hazards of doing so. Our study shows that their company objectives and supply chain objectives are related. However, most of them were affected by some aberrations and scale/scope inefficiencies. The Indian government must take action to upgrade the infrastructure so that different supply chains can operate more effectively. To perform at their best, businesses and their supply chains must closely integrate themselves into a network, carefully manage the complexity that results, align their business strategy with logistics and supply chain operations, and use information and communication technology to streamline processes and introduce operational innovation.

4.2.1 Measuring and Analyzing the Values and Efficiency of Domestic Supply Chain Networks:

While many organizations are using Lean Six Sigma, Strategy Deployment, and Balanced Scorecards to achieve Operational Excellence, at least in terms of their Supply Chain, and are reaping the benefits of faster response times, lower inventory levels, and lower costs, others are still considering where to begin. The absence of a thorough and organized method for measuring the performance of the supply chain is one of the causes of this. Because of this, it is challenging to build a functional

connection between possible Lean Six Sigma initiatives and the overarching aims and objectives of the firm.

While ensuring that customer service goals are being met, an organisation can optimize its inventory investment and achieve a positive impact on its cash flow and overall profitability by utilizing an effective Sales & Operations Planning Process and Lean Six Sigma techniques like Value Stream Mapping, Quick Changeover, and Kanban Systems.

Methods of Measuring The Value and Efficiency of Supply Chain Networks:

Three methods for measuring performance in the industry are the balanced scorecard, the SCOR model, and benchmarking. These methods are also frequently debated in academia.

a. Balanced Scorecard:

The Balanced Scorecard is a framework for measuring organisational performance. The scorecard contains both financial and non-financial information. There is no general agreement on what measurements should be included in the scorecard. The measurement criteria differ between companies and even within the same company. Kaplan and Norton (1996) defined four broad categories.

- Financial measures
- Customer-related measures
- Internal performance
- Learning

Financial indicators emphasise economic value added and return on investment. Customer satisfaction and market share are two customer-related metrics. Internal performance metrics include quality, response time, and cost. Learning encompasses aspects of employment such as skill development, retention, and information technology.

b. SCOR Model:

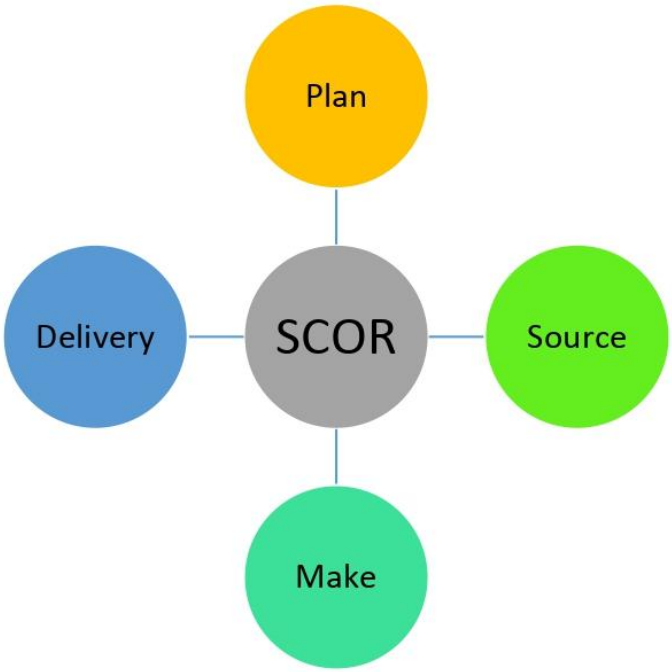
The SCOR model was created by the Supply Chain Council. SCOR stands for Supply Chain Operations Reference, and the model is a reference model. The model's purpose is to

- Provide a standard language for SCM that can be used cross-industry
- Facilitate external benchmarking
- Establish a basis for analysing Supply chains
- Compare the current Supply chain with the target for the future

According to Christopher, the goal of SCOR is to provide a standard way to measure supply chain performance and to use common metrics to benchmark against other organisations (1998).

The SCOR model is based on four management processes:

- **Plan:** balances Supply and demand
- **Source:** procurement of products and services
- **Make:** transforming products and services into finished goods
- **Delivery:** delivery of products and services.



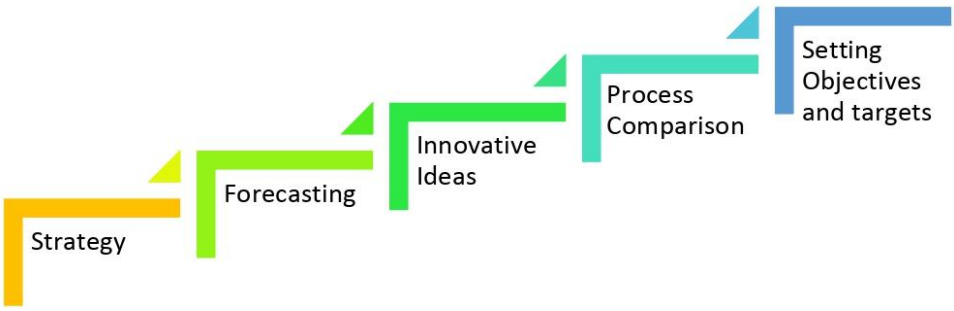
A process is made up of process elements, which are made up of tasks. Tasks are a collection of activities. The activities are standardised to allow for comparisons between supply chains. There are 12 performance metrics in the SCOR model. Understanding customer behaviours and designing and sustaining a supply chain tailored to deliver value to each customer segment is the most effective way to develop a close customer relationship.

c. Benchmarking:

According to Camp, a formal definition of benchmarking is "a systematic procedure for identifying the best practice and modifying actual

knowledge to achieve superior performance" (1989). Benchmarking is the process of comparing one's performance to best practices. It is critical to have common metrics that can be used to compare companies. Splendolini defines benchmarking as having five primary goals (1992)

- **Strategy:** planning for short and long term
- **Forecasting:** predict trends
- **Innovative ideas:** stimulate new thoughts
- Process comparisons
- **Setting objectives and targets:** base them on best practice



Benchmarking can be used both internally and externally within a company. Internal benchmarking can be used to compare different departments, but it can also be used to examine how one department has changed over time. External benchmarking can be used to compare one's own company to competitors or high-performing companies.

Measurement of Supply Chain Excellence:

According to Keebler, supply chain excellence necessitates that supply chain actors understand how to perform performance measurements (1999). What is the purpose of performance evaluations? There are several reasons for this, and they differ between companies. Parker (2000) identified the following reasons for measuring organisational performance.

- Identify success
- Identify whether the organisation understand its processes
- Identify whether the company are meeting customer requirements
- Identify bottlenecks and where improvements are necessary
- Ensure decisions are based on facts
- Show if planned improvements happened

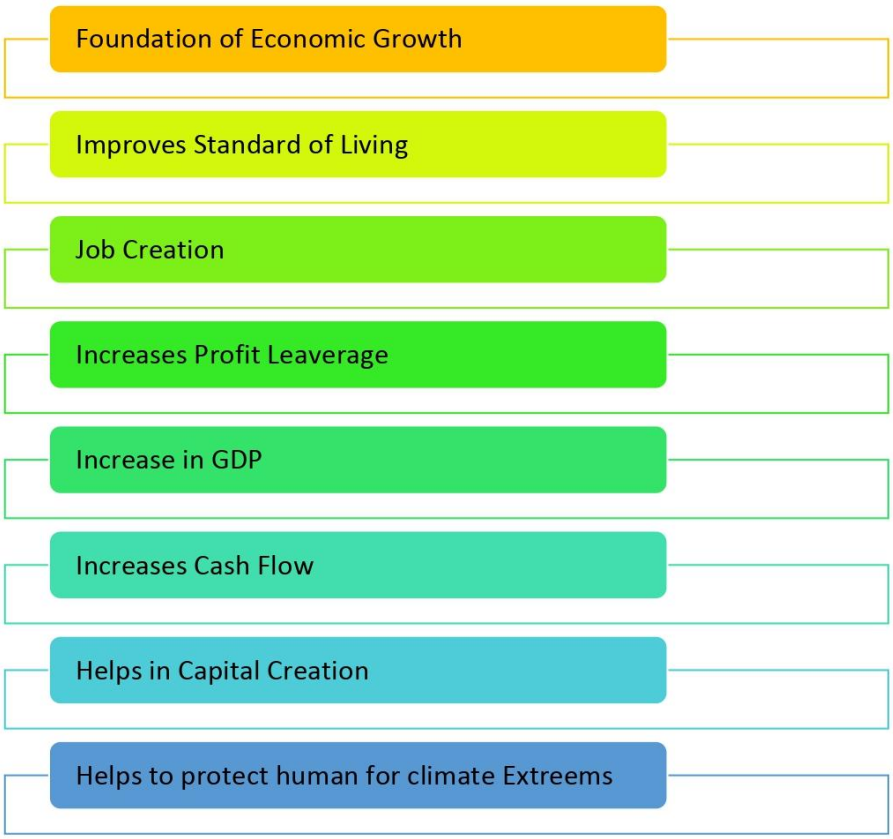
According to Geanuracos and Meiklejohn (1993), most business people are influenced by the manufacturing environment rather than service-oriented businesses. Richard Schonberger uses ITO to measure

performance. Companies are classified into different groups based on their ITO improvements over time. According to Schonberger, some companies are doing well despite unimpressive ITO trends (1996).

4.2.2 Economic Effects of Supply Chain Management:

Supply chain experts roll up their sleeves and get to work, whether dealing with day-to-day product flows or dealing with an unexpected natural disaster. They diagnose issues, devise creative solutions to avoid disruptions, and figure out how to get essential products to people in need as quickly as possible.

Over the last 100 years, increased global trade has resulted in significant growth in global GDP. Supply chains have become major enablers of global trade, and they connect the entire world. Any disruption in any part of the world has resulted in supply chain disruptions and economic recessions.



1. Foundation for Economic Growth:

Societies with highly developed supply chain infrastructure including an extensive train network, contemporary interstate highway systems, and several modern ports and airports can interchange various items between producers and consumers rapidly and affordably. Thus, the economy expands. A lack of or a very underdeveloped supply chain infrastructure is the one thing that many developing countries have in common.

2. Improves Standard of Living:

Societies with highly developed supply chain infrastructure including an extensive train network, contemporary interstate highway systems, and several modern ports and airports can interchange various items between producers and consumers rapidly and affordably. Consumers can afford to purchase more goods as a result, enhancing the level of living in society.

3. Job Creation:

All a society's supply networks are designed and managed by supply chain experts, who also oversee logistics data management, warehousing, inventory control, and packaging. As a result, the supply chain industry has many positions. For instance, in the United States, logistics expenditures made up 9.9% of all purchases of products and services in 2006.

4. Increases Profit Leverage:

Supply chain managers are valued by businesses because they help control and reduce supply chain costs. This can lead to significant increases in firm profits. For example, U.S. consumers consume 2.7 billion packages of cereal per year, so lowering U.S. cereal supply chain costs by just one cent per cereal box would result in a $13 million savings industry-wide as 13 billion boxes of cereal flowed through the improved supply chain over five years.

5. Increase in GDP:

According to a report released in collaboration with CII, India's supply chain and logistics costs currently account for 14% of the country's GDP, totaling $400 billion, compared to the global average of around 8%. There is a $180 billion competitiveness gap in the sector, which is expected to grow to $500 billion by 2030 if supply chain inefficiencies are not addressed. The World Bank Logistics Index, for example, ranked India 44th, far behind the United States at 14 and China at 26. Other countries in the region, including Thailand and Vietnam, have high logistics costs as well.

6. Increases Cash Flow:

The implementation of the Goods and Services Tax (GST), the liberalization of foreign direct investment (FDI) rules, and increased government spending have all contributed to the sector's growth.

India's desire to become a global manufacturing powerhouse, as well as the government's emphasis on 'Make in India,' necessitate nationwide supply chain reform, prompting a slew of federal and state-based schemes and investment incentives.

In this article, we will look at India's supply chain ecosystem and how new business opportunities are emerging. We also highlight how both

government entities and private ventures are attempting to introduce critical efficiencies to transform the status quo.

7. Helps in Capital Creation:

Countries require capital goods to replace older ones used in the production of goods and services. Production falls if a country is unable to replace capital goods as they reach the end of their useful lives. In general, the higher an economy's capital formation, the faster it can grow its aggregate income. SCM helps in the creation of infrastructure and thus the creation of wealth.

8. Helps to protect humans from climate Extremes:

Humans rely on an energy supply chain to deliver electrical energy to homes and businesses for lighting, heating, cooling, and heating. A logistical failure (such as a power outage) can quickly lead to a threat to human life. For example, during a massive East Coast ice storm in January 1998, 80,000 miles of electrical power lines collapsed, leaving 3,200,000 Montreal, Quebec residents without power. Thirty people died because ofthe extreme cold, and 25% of all Quebec residents left their homes to seek heated shelter. Furthermore, the economic costs included $3 billion in lost business, $1 billion in property damage, and $1 billion in government expenditures.

4.3 CUSTOMER PERSPECTIVE

Today Customers have more options than ever and offering outstanding items to customers is getting more and more crucial. Your company needs to stand apart if it wants to succeed. If you have the appropriate customer strategy, looking upstream to the global supply chain can be a significant win for businesses wanting to become more competitive and customer centric. Starting from the perspective of the final consumer is the most crucial step in creating a customer-centric supply chain. When we say, "from the outside, in," we mean exactly that. The "outside" is how your goods and services interact with and are perceived by your target market, including their cost, accessibility, usefulness, quality, and other attributes. The different rules and procedures your supply chain needs to follow to fulfil that commitment and give your customers impactful, satisfying experiences make up the "interior."

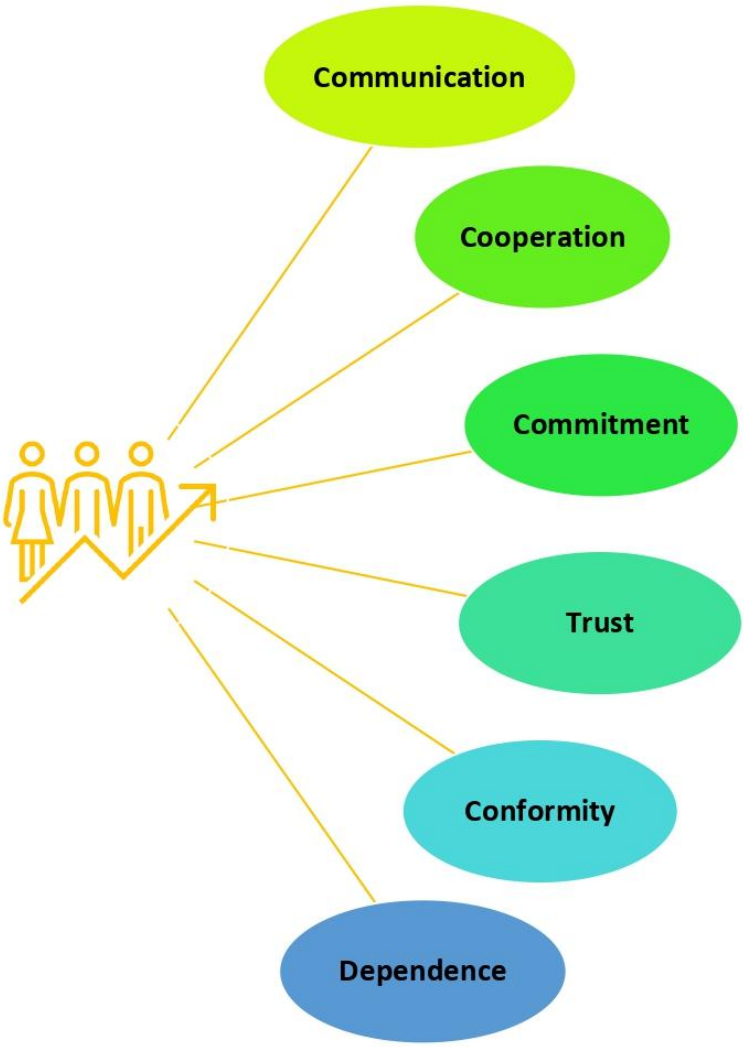
It is difficult to create a supply chain that is really customer centric. All stakeholders involved in the supply chain, from suppliers and manufacturers to logistics service providers, must buy in, including your business. Companies must instill new ways of thinking in both your company and outside parties. To fulfil the needs of the customer and go above and beyond their expectations, everything must be redesigned. If you do it well, you'll build a strong competitive advantage and fantastic customer advocacy.

4.3.1 Customer Value:

Suppliers, manufacturers, distributors, and customers are the four main players in the supply chain. Understanding the relationship between the groups and attempting to optimise this relationship is thus a major issue in businesses. The most difficult and critical issue in supply chain management is managing the relationships between the four main characters because they have a huge impact on all aspects of the supply chain and its function level.

Many companies supply chains are the result of poor communication of expectations and behaviours that occur between chain characters. Furthermore, effective relationship management is required in the supply chain to ensure that suppliers and customers collaborate in a coordinated, integrated manner while adhering to partnership principles, communication, information, and dialogue. Customers and suppliers should share the same goals and have mutual trust (Rajabzadeh, Khadivar, Kazemi, 2007).

According to conducted research by Brian Fynes, Chris Voss, and Sean de Burca (2005) various value dimensions of customers within the supply chain is:



1. Communication:

is defined as the formal and informal exchange of vital information between partners. Communication is critical to the success of partners. The rise of the global pandemic has forced many supply chain teams to reconfigure their operations due to staff shortages and shipment delays, putting pressure on supply chain managers. As a result, communication in supply chain management has never been more important.

2. Cooperation:

is defined as the relationship between two companies to achieve the ultimate goals and shift from isolation to partnership. The exchange of information on product production, processing, and analysis can reduce production costs and improve the innovation of new product processes.

3. Commitment:

The desire to sustain mutually beneficial relationships might be characterised as commitment. As a result, the organization's strategy should be customer-focused, long-term, and based on reciprocal advantages to building commitment.

4. Trust:

The desire to sustain mutually beneficial relationships might be characterised as commitment. As a result, the organization's strategy should be customer-focused, long-term, and based on reciprocal advantages to building commitment.

5. Conformity:

The term "conformity of suppliers relationship" refers to how well consumers and suppliers can match each other's skills and basic needs. Investments in products, processes and human resources lead to conformity.

6. Dependence:

Dependency is the desire of the partners to keep the connection going to attain the desired outcomes. Dependence between two businesses is a function of the value of transactions between them and the advantage they derive from each other's collaboration.

4.3.2 Role of Customers in Strengthening Supply Chain Management:

Other than these factors/values the following are the factors which affect the supply chain networks

1. Reliability:

One of the most crucial aspects of how supply networks operate is reliability because it significantly affects the completeness and quality of delivered parties, the time it takes for the logistics cycle to complete, and the logistics expenses associated with supply chains.

2. Quality:

Keeping a competitive edge in the market and lowering operating expenses depend on quality management in the supply chain. Without quality control, waste increases more than is acceptable. Examining the elements of quality management systems will assist your business in preventing and responding to supply chain problems.

3. Safety:

The component of supply chain management known as supply chain security focuses on the risk management of third-party vendors, suppliers, logistics, and transportation. Its objective is to recognise, assess, and lessen the risks associated with cooperating with other businesses in a supply chain.

4. Efficiency:

The internal procedures of the supply chain are the focus of supply chain efficiency. It has to do with making the optimum use of the available resources financial, human, physical, etc.to meet consumer demands efficiently. In many cases, technology can be crucial to improving supply chains.

5. Technology:

It is simpler to review data, get insights (on issues like customer demand, storage/transportation constraints, and supplier lead times), and make decisions that have both direct and indirect effects on the functioning of the supply chain thanks to supply chain technology.

6. Visual Impact:

The ability to track various products and/or shipments in transit provides a comprehensive picture of the inventory and activities. Through the management of goods in motion, proactive status updates, minimising disruptions, and risk mitigation help shippers enhance customer service and cost controls.

4.3.3 Methods of Improving Supply Chain Networks:

Supply networks are being stressed by rising globalisation and changing customer expectations. To control and reduce risks, you must continually reinvent the supply chain.

You can access the supplier chains' development and income by putting the appropriate tactics into place. Additionally, it enables you to take advantage of fresher chances, like utilising truck scales to enhance the supply chain.

1. Optimization of Company-Owned Inventory:

Holding and maintaining merchandise comes at a significant expense. Nearly 60% of the cost of an item that is kept in inventory for a year may be made up of inventory holding charges. Plan and estimate demand to maximise company-owned inventories. Utilizing truck scales for efficient management is yet another strategy for optimising inventories. The scales provide precise measurements that can be used to calculate how much inventory should be kept on hand.

2. Improvement in Distribution Network

There are two ways to strengthen the distribution network:

a. The cluster approach: grouping together comparable texts, graphs, and charts. This makes it easier to observe the procedures for every given business function.

b. A holistic approach: In this strategy, the critical elements of the distribution network are examined. It also emphasises comprehending how the parts cooperate.

3. Making a Supply Chain Council:

Establish a governing body that provides a precise plan for functioning and effectiveness. The council's purpose is to provide guidance and coordinate the supply chain strategy with the main objectives of the business. The council aids in breaking down obstacles inside the company.

Additionally, it enhances inter-functional collaboration inside the company. It provides leaders with chances to implement efficient supply chain management in the next projects.

4. Use of Technology:

Technology can be used to enhance the supply chain. Examine all the mechanisms in place that are resulting in subpar outcomes. Identify the processes that could be improved using technology. The supply chain can be streamlined, visible, and accessible with the use of the proper technologies, such as industrial scales.

5. Building Healthy Supplier's Relationship:

The success of the supply chain is influenced by the connection with the provider. Even after the deals are closed, continue to cultivate, and maintain supplier relationships. Put your efforts into developing plans to keep solid supplier relationships. Set objectives for sustaining value, tracking performance, and preventing disagreement.

6. Reviewing Process Regularly:

To maintain efficacy and compliance, the supply chain council must examine rules and processes. Additionally, it helps to streamline processes, prevent supply chain bottlenecks, and reduce the likelihood of fraud and theft. Regular assessments assist in recognizing various risk factors and calculating their financial impact.

7. Establishing Green Initiative

Reduce the supply chain's carbon footprint as much as possible. Supply chains and logistics must evolve to be environmentally and socially conscious. When selecting your suppliers, take the environment into account. Having a quantifiable framework of sustainable practices and policies.

Case 1- Intel's Case Study on SCM:

Intel, one of the biggest producers of computer chips worldwide, requires little introduction. However, after releasing its inexpensive "Atom" chip onto the market, the company found that it was necessary to dramatically cut supply chain expenses. For units selling for $100, supply chain costs of roughly $5.50 per chip were manageable, but the cost of the new chip was only a quarter of that, at about $20.

The Challenge of Supply Chain Cost Reduction: Intel sought to find a way to lower the Atom chip's supply chain expenses, but it only had one lever available: inventory. Intel was unable to compromise on service because the chip had to function. Additionally, there was no method to lower duty costs because each Atom product was a single component. With a high value-to-weight ratio and little packaging, Intel had already reduced the expenses associated with shipping the chips to an absolute minimum.

The only choice left was to attempt to lower inventory levels, which had previously been kept relatively high to support a nine-week order cycle. Reducing this cycle time and consequently, inventory was the only option Intel could find to lower supply chain costs.

The Road to Cost Reduction: Intel decided to test make-to-order, which was regarded as an unusual supply chain strategy for the semiconductor industry. The business started with a test project using a Malaysian manufacturer. They incrementally reduced order cycle time by seeking to identify and eliminate supply chain inefficiencies through an iterative method. Additional endeavors for improvement included:

A. Reducing the chip assembly test window from a five-day to a twice-weekly, two-day method

B. Establishing an official S&OP planning procedure

C. Where practicable, switching to a vendor-managed inventory model

Supply Chain Cost Management Results:

Intel eventually reduced the order cycle time for the Atom processor from nine weeks to just two with their incremental approach to cycle time improvement. The company reduced supply chain costs by more than $4 per unit for the $20 Atom processor as a result, which is significantly better than the initial rate of $5.50.

Case 2-Starbucks:

The coffee shop behemoth Starbucks is pretty much a household name, but like many of the most popular global businesses, it has experienced supply chain problems. In fact, Starbucks' leadership started to seriously question the company's ability to serve its 16,700 stores in 2007 and 2008. Sales were declining, as they were in most commercial sectors at the time. But at the same time, supply chain expenses increased by almost $75 million.

Challenges in Supply Chain Cost Reduction: When the supply chain executive team started looking into the rising costs and performance problems in the supply chain, they discovered that the service was in fact falling short of expectations. The findings revealed the following issues:

- Less than 50% of delivery to outlets were timely
- Several poor outsourcing decisions had led to excessive 3PL expenses
- The supply chain had become unduly complex because, like those of many large international organizations, it had developed rather than expanded by design.

The Road to Cost Reduction: To improve performance and lower supply chain costs, Starbucks' leadership has three major goals in mind. These included:

- restructure your supply chain
- Reduce your serving costs.
- Create the foundation for supply chain competence in the future.

Starbucks separated all their supply chain operations into the "plan," "make," and "deliver" sections to achieve these goals. Four U.S. factories are now operational because of the opening of a new production facility.

The corporation then started the process of severing relationships with all but its top 3PLs. Once the service level agreements were extended, it started using a weekly scorecard system to manage the remaining partners.

Results of Supply Chain Cost Management:

According to Peter Gibbons, then Executive Vice President of Global Supply Chain Operations, by the time Starbucks had finished its transformation programme in 2009 and 2010, it had saved more than $500 million, a large portion of which came from the supply chain.

4.4 SUMMARY

It is surprising that the mainstream perception of service supply chain management is mostly based on the perspective of the company given the significant role that customers play in services. In this conceptual study, we examine how service supply chains are conceptualised and managed from the viewpoint of the consumer, that is, how a customer manages, organizes, and integrates service provision to produce value. Our analysis, worldview, limits, hierarchies, and control mechanisms are all based on a system thinking perspective, namely Checkland's characterization of systems (1981). This viewpoint has led us to identify eight characteristics of service supply chains and four potential areas for future research.

Therefore, suppliers play a varied function in these various industries, which suggests that supplier resources would have a different impact on manufacturing enterprises and service organizations. According to Maull et al. (2012), one of the key distinctions between the supply chain logic of a manufacturer and a service provider is the prominence given to the client in the latter's supply chain. By adopting such a customer-centric viewpoint, the company seeks to develop opportunities and value in conjunction with the client to increase value for both parties.

Prevailing in the struggle for supplier resources While it has already been suggested in the present literature that SCM procedures for service organizations differ from those for manufacturing firms, our findings show that the significance of preferential resource allocation is also supported by this. These results appear to support the notion that, in order to boost their competitiveness, manufacturing companies are more likely to rely on supplier resources, whereas service companies depend on other sources, such as customers.

4.5 EXERCISE

1. Answer the following questions:

a. Quality is defined by the customer as" is……

A. An unrealistic definition of quality

B. A user-based definition of quality

C. A manufacturing-based definition of quality

D. A product-based definition of quality

b. The supply chain management philosophy emerged in which decade?

A. 1960

B. 1970

C. 1980

D. 1990

c. Which of the following are not key attributes of supply chain management?

A. Inventory Control

B. Leveraging Technology

C. Customer Power

D. all are Key Attributes

d. Positive, long-term relationships between supply chain participants refer to……..

A. Competitors

B. Tailored Logistics

C. Partnerships

D. Supply Chain Management

e. Process improvement technique that sorts the "vital few" from the "trivial many" is…

A. Taguchi analysis

B. Pareto analysis

C. benchmarking

D. Yamaguchi analysis

Answers: (1-B, 2-C, 3-C, 4-D, 5-D)

2. True or False:

a. Quality is defined by customer is "a user-based definition of quality"

b. The supply chain management philosophy occurred in the 1980s.

c. Positive long-term relationship between supply chain participants refers to partnership.

d. LEAN principal stress on reducing waste

e. Operations function employs more people than any other functional area.

Answers: (a-True, b-True, c-False, d-True, e-True)

3. Write Short Notes:

a. Customers perspective of SCM

b. Balance Scorecard

c. Quality

d. Customer Loyalty and Relationship

e. Reliability

4. Answer in Brief:

1. Explain methods of Measuring the efficiency of domestic Supply Chain Networks

2. Write a brief note on the Economic impact of SCM.

3. Explain in brief the factors affecting supply chain networks.

4.6 REFERENCES

- Andersson, D. and Norrman, A. (2002), "Procurement of logistics services – a minute's work or a multi-year project?", European Journal of Purchasing and Supply Management, Vol. 8 No. 1, pp. 3-14

- Ballou, H.R. (2007), "The evolution and future of logistics and supply chain management", European Business Review, Vol. 19, No. 4, pp. 332 - 348.

- Boas, J., Carvalho, J. and Henrique, N. (2014), "Logistics and Supply Chain Management: An Area with a Strategic Service Perspective", American Journal of Industrial and Business Management, Vol.4, No.1, pp 24 -30.

- Chang, H. H., Tsai, Y. C., & Hsu, C. H. (2013). E-procurement and supply chain performance. Supply Chain Management: An International Journal, 18(1), pp 34-51

- Chen, I. J., & Paulraj, A. (2004). Understanding supply chain management: critical research and a theoretical framework. International Journal of Production Research, 42(1), 131-163.

- Croxton, K.L., Lambert, D.M., Garcia-Dastugue, S.J. and Rogers, D.S., 2002, "The demand management process", International Journal of Logistics Management 13, pp. 51–66.

- Dubey, R., & Samar Ali, S. (2013). An exploratory study on logistics competency and firm performance. International Journal of Logistics Systems and Management, 14(2), pp. 179-199.

*****

MODULE - III

5

INTRODUCTION TO LOGISTICS - I

Unit Structure

5.0 OBJECTIVES

1. To understand the Process of Logistics Management
2. Understanding Competitive advantage and Changing logistics environment
3. Understanding Different approaches in Inventory control
4. To understand reverse logistics
5. Identifying and understanding the Bullwhip effect

5.1 INTRODUCTION

In today's competitive world companies are working hard to achieve a competitive advantage. Competitive advantage can be achieved by attaining cost leadership and differentiation. Inventory (Raw material, semi-finished product and finished product) are a major concern for every organization as it is many times considered dead stock where the company's working capital is stuck. A robust mechanism of maintaining inventories helps the organization in the effective management of its working capital and inventory.

Logistics management plays an important role in managing and maintaining the inventory of the organization and its timely availability in the production plant and customer market.

5.2 LOGISTICS MANAGEMENT

Logistics management is a component of supply chain management that is used to meet customer demands, through the effective planning, management, and execution of the efficient movement and storage of relevant information, goods, and services from point of origin to point of destination. Companies may save costs and provide better customer service with the aid of logistics management. From the initial step of

gathering raw materials through the last phase of transporting items to the destination, the logistics management process. Logistics management makes process strategy, planning, and execution easier by adhering to customer needs and industry standards.

5.2.1 Concept:

Logistics is concerned with getting the products and services where they are needed and when they are desired. Logistics is a planning function. Logistics helps in materials management which is concerned with arranging tasks related to the flow of materials from the purchase of raw materials from a supplier and micro supplier to the store and their movement from store to plant and distribution of finished goods to customers and its return back from customer to the company (Reverse Logistics).

Definition of Logistics:

Logistics is an important element in business functions concerned with the movement and maintenance of products and services. Logistics is defined as-

"Logistics is a process of anticipating customer needs and wants, acquiring the material necessary inputs to meet these needs and wants to fulfil the customer request."

“Logistics is the process of planning, implementation and controlling the efficient, effective flow and storage of goods and services.”

Thus, logistics is a movement of goods and services from the point of origin (Suppliers) to the point of destination (Customers) to satisfy customers and thereby earn profit.

Definition of Logistics management:

“Logistics management is the process of planning, implementing and controlling flow of goods and services and its related information from the point of origin to the point of consumption as per customer requirement.”

Logistics management is thus concerned with the issue of ensuring the flow of goods where they are needed and when they are needed in required quantities.

For Reference:

Types of Logistics:

Logistics is divided into four main sub categories:

1. **Business logistics:** helps in planning, implementation and control of efficient flow and storage of goods and services.

2. **Military logistics:** helps in the operational capability of military forces and their equipment

3. **Event logistics:** helps in organizing, scheduling and deploying the resources for the event to take place.

4. **Service logistics:** helps in the management of facilities, personnel and materials to support and sustain service requirements.

Functions of logistics:

1. Management of information and order processing
2. Control of inventory (Raw material, semi-finished products and finished products)
3. Transportation (Movement of raw material, semi-finished products in plant and finished product)
4. Warehousing
5. Inventory handling
6. Packaging of raw materials and finished products.

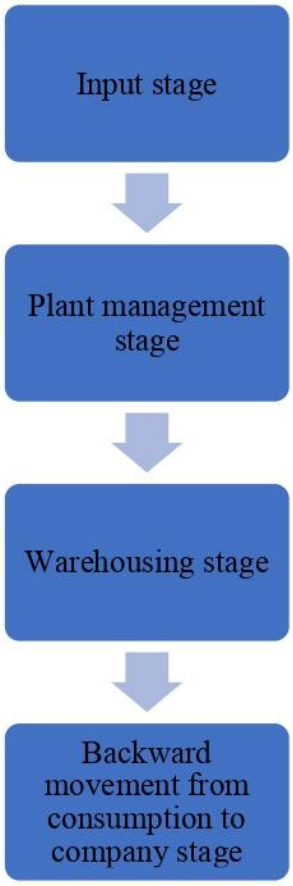
Scope of logistics:

1. **Inbound logistics:** making available raw material for production at the right time
2. **Outbound logistics:** Making finished goods available to customers at a place and time convenient to them.
3. **Reverse logistics:** Backward movement of finished goods to the company (Cancellation of an order, return of goods, handing over used goods for safe and environmentally friendly disposal)

5.2.2 Logistics process:

Logistics is the movement and maintenance of inventory from the place of destination to the place of consumption. Effective logistics management in an organization ensures smooth production and availability of products and services at minimum cost and wastages. The organization has to ensure that an efficient logistics process is in place.

The logistics process includes:



a. Input stage:

The input stage is the starting point for logistics management where the production department, with the help of the sales department, forecasts the sales. Forecasting helps in inventory planning and subsequent ordering and reordering.

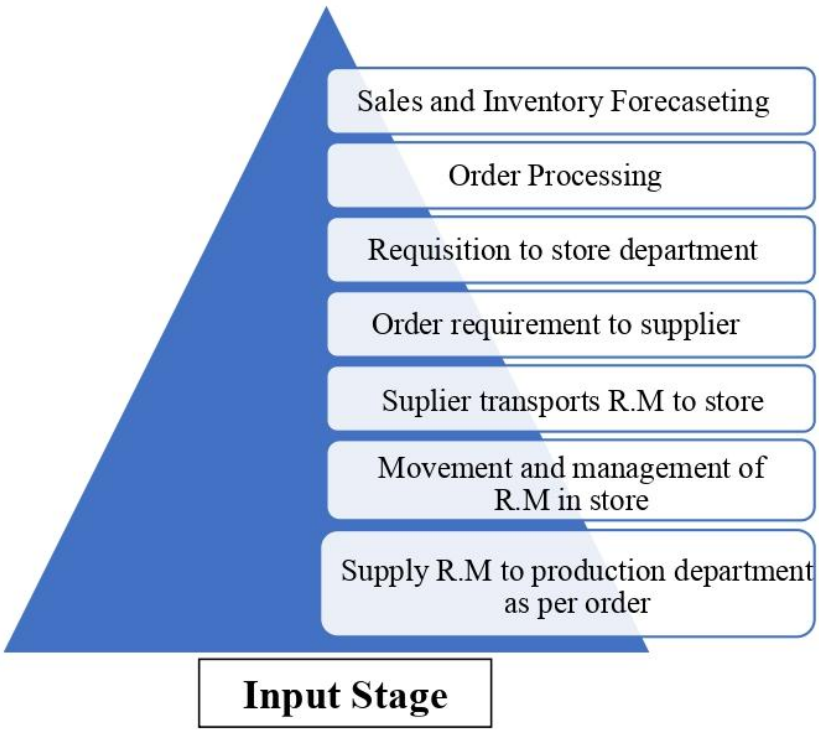
Once the order is received and processed, the process of acquiring resources to complete the order starts. The production department sends the requisitions to the store department which is responsible for storing and maintaining the raw materials.

On receipt of requisition of raw material, the store department verifies their stock and forwards the inventory to the production department if it is available with them. If the said inventory is not available then they start the process of procuring raw material by issuing tenders/ orders to suppliers.

Suppliers at their level, start manufacturing raw material or procuring the same from a micro-supplier. Once the raw material is ready, it is transported to the store department of the company.

The store department on receipt of inventory manages its internal movement and then dispatches the same to the store department (by using the inventory method of Last in First Out (LIFO), First in First Out (FIFO)

or weighted average as per the order received). The store department is also concerned with maintaining the quality of stock and checking on any wastages or spoilage of raw material.



b. Plant Management:

On the receipt of raw material and other resources for production, the production department starts manufacturing the product. The raw material is put into production which passes through various processes. It is important at this stage that quality of production is ensured and also wastages are reduced. It is quite likely that there may remain semi-finished material at the various processes of production which needs to be handled and stored properly.

The finished product is transported to the warehouse for packing, labeling and storage.

c. Warehousing stage:

Finished products are stored in the warehouse. In the warehouse, packing, packaging and labeling of the product are done. The company has to ensure that the finished goods are maintained properly as per the storage requirement which will help in maintaining quality and weight and reduction of their wastages.

In the warehouse, the product is packaged as per the standing instruction of the customer in their customer order. From the warehouse, the product starts its final journey toward the customer where goods and services will reach them as per their convenience and location. This stage needs to be monitored as goods are handled and moved and change hands in transportation.

d. Reverse logistics:

In this, there are various conditions such as-

i. Customers may cancel the order and the company will have to arrange for the movement of goods back to its terminal.

ii. Goods reach the customer, but as per the return back policy, they may be returned back due to non-specification or quality.

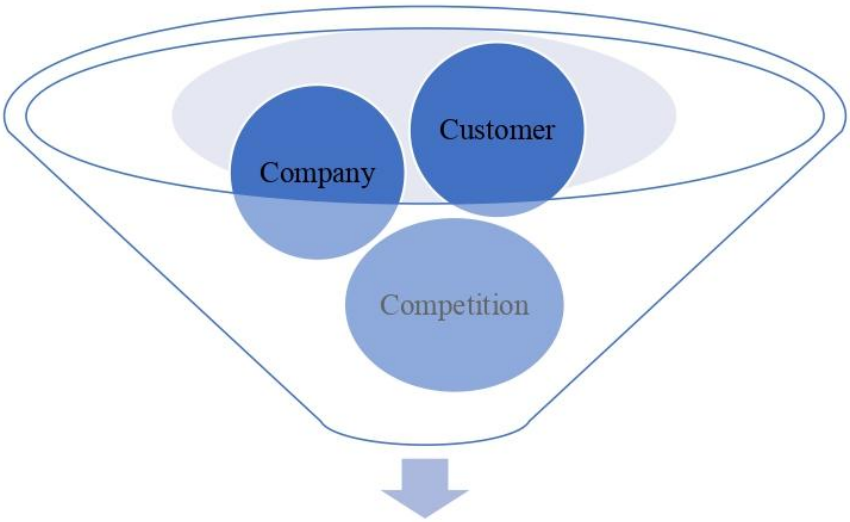
iii. After the use, the customer returns the used product to the company for its safe disposal.

In all the above cases, the company has to arrange for the return back mechanism of goods so that their quality and cost is not hampered.

Cost leadership and differentiation can be achieved when the company puts a lot of effort into designing and maintaining its logistics process as per the changing environment and regulatory framework.

5.2.3 Competitive advantage and Three C's:

Martin Christopher in his book 'Logistics and Supply Chain Management has proposed 3 C's of logistics which will help the company in achieving a competitive advantage.



3C Model of Logistics

The customer is the prime mover in the market. Goods and services need to be produced and supplied as per the need and want of the customer. The success of the business will depend on satisfied and loyal customers. A company needs to provide value to the customer.

The company should be sensitised about their customers and employees and aware of the changes in the market and strategies of their competitors. It is important to understand customer and company needs as this will ensure a competitive advantage over the competitors. The company should

keep on adding value to their product and services to remain ahead of its competitors.

On the other hand, competitors too, will try to add value to their offerings to remain in the market and also achieve market leadership. (Example: Patanjali and Dabur Honey; Complan and Horlicks; Jio and Airtel).

The company should try to position/ differentiate its product from its competitors. Logistics helps the company in achieving a competitive advantage by achieving cost leadership and differentiation. Dominos in India has achieved differentiation by providing its pizzas to the customers in 30 minutes.

The company should strive in differentiating itself from its competitors on one side and operating at a lower cost on the other side. In today's market, the company can achieve profit and wealth by achieving any one or both of the above factors. (Cost advantage and differentiation/ Value).

Cost advantage can be achieved by:

- Better utilization of transport by proper re-ordering and other measures- lower transportation cost
- Saving on operating cost
- Saving in storage, packaging
- Better management of order processing
- Inventory management
- Use of ICT and artificial intelligence
- Managing idle time etc

The savings in the above is normally passed to customers or are absorbed against rising prices of inputs by refraining from transfer to such rise to customer.

Differentiation/Value can be created by:

- Robust delivery
- Efficient and effortless after-sale service
- Financial aid
- Technical back up
- Product use and its supplementary use etc.

Competitive advantage = Cost advantage + Differentiation (Value creation) + Better management of Competition.

Martin Christopher has suggested better management of customers and competitors for ensuring competitive advantage through his 3C Model. In

the absence of such management companies lose out on competition and may cease to exist.

Business and competition are witnessing dynamic changes. Globalization supported by liberalized business policy has led to an emerging new way of business with the help of technology. International business, economic and political impact has a deep impact on the movement of goods internationally.

Covid-19, Ukraine- Russia war and involvement of other countries in regulating trade and movement of goods (USA and EU nations controlling the trade of Russia), increasing prices crude and petroleum products, difficulty in procuring inputs (Car companies finding difficulty in accessing chips), the expansionary policy of certain countries by trying to achieve control over various trade routes has impacted logistics.

5.2.4 Changing Logistics Environment:

Business and its environment are dynamic in nature. With the changing nature of the environment and business, there is a need to have a change absorbing logistics system in place. Logistics managers must be equipped with skills and information for making modifications to the logistics system to be ahead of their competitors.

Changing business environments has a direct impact on the market, competition, changes in technology and governance framework and regulations. Logistics managers should change their logistics approach by including these impacts. Challenges of changing logistics environment-

1. Dynamic customer service demand:

Young customers, disposable income, nuclear family etc are some of the demographic environmental changes that have led to the demand for the innovative product in a short time and place. In-time delivery, good after-sale service, home delivery etc is the need of the hour. It has now a challenge for a logistics manager to provide all these customers with no or negligible cost.

2. Time constraint:

Time has become the key issue in logistics management. Small product life cycle, zero inventory/ Just in time delivery, less product loyalty and minimum transport/ delivery time is the challenge in logistics.

For example, Goli Vada Pav has tied up with one foreign company to deliver Goli (Stuff used in preparing Vada Pav) as this Goli has to reach their outlets across the country every day before 11 am from their central kitchen situated in the Thane district.

3. Globalization:

Globalization has resulted in tough competition at home and in the international market. Companies are using technology to gain a

competitive cost advantage. Growing competition has made it compulsory for the company to look into their logistics system as the availability of products and services on time and place at a customer's convenience is needed. Many companies fail because they are not able to provide products or after-sale services on time.

4. Organizational integration:

In a global competitive structure, organizations are integrating their functions to gain an advantage. Material management, sales management and production management work in integration to achieve minimum inventory and regular supply of goods and services. The company looks into customer satisfaction as the prime mover and concentrates on providing goods and services with a minimum waiting period.

5. Technological revolution:

Continuous technology change has brought a change in doing business. Innovative machines have resulted in large-scale production, and Artificial Intelligence (AI) and CRM initiatives have made marketing comprehensive and customized. All of these have impacted the movement and maintenance of products and brought challenges to logistics.

6. Transportation:

The traditional method of transportation still dominates the logistics in the international market. New and quick transportation services supported by technology-driven management and control of the movement of goods and services have emerged as a challenge for companies and logistics providers.

9. Products with special transport/ storage requirements:

Many products require shorter delivery life, shelf life and specific nature of transportation. A large volume of such products moves internationally which requires special care and logistics inputs. The movement of such materials is another challenge for logistics managers.

Changing time has made business complex. Competitive advantage can be achieved if the company can control its cost and create successfully value differentiation. Logistics is challenging in such a business environment and needs changes as per the changing market and regulatory framework.

Reference:

Strategies to cope with challenges in changing logistics environment:

1. Cost reduction: it aims at minimizing variable costs and managing warehouse and transportation costs.

2. Capital reduction strategy: It aims at minimizing investment level which will result in higher returns on logistical assets. Strategies adopted under this can be shipped directly to the customers without storing, just-in-time delivery, outsourcing of logistics etc.

3. Service improvement strategies
4. Proactive

5.2.5 Reverse logistics:

Logistics is a supply of goods from the point of origin to the point of destination. The customer is the point of the destination. Customer awareness needs for customization, online shopping and delivery apps has opened up a new branch in logistics- **Reverse logistics**.

The growing concern of customers towards the environment, government regulation relating to the recycling of products and waste disposal, and cut-throat competition have resulted in companies adopting reverse logistics.

Definition:

Reverse logistics can be defined as:

"Reverse logistics is the process of moving goods from the place of use to the place of manufacture to reprocess, refill, repairs or product disposal."

Scope of reverse logistics are:

Refilling:

Industries such as LPG, soft drinks, oils etc are involved in getting back packages back so that the same can be used for refilling the product again and supplying the same to the customers etc.

Repairs and Refurbishing:

Service industry is engaged in this more often. Consumer durables such as television, washing machine, fan etc and industrial products require repairs and refurbishing from time to time.

Product recall:

Many companies such as mobile, and auto manufacturing may have to recall the products due to faulty parts which affect the performance of the product. Product recall helps in fixing the problem and product recovery.

Recycling and waste disposal:

As a part of social responsibility and environmental sensitize, the company offers its customers to handover them unused products for environmentally friendly disposal. Companies such as mobile, packaged drinking water and soft drink, laptops and other electronic companies ask their customers for used products. This helps in the waste disposal of products and provides a platform for the company for marketing its efforts.

Remanufacturing:

Companies may ask their customers and industrial user for the used product which they can put for remanufacturing products.

5.2.6 Components of Reverse logistics:

Reverse logistics have the following components:

Product location:

The company needs to identify the location of the product which needs to be called back. Product location can be identified by tracking the same in the distribution network if it is not yet delivered to customers. If the product is delivered then the sales record or customer request may be the base to trace the product.

Product collection system:

The company has to design the product collection system. It is a system through which products will be collected from the customers and will be brought back to the base from where the further movement of the product will be undertaken.

Product recycling:

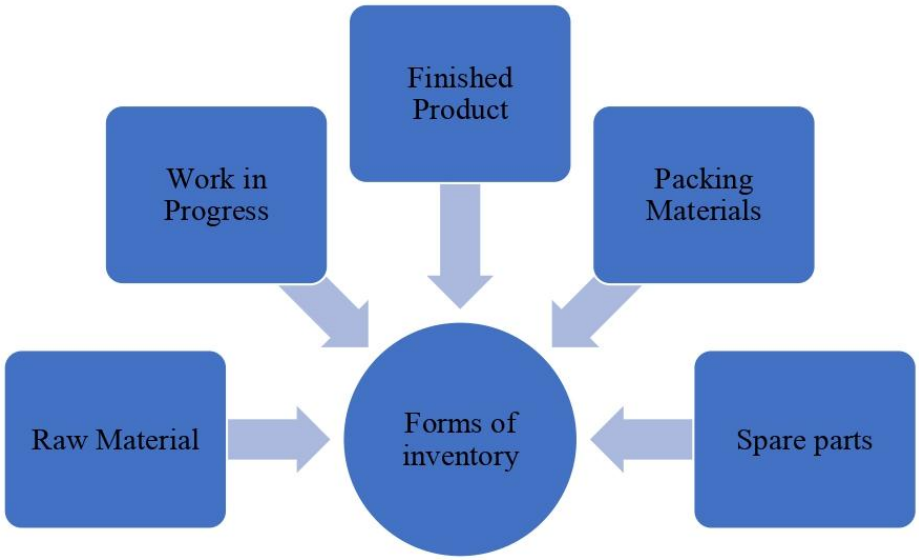
In this, if the product is meant for recycling, then the plant/ mechanism for safe recycling/ disposal needs to be in place.

Documentation system:

Proper documentation needs to be maintained as reverse logistics may attract legal formalities as goods are taken back and need to be replaced either with the other product or refunded amount. Documentation can also be used as a marketing tool by the company and show their corporate social responsibility and concern for the environment.

5.2.7 Importance of Inventory Control:

Inventory/ Stock is an important element in a company's operation management. A large amount of investment is engaged in inventory. Idle inventory is a dead asset for the company and it affects the working capital management of the company. It is important to control the inventory in the organization as its effect can be seen on the profit and corporate image.



Inventories are essential for the company as it helps in regular availability, take advantage of large-scale production, maintain service stocks, buffers etc. However, if stock is not managed properly it may lead to a financial burden on the company.

The importance of inventory control is:

1. Lower investment:

Optimal inventory ensures that there is no high inventory. High inventory blocks the investment and has financial implications such as warehousing costs, maintenance costs etc.

With an optimal inventory, the level company can achieve lower investment which results in a higher return on investment.

2. Timely availability of product:

Inventory management reduces the risk of production stoppages and results in a continuous flow of products to the customer. Good inventory management helps in continuous production by providing timely raw material in the plant and the availability of finished goods to the customers.

3. Taking advantage of economies of scale:

In large-scale production, fixed cost remains the same and there is an increase in variable cost only with the increase in production. With fixed costs remaining the same, the total cost comes down and thereby cost of production comes down. This cost-saving in production can be passed on to the customers and help the company in achieving a cost advantage. Good inventory management helps in taking advantage of economies of scale.

4. Reduction in stock out chances:

Stock out in the plant and retail outlets can be checked with proper inventory management. Stock-out results in idle time. Idle time is a situation where other resources in the plant have to wait for the arrival of raw material/ shortage of raw material due to poor management. Idle time leads to financial loss for the company.

Stock out in the store results in the defection of customers. Stock out damages the reputation of the company and results in losing out to the competitor's product due to low brand loyalty.

5. Reduction of risk of expiry of unsold stock:

High inventory may result in the expiry of the product/ raw material if it is not put into use in a certain specified time. Products like dairy, poultry, and vaccines result in the expiry of such products which will bring financial loss to the company.

For example, in the month of June 2022, Serum Institute was at risk of losing out on more than 200 million covid-19 vaccines doses due expiry date as there was no procurement of vaccines from the government and private hospitals.

6. Helps in ensuring uninterrupted supply in the international market:

Good inventory management helps in making a good environment in the international market. Cutthroat competition is present in the global market and the company cannot afford to lose out market due to stock out.

7. Reduction in inventory management cost:

Inventory management involves the cost of carrying and packaging. Recovering this cost will be difficult if the inventory is overstocked. If an inventory is stocked then the carrying cost per unit will increase as the transportation will not be fully utilized.

8. Lower inventory storage cost:

Large inventory requires huge space for storage. Goods are stored in a warehouse, and raw materials are stored. The company has to arrange for storage by either owning their private warehouse or taking the services of public/government-owned warehouses. Public warehouses are fewer, hence owning a warehouse or procuring a private warehouse will increase the cost.

Good inventory management will help the organization in lowering its inventory storage cost.

Inventory control is important as it helps manage cost, finance and quality of inventory.

5.3 BULLWHIP EFFECT

The bullwhip effect was seen at the start of Covid-19. The beginning of the pandemic has seen unprecedented demand for food, medicine, sanitiser, medical supply, ventilators etc, this has resulted in extra demand at the supply chain level in anticipation of additional demand.

At all levels from customers to dealers, distributors, and raw material suppliers started keeping extra stock. The same was seen when for the first time vaccines were developed and introduced, all the countries tried buying maximum vaccines for their population. This impact is the bullwhip effect.

Concept:

Bull-whip effect in the supply chain is a term used to describe how a small change/ fluctuation in the demand at the retail level can bring larger fluctuations in the supply chain- wholesale, distributor, manufacturer and raw material level.

The concept was first introduced by Jay Forrester and hence it is also called the Forrester effect.

The bullwhip effect is the result of demand forecasts yield supply chain inefficiencies in supply chain management. It is observed that a change of 5 per cent in demand at the point of sale results in an up to 40 per cent increase in the demand at the supply chain level.

Product demanded in the market by the customers is not stable. It keeps on fluctuating depending on various reasons. These fluctuations need to be forecasted by the members of the supply chain. This forecasting is normally not perfect which results in higher demand for the product at various supply chain levels due to safety/ buffer stock which all supply chain members keep

The bullwhip effect is the result of:

1. Manufacturing delays which result in lead time issues
2. Communication gap between the participants of supply chain members
3. Over or under reactions to the demand expectations.
4. Sales promotion, discounts, etc
5. Poor forecasting regarding demand.
6. Disorganization
7. Free return policies
8. Order batching

9. Price variations
10. Misuse of base stock policies
11. Wrong feedback and time delays
12. Panic ordering by customers
13. Trade promotion and forward buying

Consequences of Bullwhip effect:

The bullwhip effect has the following consequences

- Greater safety stocks at the supply chain level
- Excessive inventory
- Low utilization of the distribution channel
- Stock-outs
- Poor customer services
- Negative impact on employment

Reducing the impact of the bullwhip effect:

The following methods can be used to reduce the impact of uncertainty and lead time:

1. Vendor Managed Inventory (VMI)
2. Just in Time (JIT)
3. Demand-driven Material Requirement Planning (MRP)
4. Strategic partnership with members of the supply chain
5. Reducing minimum batch sizes
6. Restriction in returns and order cancellations (Ex. Higher cancellation charges, returns with the condition of time)
7. Information sharing for removing miscommunication.

5.4 SUMMARY

Logistics management plays an important role in managing and maintaining the inventory of the organization and its timely availability in the production plant and customer market. Logistics is the movement and maintenance of inventory from the place of destination to the place of consumption. Effective logistics management in an organization ensures smooth production and availability of products and services at minimum cost and wastages. The organization has to ensure that an efficient logistics process is in place. It involves four stages- Input, Plant

Management, Warehousing, Backward etc. Martin Christopher has suggested better management of customers and competitors for ensuring competitive advantage through his 3C Model- Company, Customer, Competitor. In the absence of such management companies lose out on competition and may cease to exist.

Business and competition are witnessing dynamic changes. Globalization supported by liberalized business policy has led to an emerging new way of business with the help of technology. International business, economic and political impact has a deep impact on the movement of goods internationally. Logistics environment is highly dynamic. Reverse logistics is the process of moving goods from the place of use to the place of manufacture to reprocess, refill, repairs or product disposal. Inventory/ Stock is an important element in a company's operation management. A large amount of investment is engaged in inventory. Idle inventory is a dead asset for the company and it affects the working capital management of the company. Bull-whip effect in the supply chain is a term used to describe how a small change/ fluctuation in the demand at the retail level can bring larger fluctuations in the supply chain- wholesale, distributor, manufacturer and raw material level. The concept was first introduced by Jay Forrester and hence it is also called as Forrester effect. The bullwhip effect is the result of demand forecasts yield supply chain inefficiencies in supply chain management.

5.5 EXERCISE

Fill in the blanks:

1. The ____ collaboration has become a critical area of SCM.
2. ____ aims at maximizing the revenue from movement of goods while minimizing associated cost.
3. ___ defines logistics as planning, implementing and controlling the physical flows of material from point of origin to point of consumption.
4. Logistics involves flow of ___ in the supply chain.
5. The primary objective of logistics management is to achieve a target level of ___at lowest cost.

Answers:

1. Retailing, Carrier
2. Philip Kotler
3. goods and services
4. Customer service

True or False:

1. Water Transport is the costliest means of transport.
2. One must outsource to only reduce cost.
3. The concept of supply chain has been developed from logistics.
4. The Forrester effect is known as the BullWhip effect.
5. Private warehouses are operated by third parties.

Answers:

True: 4

False: 1, 2, 3,5

Shorts Notes:

1. Reverse logistics
2. Bull whip effect
3. Three C's
4. Advantages of Inventory control
5. Process of logistics management

Answer in Brief:

1. Define logistic management. Explain its process.
2. Write a note on 3Cs
3. 'Company can achieve competitive advantage with the help of 3Cs'. Elaborate
4. Discuss on changing the logistical environment.
5. Write a note on reverse logistics
6. What are the advantages of inventory control?
7. Write a note on the Bull-Whip effect.

*****

6

INTRODUCTION TO LOGISTICS - II

Unit Structure

6.0 OBJECTIVES

1. To understand the Transport functions, Infrastructure
2. Understanding Warehouse functions and operations
3. Understanding Different Packaging- Consumer and Industrial goods and its importance
4. To understand factors influencing material planning
5. Identifying and understanding preservation, safety and measures of material handling

6.1 INTRODUCTION

The transportation system is the backbone of logistics and supply chain management. Transportation helps in the movement of raw material from supplier to the company and also the internal movement of raw material and semi-finished products in the plant and the journey of the finished product to the customers. Transportation helps in the movement of products and storage of products while in transit.

There are various modes of transporting the raw material and products such as water, rail, air, pipeline, ropeway and road. Transportation has seen a vast improvement over the period because of technological development. Today cargos are transported from one place to another where real tracking with the help of GPS is possible. Modes of transportation have also improved in terms of speed and carrying capacity.

Transportation creates time and place utility. The movement of raw materials and products adds value to the products which create place utility. Speed and consistency in the movement of raw materials and products create time utility.

Nature of goods, access to carriers, price of transport, transit time, and safety are some of the characteristics which affect the selection of mode of transportation.

a. Transportation and warehousing:

Transportation and warehousing are important and correlated part of logistics management. Moving things around physically is transportation. Storage and warehouse decisions can have a direct impact on logistics and transportation. Consider the number of warehouses required, their location, size, and the amount of merchandise that should be stored in each. Also The location of the plant and the warehouse site can change how the warehouse and the client relate to time and place. Often, the location of plants and warehouses is influenced significantly by transportation costs.

6.2.1 Transport functions:

Transportation is an aid to the trade element of business. It helps in the movement of raw material and finished products from the place of origin to the customer. Functions of transport are-

1. Movement of goods:

The transfer of goods from one place to another is the basic function of transport. Transport helps in the movement of raw materials; semi-finished goods and finished goods. The movement of raw materials and goods helps in the continuous production and availability of goods to the customers.

2. Economic utility:

Transport creates economic utility. Transport aids various other sectors and thereby keeps the economy robust. Transport creates utility to various other industries such as automobiles, insurance, banks etc.

3. Storage of product in transit:

Goods in transit are stored in the vehicle/vessels in which they are transported. These vessels act as storing places for the goods while they are traveling to their final destinations.

4. Geographical specialization:

Transportation helps in achieving geographical specialization. Transport companies can specialize in transportation region-wise this helps in transportation of specific products.

5. Safety of goods:

Safety of goods is a primary function of transport. A good transport system helps in the safe movement of goods in quick time with less/ nil wastages or spoilage. Transport helps in reaching the goods to the customer in the correct shape, and condition without any breakage.

6. Helps in achieving economies of scale:

Good transport ensures that goods reach distributors, agents, wholesalers, and retailers in a quick time. At the international level, goods reach the international market in real-time. This helps the manufacturer to concentrate on producing the goods on a large scale and enjoy economies of scale.

7. Discourage monopoly:

A monopoly is a state where there is one seller in the market. This situation may arise if goods of competitors are not available in the market. Transport helps in the movement of goods from one part to another part and thereby ensuring that products of various manufacturers are available in the market. This function of transport will discourage forming a monopoly in the market.

8. Benefit to customers:

Customers can get the product at the right time, place and in the right condition due to transportation. Goods are offered at a reasonable price to the customer with customized delivery. During Covid-19, transportation played an important role in supplying medical emergencies such as oxygen, PPE kits, gloves, ventilators and goods to the customers.

9. Creation of employment:

Transportation creates direct and indirect employment. Direct employment in the form of the transport agency, drivers etc are created while indirect employment is created in the automobile industry, insurance, banking, construction etc

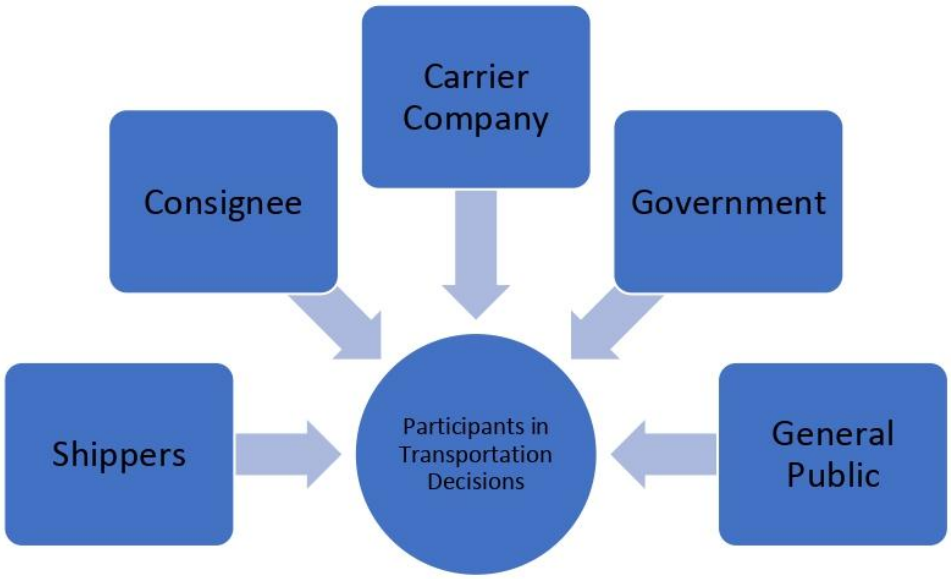
10. Helps in the generation of national income:

Transportation helps in creating national income and GDP. The GDP contribution of transportation in India is above 4 percent. The majority of this comes from road transport. Transportation through this national income and GDP contribution helps in the economic development of the country.

6.2.2 Participants in transportation decision:

Participants in transportation decisions depend on the nature of the business. Participants involved in local and national level trade are simple and restricted to consignors, consignees and Carrier companies.

Participants in transportation trade involving imports and exports are complex. Shipper, consignee, Carrier Company, government, the general public, regional groupings etc are involved.



Shipper:

A shipper is normally the businessman who manufactures the product and wants to dispatch his product to the customer (Industrial or Customer). He generally decides the mode of transport as per the nature of goods, the price involved in transportation, time engaged in transportation, a specific requisition from the customer if any etc.

Consignee:

Consignee is the recipient of the product. He receives the delivery of the goods by showing invoices and other documents. In the case of export/ Import, he needs to present additional documents to the port authority for getting the goods unloaded on the port and later get clearance for receiving the delivery of the product.

Carrier:

A carrier is the transportation company involved in the transportation of goods from the manufacturer to the customer. Carrier companies are engaged in the transportation and booking of cargo. Carrier Companies have their branches/franchising/agents through whom the booking vessels/ transportation can be booked.

Government:

Quality roads and speedy and hassle-free transportation are the basic criteria for any country's road to economic development and progress. Building and maintaining roads, ports, and airports add to the economic prosperity of the country. Government receives taxes and other income sources from transportation.

General public:

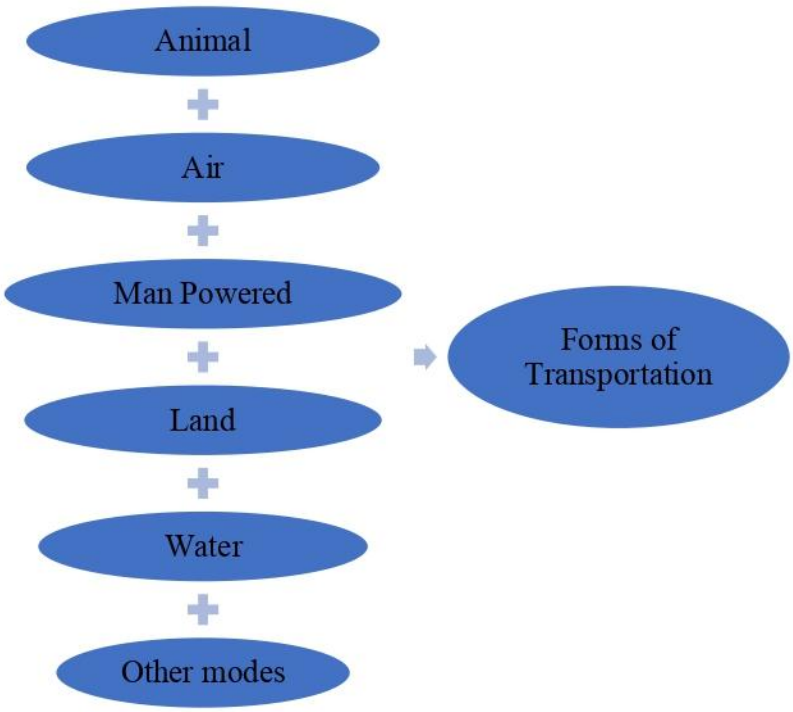
General public demands customized delivery and goods all over the world or in any part of the country. The demand of the general public can be met with the help of transportation.

Participants in transportation help in deciding the mode of transportation of products. In today's modern world, transportation and its decisions are dynamic and complex.

6.2.3 Transport infrastructure:

Forms of transportation:

Transportation plays an important role in supply chain management. Various forms of transportation are-



1. Animal-based transportation:

Animals are used even in today's world which was earlier dominated at the start of the human age. Goods are carried on the pack for carrying goods. Bullock carts, pack-on horses and donkeys are some examples

2. Air transport:

Air transport is the fastest mode of transport. Perishable, hardware and software products are normally transported by air. The development in the aviation sector supported by new airports has helped air transportation.

Advantages: Quickest mode, Suitable for long-distance and less bulky products

Disadvantages: Costlier, not suitable for a short distance and heavy bulky products.

3. Man-Powered:

Human beings have the sharpest brain; advanced technology has resulted in the creation of super machines. These machines are cost-saving and help in transportation. Vehicles such as bicycles, inline skates, skiing, and drones are examples of man-made transportation.

4. Land/ Road:

Land transport is one of the most used modes of transport. The development of roads, highways and advanced carriers has helped in the movement of goods through roads. Road transport is the second fastest mode of transport. It is the transport which helps in providing the goods at the doorsteps. Semi-bulky products can be carried easily through road transport.

Advantages: flexible mode of transport, suitable for short and medium distances, door-to-door service, speedy

Disadvantage: Not suitable for long-distance, low capacity, accident-prone, depends on road condition.

5. Water:

Water transport is the oldest and cheapest mode of transport. Water transport dominates the international market. Water transport helps in carrying bulky products.

Advantages: dominant in international trade, less costly, suitable for long-distance and large volumes.

Disadvantages: Not flexible and suitable for a short distance, involvement of risk.

6. Other Modes:

1. Pipelines:

The pipeline is used to transport petroleum and gas. Pipelines are fixed and product flows through them. Only liquefied products in gaseous form can be transported through the pipeline. It is a slow, rigid and terminal-to-terminal service.

Advantages: lower transit losses, safe, reliable, cheap, lower operating and maintenance costs.

Disadvantages: Only liquid and gas forms of goods can be transported, limited area, rigid.

2. Ropeway:

The ropeway is used where traditional transport mode cannot be used due to difficult terrain and other factors.

Advantages: Short distance, lower capital cost, ideal for hilly areas and difficult terrain.

Disadvantages: Limited scope, slowest mode of transport, limited capacity.

3. Drone:

The drone is one of the latest technology-driven modes of transport. The drone is recently used in supplying vaccines in difficult terrain in India. A drone is used to carry light transport products to a small range.

WAREHOUSING:

Warehousing is one of the important elements in logistics and supply chain management.

Reference:

Classification of Carriers:

1. **Common carriers:** it is a company that helps in the transportation of goods from one person to another and is responsible for in-transit damage of goods. Example: Truck, tempo etc

2. **Contract Carriers:** These carriers do not serve the general public. Contract carriers are shippers who have a specific contract with the company to transport their product and hence they are called contract carriers.

3. **Private Carriers:** Companies having a transportation wing which transports the product from one place to another are called private carriers. They do not transport any other company's products.

4. **Specialized Carriers:** These carriers transport specialized products in specialized vehicles. For example, a product requiring a freezer will be transported in a vehicle which is freezing service enabled.

Warehousing is generally related to storing finished products of the company after being manufactured, however, it can be used to store the raw material depending on the nature of the product. Goods produced are normally not sent for distribution, they are kept in the warehouse before it starts its final journey toward customers.

Warehousing is a location with adequate facilities where a large volume of shipments are received from the company plant which are then broken into a particular order and transported to the customer (Local, National or international level).

Warehousing is used for product mixing and cross-docking (movement from receiving dock to shipping dock, to eliminate storage expenses). It works as a cushion against contingencies of delays in transport, distributor's stock puts etc. Warehousing is concerned with smooth operation and order filling.

6.2.4 Warehouse functions:

Warehouses play an important role in storing the raw material and finished products thereby helping in smooth company operation.Warehousing primarily plays three important functions- material storage, material handling and information handling function.

a. Material storage function:

Storing material (raw material and finished product) is the primary function of warehousing. It helps in transporting the goods to the customer. As a storage function, warehousing helps in-

1. Hold:

Warehousing keeps the goods ready for delivery. As per the customer order/ demand, warehousing ensures smooth movement of the goods to the customers. The material handling function of warehousing has to be taken care of as the warehouse receives and dispatches goods frequently from different assemblies, the mix of products, product characteristics and expiry dates.

2. Consolidation:

It is advisable to collect the goods at one place and then dispatch them to the destination as it saves time and cost. In export and import, goods from small vendors can be collected at a central place (warehouse) and then the final delivery can be planned. This will help in saving the freight. Thus, warehousing helps in the consolidation of raw materials and finished products which helps in saving time and cost.

3. Break Bulk:

Warehousing can be used in breaking the bulk consignment into small as per the order or customer customization. For example, bulk cargo of oil, minerals etc is broken into small consignments as per the order/region-wise distribution.

4. Cross-Docking:

Here, goods are brought into the warehouse, not for storage purposes. Goods are brought from one source into the warehouse where they are further loaded into trucks in small quantities so that they can be further delivered to the customers. Warehouse use time here is very small as goods are transferred from bulk into small quantities in the trucks for further distribution.

5. Product Mixing:

Companies having multiple products or product lines use warehouses for mixing their product before they are delivered to the market. A common mixing point (warehouse) serves in assembling the orders and then dispatching them to the customer in a larger size which saves on time, packing and transportation costs.

For example, Company may assemble toothbrushes and toothpaste from its different plants and pack them into a combo pack of toothpaste and toothbrush.

6. Postponement:

Uncertainty in demand, market mood, and national and international environments may require a company to withhold the final production. Raw material and other inventories can be stored during this period when a company decides to postpone its production.

Example: During covid-19, many vaccine producers kept their regular vaccine production on hold to push covid-19 vaccines. Inventories of such regular vaccines require storage which can be stored in the warehouse.

7. Packing:

Warehousing performs the function of packing and repacking the materials. Goods are packed as per customer order or customer customization in the warehouse from the bigger lots of goods stored in the warehouse.

b. Material Handling Function:

Material handling functions of the warehouse are-

1. Loading and unloading:

Materials are loaded and unloaded in the warehouse. Materials packed are loaded in the truck for their dispatch to the customers. Loading and unloading the material without goods being damaged is one of the functions of warehousing.

2. Material movement:

Goods and raw materials are internally moved in the warehouse manually or with the help of a material handling machine after they reach from plant and suppliers. They are stored in the warehouse as per their usage needs.

For example, Liquors are stored in a wooden barrel in different locations in the warehouse depending on their usage or storage time

3. Order filling:

Warehousing helps in the collection of material from different lots/ vendors/ locations as the order. This movement of goods for order filling is done either manually or with the help of robots.

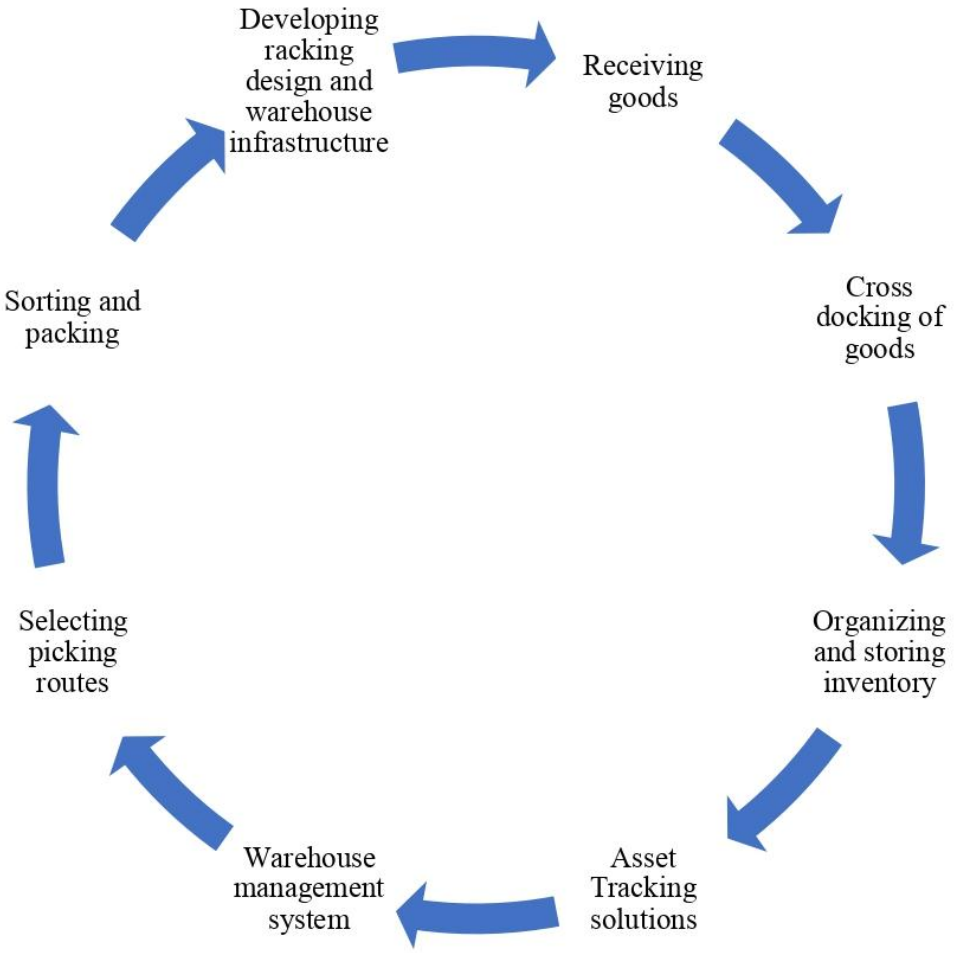
c. Information Handling Function:

The flow of information is important for all businesses. Warehousing helps in providing information to the company and members in the supply chain regarding the availability of goods, their expiry date, dispatch schedule etc. Company and chain of distribution require information about inward goods, an inspection of goods, stock-outs, data of goods moving out, excess stock, consignment tracking etc.

6.2.5 Warehouse operations:

Warehouse operation is concerned with satisfying the needs and wants of customers by utilizing the space, equipment and workforce in the warehouse effectively. The main aim of warehouse operation is to keep goods protected and accessible. Software such as WMS, WES, CRM etc is used for effective warehouse operations.

Warehouse operation consists of the following:



1. Receiving goods:

Receiving raw materials from different supply points and finished goods from different points is an important function of operation management. Goods are accumulated in the warehouse so that they can be supplied to the plant or chain of distribution without any delays.

2. Cross-docking of goods:

In cross-docking, goods are brought into the warehouse for being sorted so that they can be dispatched to specific areas/ Customers. Here, the goods are stored in the warehouse for a very short period.

For example, Online retailers, after receiving the order, dispatches the goods from their central warehouse to the district/ regional warehouse where these goods are sorted and dispatched immediately to the address of the customer.

3. Organizing and storing inventory:

Storing the goods safely is an important function of warehouse operation. Seasonal foods, grains, perishable products etc. need to be stored properly. It is also important that documents of the arrival of goods are maintained so that their proper move-out can be fixed.

4. Asset tracking solutions:

Technology has boosted warehouse operation management. With the help of technology, goods and their arrival, movement and location can be tracked easily. Various software helps in warehouse operations and tracking of goods. Barcodes can be used for tracking goods.

5. Warehouse Management System:

A warehouse management system helps in warehouse operations. Software such as WMS helps in the effective management of warehouse operations.

6. Selection of picking routes:

The selection of picking routes and updating them is an important element of warehouse operation.

7. Sorting and packing:

Sorting the goods received based on their quality, arrival cost etc helps in effective warehouse operations. Goods are packed in the warehouse. Packing is challenging especially if goods are moving out of the country as the destination country or the client may ask for specific packaging. Warehouse operation helps in sorting and packing of goods in the warehouse.

8. Developing racking designs:

Proper storage capacity utilization in the warehouse is the key element in warehouse operation.

Minimizing of cost of the warehouse can be achieved with proper zoning and layout of the warehouse with the help of effective racking designs.

6.3 PACKAGING AND MATERIAL MANAGEMENT

One of the five interconnected logistics functions is the packing and management of materials. The transportation of items into and out of each facility as well as inside the storage area are all aspects of material handling. It involves moving the proper stuff to the proper location at the proper time in the proper manner. During the manufacturing, distribution, and disposal processes, materials, products, and packaged goods are moved, stored, controlled, and protected. The protection of materials and products for distribution and movement is a key component of packaging, an important component of materials handling. It protects, facilitates transportation, and transmits product information, among other things.

6.3.1 Consumer and Industrial Goods Packaging:

A - Packaging and Materials Handling:

Packaging and material handling are important functions in logistic and supply chain management. Packaging helps in easing the movement and transportation of goods. It also adds appeal and provides important information. Material handling is important as if not taken care of will lead to an increase in cost due to wastage, damage or spoilage of the product.

B - Consumer goods and industrial goods:

Consumer goods are manufactured in the plant and are meant for the consumption of the final customer. Example- soap, biscuits etc. Consumers buy these goods from the market to satisfy their needs and wants.

Industrial goods are bought by industries that aid in manufacturing consumer goods. Example: machinery, packaging material etc.

A brief distinction between consumer goods and industrial goods:

Particular	Industrial goods	Consumer goods
Nature	Goods used for the production of consumer goods.	Consumer goods are the final goods which are sold to the consumer for their use.
Example	Machinery, raw material, packaging material etc	Soaps, laptops etc

Demand	Demand for industrial goods depends upon the demand for consumer goods	Demand for consumer goods depends on the buyer's needs, inflation, market mood etc.
Buyers and volume	Industrial goods are bought by limited buyers and their volume is low	A large volume of goods bought by customers which are large in number.
Elasticity of demand	The demand for Industrial goods is elastic.	Demand for consumer goods is elastic.
Price	The price of industrial goods is high.	The price of consumer goods is relatively very less.

Packaging:

Packaging is an important element of logistics and supply chain management carrying marketing tool value. It aids in the movement of goods from the warehouse to the final consumer in convenient carrying options with the protection of goods. The primary function of packaging is to prevent the goods from damaging during transportation, storage and goods handling. Packaging needs to adhere to the rule of the land.

6.3.2 The importance of packaging:

1. Protection of goods:

The primary function of packaging is to protect the goods from damage and spoilage while transportation, handling and storing. Goods are packed for transportation and consumer. (Packing is usually used for logistical movement while the packaging is the cover in which goods finally reach the customer)

2. Helps in storage:

Goods are safe to store when they are kept in covers/ containers. Packaging helps in storing the goods in the warehouse, in transit, store.

3. Provide information to customers:

The packaging carries necessary information (Statutory and Marketing appeal) that helps customers in selecting the product. Different products require different types of packaging and information. Example- Medicine, FMCG, and electrical products need different packaging and carry different information.

4. Improves appeal of the product:

Quality packaging adds to the quality of the product. Good packaging command a premium price in the market. Good packaging with an after-use appeal to the product.

5. Helps in buying decisions of customers:

Goods with quality packaging create a positive perception about the good's quality and trigger demand in the market for the same. Good packaging helps consumers in their buying decisions.

6. Ease in transportation:

Good packaging helps in ease of transportation. Goods can be moved from one place to another with ease if they are packaged properly.

Example: Soft drink and mineral water bottles are clubbed in plastic packing of 12 (for one-litre packs) so that they can be transported and handled with ease while their movement from warehouse to retailers and customers.

7. Helps in meeting government regulations:

There are various local, regional and international regulations relating to the packaging of goods. Recently, from 1st July-2022, a ban was imposed on single-use plastic. Different kinds of plastics are allowed/disallowed for packaging industrial and consumer goods. Necessary information as per the government regulations should be printed on the packaging before goods start their journey toward the final customer.

6.3.3 Factors influencing Material Planning:

Material handling is an important element of production and material management. Material management is an art and science consisting of moving, packaging and storing materials. Material handling creates time and place utility and helps in achieving cost management. Material management helps in the movement of material (external and internal movement) for storage. Material handling is one of the criteria that an organization uses for plant layout. It is estimated that around 50 per cent of the production cycle time of goods is used in handling materials. A good material handling system reduces material handling cost and manufacturing cycle time. Improved working conditions, safety in movement of materials, better quality, increased storage capacity, and higher productivity are some of the importance of a good material handling system in the organization.

Factors influencing material planning:

Material planning depends on the various factors-

1. Global price trends:

Material planning depends on international price trends. Prices of the inputs in the international market decide the material planning by the companies. Non-availability of micro-chips in car manufacturing leads to stress on the material planning of the organization.

Example: Russia- Ukraine war has put pressure on the supply of inputs of raw materials (edible oil supply for example) required in FMCG.

2. Business cycle:

The business cycle helps in planning the material turnover. A longer and shorter business cycle requires proper planning of materials as it should not hamper the supply and production of products in the plant.

3. Country's Foreign Trade Policy (FTP):

A country's foreign trade policy has an impact on material planning. Government policies such as encouraging home production and utilization may require material planning.

Example: Government of India's pet project Make in India, Atmanirbhar Bharat, Local is vocal etc. has its impact on material planning. Accordingly, the Government policy of discouraging imports from certain countries also impacts material planning if materials are imported from the said country.

4. Government and RBI credit policy:

The government's credit policy through RBI has an impact on material planning and its subsequent payment for import and storing. Recently, RBI has increased the repo rate and reverse repo rate to control the inflation in the country. Such measures along with foreign trade policy and payment measures impact material planning.

5. Plant capacity utilization:

Management's vision for utilization of the plant will decide the material planning. If management decides to expedite the production, then more material will be required and so.

Example: During covid, many pharma companies extended the use of their plant capacity for providing medical emergencies and exploring the market led to more materials and its subsequent planning.

6. Production plan:

The production plan of the organization has a direct impact on the requirement of the material which led to material planning.

7. Inventory management:

The inventory management concept of the company decides the material planning. Companies adopting the Just In Time (JIT) inventory system will have different material planning systems as compared to companies adopting other inventory systems.

8. Lead time:

Lead time is the time taken to complete the material process right from the start to the end. Longer and shorter lead times demand different material planning in the organization.

9. Rejection rates:

Lower rejection rates will bring down the material requirement and similarly higher rejection rates will lead to more frequent production and thereby more demand for the material. Lead time is one of the factors that will influence material planning.

10. Working capital:

The availability of satisfactory working capital influences material planning. Organizations having less flexibility in working capital will have to plan their material differently as compared to the organizations sitting with comfortable working capital. Less working capital restricts the procurement of material and commands planning accordingly to ensure smooth and continuous production.

11. Seasonality of products:

Seasonality of products has a direct impact on material planning. Materials that are available throughout the year require different planning whereas seasonal products such as fruits, vegetables etc. need different planning. Seasonal material needs to be procured and stored so that the same can be used and supplied in the market throughout the year.

6.3.4 Preservation, safety and measures of material handling:

Problems of preservation and measures for material handling can be effectively tackled by applying principles for materials handling. Principles for material handling are-

1. Principle of planning:

Planned material procurement, transportation, storing and handling process will ensure there is no wastage and damage to the quality and quantity of material.

2. Principle of standardization:

A standardized policy should be in place regarding movement, storage, material handling equipment and software. Standardization will help in the smooth operation of material handling and thereby helps in the preservation and handling of material.

3. Principle of systems:

Material handling management is not possible in isolation. Material handling needs to be integrated into other areas of the supply chain and logistics such as suppliers, material ordering, production, packaging, warehousing, returns etc. Effective and cost-managed integrated material handling will ensure better material preservation.

4. Principle of work:

Preservation and material handling can be effectively achieved by reducing material handling work without impacting productivity.

5. Principle of ergonomics:

Planning of material handling should be undertaken after considering the employee's capabilities and their limitations. This will help in the safe and effective handling of materials.

6. Principle of unit size:

Unit-size of loads should be carefully undertaken so that it aids in material handling. This unit size will help in material preservation and handling.

7. Principle of utilization:

Effective material handling is possible when there is an effective use of space, workforce and equipment.

8. Principle of automation:

Mechanized operation of material handling will ensure accurate data, decrease operating cost, and less man and unsafe handling. Automation will bring consistency and standardization in material handling.

9. Principle of the environment:

Environmental impact, energy conservation, and recycling are the norms of modern business. Material handling will help in achieving green handling which will bring down the cost and protect the environment leading to sustainable development.

10. Principle of life-cycle:

A better understanding of the material life cycle will help in better material handling and its preservation.

6.4 SUMMARY

Transportation helps in the movement of raw material from supplier to the company and also the internal movement of raw material and semi-finished products in the plant and the journey of the finished product to the customers. Transportation helps in the movement of products and storage of products while in transit. Transportation creates time and place utility. The movement of raw materials and products adds value to the products which create place utility. Speed and consistency in the movement of raw materials and products create time utility. Participants in transportation decisions depend on the nature of the business. Participants involved in local and national level trade are simple and restricted to consignors, consignees and Carrier companies.

Participants in transportation trade involving imports and exports are complex. Shipper, consignee, Carrier Company, government, the general public, regional groupings etc are involved. Warehouses play an important role in storing the raw material and finished products thereby helping in smooth company operation.Warehousing primarily plays three important functions- material storage, material handling and information handling function. Packaging and material handling are important functions in logistic and supply chain management. Packaging helps in easing the movement and transportation of goods. It also adds appeal and provides important information. Material handling is important as if not taken care of will lead to an increase in cost due to wastage, damage or spoilage of the product. Consumer goods are manufactured in the plant and are meant for the consumption of the final customer. Example- soap, biscuits etc. Consumers buy these goods from the market to satisfy their needs and wants.Industrial goods are bought by industries that aid in manufacturing consumer goods. Example: machinery, packaging material etc. Material handling is one of the criteria that an organization uses for plant layout. It is estimated that around 50 per cent of the production cycle time of goods is used in handling materials. A good material handling system reduces material handling cost and manufacturing cycle time. Improved working conditions, safety in movement of materials, better quality, increased storage capacity, and higher productivity are some of the importance of a good material handling system in the organization.

6.5 EXERCISE

Fill in the blanks:

1. _____ is not one of the C's of Supply Chain.

   (Customer service, Communication, Control, Conversation)

2. Bullwhip effects undertake ___ forecasts.

   (Demand, Supply, Production, Service)

3. Reverse logistics is required because ___

   (Goods are unsold, Goods are defective, goods are reusable, all of the above)

4. ___ is the first stage in the logistics process.

   (Input, Plant Management, Warehousing, Backward)

5. JIT reduces ____ cost.

   (Inventory carrying, warehousing, Material handling, Packaging)

Answers:

1. Control

2. Demand

3. All of the above

4. Input

5. Inventory Carrying

Match the Column:

A	B
1. Inventory Management	a. Warehousing
2. Warehouse	b. Productivity and performance
3. Physical Distribution	c. Transport and Storage
4. Logistics	d. Store function
5. Grading	e. Minimise working capital in stock

Answers: (1-e, 2-d, 3-c, 4-b, 5-a)

Shorts Notes:

1. Write a note on warehousing.
2. Functions of warehousing.
3. Write a note on warehouse operations.
4. Consumer and Industrial goods
5. Packaging and its importance

Answer in brief:

1. Discuss various functions of transportation.
2. Explain different participants in transportation decisions
3. What are the different forms of transportations?
4. What are the factors influencing material planning?
5. What are the various preservation, safety and measures of material handlings?

6.6 REFERENCES

- Abdinnour-Helm, S. (1999), 'Network Design in Supply Chain Management', International Journal of Agile Management System, 1(2): 99–106.
- Agarwal, A., and R. Shankar (2003), 'Online Trust Building in E-enabled Supply Chain', Supply Chain Management: An International Journal, 8(4): 324–34.

- Albertson, T. (2007), The Gods of Business: The Intersection of Faith and the Marketplace, Los Angeles, CA: Trinity Alumni Press.
- Alvarado, U., and H. Kotzab (2001), 'Supply Chain Management—The Integration of Logistics in Marketing', Industrial Marketing Management, 30, 183–198.

*****

MODULE - IV

7

DESIGN OF SCM LOGISTICS AND USE OF INTERNET - I

Unit Structure

7.0 OBJECTIVES

1. To understand the Demand planning, Production and assembly steps
2. Understanding sourcing of procurement and Sales returns in SCM
3. Understanding E Market, E Procurement and E Logistics, E - Fulfillment

7.1 INTRODUCTION

SCM consists of integration of planning and execution of all activities required to optimize the flow of materials, information and financial capital in the areas that includes demand planning, Sourcing of Procurement, Production or Assembly, Delivery and Return of Excess or defective products.

7.1.1 Demand planning:

Demand Planning is a step in supply chain management that ensures products can be delivered on time and that consumers are satisfied at all times. A successful demand planning strategy can increase the accuracy of revenue predictions, match inventory levels to demand peaks and troughs, and increase the profitability of a specific channel or product. The Labouré force, natural disasters, weather patterns, current events, and other influences are some of the external and internal factors that demand planners keep an eye on. The best method to create an accurate prediction and assure integration with the supply forecast to effectively fulfill customer demand is to collect data from all available sources.

7.1.2 Importance of demand planning:

1) Facing Changing environment:

Demand plans must adapt to the market's shifting dynamics as it might change in an instant.

2) Managing stocks:

Companies risk experiencing stock-outs, disgruntled consumers, warehouses full of idle inventory.

3) Proactive step:

In a perfect world, demand planners would be proactive rather than reactive, and they would base their judgments on near-real-time market data rather than just historical data.

4) Preventing losses:

Without sound demand planning and forecasting, losses will occur and Disgruntled finance managers, and millions of dollars in wasted capital if demand plans can't be altered swiftly.

5) Improving SCM:

Demand plans helps to improvise order configuration in the right form along with customer satisfaction which aligns upstream and downstream processes in SCM.

7.1.3 Production or Assembly steps:

Production and assembly steps are guided by manufacturing flow procedures while applying factors of production to transform raw materials into finished goods.

In order to accomplish the following, manufacturing process flow management charts and tracks the flow of production processes at various production stages.

- To cut waste and reduce production downtime, pinpoint the production process's bottlenecks.
- By eliminating recurring bottlenecks or operational flaws, improve the production process.
- To reduce flaws or errors in order to achieve significant cost savings.

The following are the process flows:

1. Product Characteristics:

Decides on the product's aesthetic and functional traits in order to determine the qualities it should have.

Its appearance, thickness, colour, and other aesthetic qualities are only a few examples.

2. Performance characteristics:

It includes their levels of performance as they are put through various testing processes under varied circumstances. attributes like how quickly or slowly it moves, how well it holds up under pressure, etc.

3. Develops technological requirements:

By describing the characteristics of its many sections and components, technical specifications of the product are provided.

4. Selecting the appropriate production procedures to be used in production:

Performs job production if the production is carried out in accordance with the purchase order's tailored specifications from the customer. This type of production method involves the mass production of identical items, or the parts and components thereof.

Performs batch production if the production calls for the batch production of a certain group of components. The manufacturer of heavy equipment's engine parts frequently uses batch production.

On Monday, Engine Part No. 1 is created by Machine A.

Engine Part No. 2 is produced by Machine B on Tuesday, and so forth.

Performs flow production if there is constant demand for the product. Without waiting for the entire batch to be finished, a unit is made at one stage of manufacturing and then moves on to the next. It entails a continuous manufacturing process that creates parts and subassemblies from one production stage to the next until it is finished. This method of production is used in the auto industry. The success of this production process depends on the accuracy of the sales prediction; otherwise, finished goods may be overstocked.

Describes its technical components, including its mechanical, electrical, chemical, and other components.

Outlines the resources required to begin the production process and the resources that can be used as backup if necessary.

Creates a list of the raw materials, industrial supplies, engineering materials, tools, and machinery needed to produce a bill of materials.

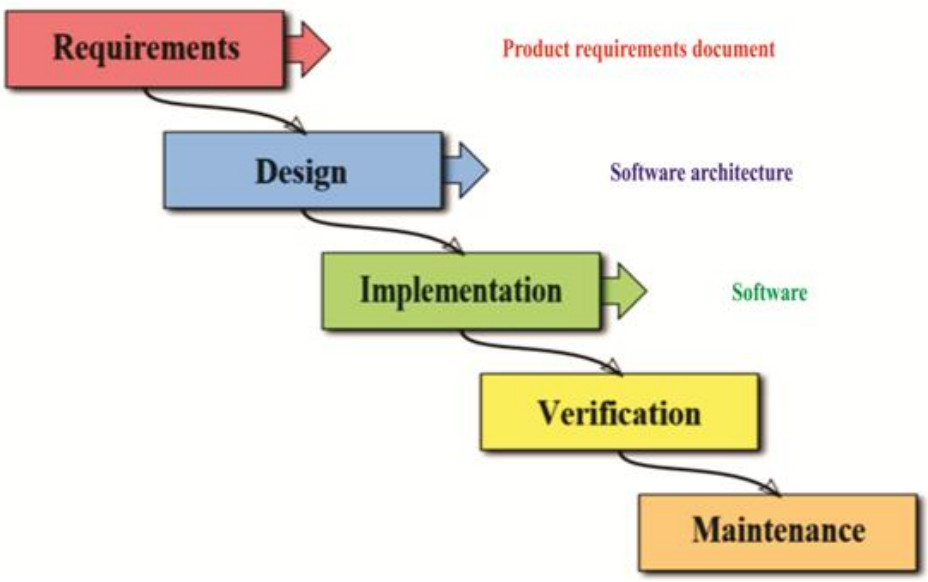
Subjecting the production resources to be used to various testing techniques, Chemical supplies are tested in laboratories., Engineering tests mechanical components to determine their durability, etc.,Electrical testing is performed on electrical materials, and so on.

Checking workstations for each stage of production, setting up machinery, tools, and equipment, and making operating manuals available so that personnel can refer to them.

- Checking the chemical, mechanical, electrical, and computer-related configurations or settings of these equipment is necessary for production set-up so that they are prepared to begin the manufacturing process.
- loads raw materials into machinery and equipment under each step of production to begin the production process, which eventually transforms them into final goods.
- uses inputs, such as supplies and materials, at each stage of production in accordance with the production manual.
- checks each output's quality and quantity by confirming its specifications at each stage of manufacturing.
- During each stage of the production process, damages, variances, and equipment malfunctions are reported.

Implement corrective actions, such as putting backup equipment underneath each stage of production, in the event of operational errors, equipment damage, etc.

In this stage it keeps checks on output quantity and quality at the latter end of the production process.



https://www.process.st/checklist/supply-chain-management-procedures-3/

7.1.4 Sourcing of Procurement:

The sourcing function is in charge of every step in the purchasing process, from finding possible suppliers to negotiating and awarding contracts and making sure contract requirements are satisfied. When a clear and distinct

need for a purchase is determined inside the company, the purchasing process can start.

The sourcing function's responsibilities include choosing the right suppliers, negotiating deals, and managing the acquisition process. First, sourcing must determine whether the requirement can be satisfied by current suppliers or if new suppliers need to be found. In general, sourcing keeps a list of acceptable suppliers for continuing purchases, but it also assesses vendors for brand-new requirements as they arise.

In order to select a supplier, one must first identify possible partners and then approach them with a request for quotes (RFQ), request for proposals (RFP), or request or invitation to bid (ITB) (RFB). It is crucial that the sourcing function manage the supplier base and that decisions about supplier management and selection be made through this function. Companies frequently engage in "maverick buying," a practise where internal users try to purchase items directly from suppliers without using the sourcing department. It is permissible for such actions to take place on occasion, such as when a waiter leaves the restaurant to get bread or a secretary buys paper. However, doing this frequently should be avoided because it sidesteps sourcing and undermines all the advantages sourcing offers the company, such as economies of scale when working with a sizable supply base.

Process/Steps of sourcing:

1) Analysing Organisational needs:

The sourcing team must first decide what items and services the organisation needs to buy, as well as the specifications for those products.

Employees must also define the categories of spending and assess their spending patterns. For example, are you purchasing office supplies like coffee and snacks or software or maintenance services?

Who makes use of these products or services? What volume is used? The supply chain includes who?

2) Market Research:

Following the identification of internal requirements, the sourcing specialists look for suppliers, examine market offerings, and assess market risks and opportunities.

Additionally, they analyse the cost elements of the product, including labour, raw material, and transportation costs.

3) Strategic planning for sourcing:

The third phase is selecting the best strategy, which involves identifying where to purchase the required commodities in order to reduce costs and guarantee supply chain stability. A company develops a set of requirements for potential suppliers at this step.

4) Supplier formalities and proposals:

Employees then begin the process of requesting bids and assessing vendors. A company may issue a request for quotes (RFQ) or a request for proposals to prospective suppliers (RFP).

Both are business documents that describe a project and request bids in order to evaluate the suitability of each vendor to accomplish it.

A request for proposal typically includes project specifics, cost analysis, product specs, and delivery terms and is more intricate than a request for a quote.

5) Negotiations:

A sourcing team examines responses to vendor quotes, seeks clarifications as necessary, and then starts negotiations with suppliers who have been shortlisted for cheaper prices, better payment terms, benefits, etc.

After the negotiations are through, a responsible person selects the best suppliers based on factors including quality and pricing, reputation, market recognition, and potential risks.

6) Coordination with suppliers:

The implementation procedure started after notifying the chosen vendor. A contract is signed by a customer and a vendor.

The sourcing team must also create a communication strategy and a way to evaluate the performance of suppliers.

7) Follow ups and performance analysis:

After making the purchase, the process moves on to its conclusion. The sourcing team benchmarks the state of the expenditure category and evaluates the performance of the suppliers using KPIs that have been developed.

7.1.5 Sales returns for defective or excess products:

Sales return popularly called Reverse logistics, a sort of supply chain management that transfers items from buyers back to sellers or manufacturers, is what it is commonly known as Reverse logistics are needed for procedures like returns or recycling after a customer receives a product.

Sales return begin at the customer and work their way backward through the supply chain to the producer or the distributor. Reverse logistics can also refer to procedures where the customer is in charge of the product's final disposal, such as recycling, refurbishing, or resale.

When items return from their destination back via the supply chain to the seller and maybe back to the suppliers, organisations use reverse logistics. The objective is to sell the product or recover some value from it. Returns

are worth roughly a trillion dollars globally every year and have increased in frequency with the rise of ecommerce.

Recovering value and encouraging consumer repurchase are the goals of reverse logistics. Compared to at least 30% of things ordered online, less than 10% of in-store sales are returned.

Good sales return Process the Return in 5 Easy Steps

a. Process returns:

When a customer indicates they want to return a goods, the return process begins. This step should specify the product's condition and include a return authorisation. Additionally, this procedure entails planning return shipments, approving reimbursements, and exchanging defective items.

b. Handle returns:

Once a returned item has been delivered to your site or a centralised processing facility, examine it to establish the type of return it falls under.

c. Move the returns along:

By delivering fixable things to the repair department, you can cut down on your daily trash.

d. Repair:

Move the returned item/equipment to the repair area after examining it and determining whether it can be fixed. If possible, sell any pieces that can be sold.

e. Recycle:

Send any products or parts that you can't repair, repurpose, or sell to the local recycling facility.

7.3 USE OF INTERNET IN SCM

The development of the Internet and electronic communication has made it possible for businesses to respond to their clients more quickly. The marketplace itself is evolving, though, as a result of the application of the same technical improvements in business-to-business supply chain management. A shift from controlling individual operations to integrating activities into the primary supply chain process is necessary for effective supply chain management. A seamless chain that runs smoothly benefits the entire value chain by accelerating communication between consumers and their suppliers, enhancing service quality, and cutting costs. The benefits outweigh the effort required to acquire the end product.

7.3.1 E Market:

The use of an electronic medium to sell the goods is referred to as the "Electronic market" (also known as the "e-market"). The majority of the

time, it relates to the online selling of goods, but the term E market includes online purchase methods as well (for B-To-B).

Cyber Consumers are customers who make purchases online.

E-Market includes more than just online sales; it also includes things like: Online estimate preparation User consultation Provision of an electronic catalog Access plan to point of sales, Online payment; real-time management of product availability (stock); Delivery tracking and post-purchase support

When the online store is connected to the company's manufacturing system, the electronic market occasionally makes it possible to create products that are highly customised.

7.3.2 Different E-Markets includes:

A business-to-business relationship based on the use of a numerical support for information transmission is referred to as B to B (Business To Business; also written B2B).

B2C (Business to Consumer) refers to a relationship between a business and the general public (individuals). This is known as electronic commerce, which is defined as any potential interaction between a business and its customers, from requesting an estimate to providing after-sales assistance, and is not just sales;

7.3.3 Role of E Marketplaces:

It is now widely acknowledged that new technologies, particularly access to the Internet, tend to change communication between the various players in the professional world, particularly:

- Relationships between the enterprise and its clients;
- The internal operations of the enterprise, including enterprise employee relationships;
- Relationships between the enterprise with its various partners and suppliers.

The integration of tools based on information and communication technology (often referred to as business software) within the organisation is what is referred to as "e-Business" in order to enhance its functionality and produce value for the company, its clients, and its partners.E-Business now encompasses traditional businesses as well as virtual ones (sometimes known as "click and mortar") whose entire operation is located online (called brick and mortar).

In reality, the word e-Commerce, also known as electronic commerce, which is frequently used interchangeably with the term e-Business, only refers to the use of an electronic platform for business transactions between an organisation and individuals. This document's goal is to list the various underlying "technologies" (which are actually organisational

models based on information and communication technologies) and the acronyms that go along with them.

7.3.4 Characteristics of E Market:

A firm can be thought of as an organisation that offers clients goods or services while utilising the goods or services of partners in a dynamic environment. A set of interdependent functions that are often divided into three categories can be used to represent the operation of an enterprise:

Performance functions, or the creation of goods or services, serve as the organization's fundamental business. They concern production, stock-management, and purchasing (purchasing function) activities;

The management functions, which include all strategic functions of the organization's management; they include the general management of the organisation, the management of human resources (HR), as well as the management of finances and accounting;

The support functions assist the performance functions to guarantee the enterprise's smooth operation. Support activities include all sales-related operations (which, in some situations, are a component of the organization's main business) as well as all organizationally-internal tasks, such managing technology infrastructures (IT, Information Technology function).

Businesses are typically defined by the kinds of business ties they maintain. Therefore, specific names exist to describe this kind of relationship:

1. A business-to-business relationship based on the use of a numerical support for information transmission is referred to as B to B (Business To Business; also written B2B).

2. B to C (Business to Consumer, also written as B2C) refers to a relationship between a business and the general public (individuals). This is known as electronic commerce, which is defined as any potential interaction between a business and its customers, from requesting an estimate to providing after-sales assistance, and is not just sales;

3. Business to Administration, or B to A, refers to a connection based on numerical exchange mechanisms between an organisation and the public sector (tax administration, etc). (tele procedures, electronic forms, etc.).

4. As an extension of these ideas, the term B to E (Business to Employees, also written B2E) has also come to be used to describe the relationship between an organisation and its employees, particularly through the provision of forms targeted at them for managing their careers, vacations, or relationships with company committees.

7.3.5 E Procurement:

The practice of requesting, ordering, and buying goods and services online is known as electronic procurement, often referred to as e-procurement or supplier exchange. It involves business to business transactions.

E-procurement, in contrast to e-commerce, relies on a supplier's closed system and is only accessible to registered users. Through bids, purchase orders, and invoices, electronic procurement streamlines communications between customers and selected suppliers.

E-procurement began in the 1980s once Electronic Data Interchange developed (EDI). A decade later, EDI advancements made it possible for businesses to create online vendor catalogs. E-procurement now includes everything from contract management to electronic orders and payments to supplier evaluation and selection.

E-procurement links suppliers and customers through a web interface or another type of networked technology. The policies governing the e-procurement of materials for the firm are often established by the chief procurement officer or the procurement department.

Utilizing an electronic procurement system's optimum pricing and timing for purchasing goods or services is its main objective. It's crucial for firms to build relationships with suppliers if they want to achieve this goal. This makes it possible for procurement staff to bargain deals with suppliers. Within the e-procurement platform, they can also establish rules or restrictions regarding budgets and spending.

How does E Procurement work?

E-procurement does away with the need to manually complete time-consuming procurement-related processes including eAuctions and eTenders, exchanging supplier contracts, and completing questionnaires for supplier onboarding. Through the use of a centralised platform, the process connects multiple entities and processes. One of the most crucial elements of e-procurement is vendor/supplier management. Supplier relationship management and supplier information management are also included.

Among e-other procurement's essential elements are the following:

E-sourcing involves defining needs and screening prospective suppliers;

E-tendering entails requests for information, proposals, and quotes;

E-auctioning involves assessing vendors, contract administration, and negotiation;

E-ordering and payment involves issuing requisitions and purchase orders and receiving requested goods; and

E- analytics: view expenditures and take necessary corrective action.

7.3.6 Benefits of E Procurement:

The procurement process is made more automated through e-procurement. Delivery times are slashed and procurement cycles are shortened thanks to centralised transaction tracking, streamlined reporting, and contract compliance.

Automated solutions and integrated monitoring tools decrease the administrative burden on procurement teams, enhance performance, boost workflow effectiveness, and generate cost savings. They also aid in reducing maverick expenditure, which is when employees make purchases "off contract," or outside the restrictions outlined in negotiated and binding contracts.

With e-procurement, businesses can choose from a wider range of goods and services to suit their own requirements. Inventory quantity and prices can be managed by being able to locate products from customers' chosen suppliers or vendors rapidly.

The procurement department can shift resources to higher value operations, such contract negotiations, because it no longer needs to perform manual, repetitive, or low-value duties.

Additionally, e-procurement improves reporting on metrics and trends in procurement and raises the visibility of corporate procurement spending. Since all information is centralised, stakeholders or firm management may quickly access it to facilitate decision-making. As a result, it improves process accountability and transparency and gives the procurement function better control.

7.3.7 Logistics:

By sharing data, knowledge, and information with supply chain partners, e-Logistics is a dynamic combination of communication, computing, and collaboration technologies that alter core logistical operations to be customer centric. Delivering the right products in the right amounts to the appropriate Customer at the proper location and time is E-Logistics' ultimate goal.

Processes Involved E-Logistics (B2c):

1. Method of payment:

At the moment of ordering: credit card, electronic check (such as PayPal), In the case of electronic payments, a system of payment verification is required prior to shipping: COD

2. Check product availability:

If at all feasible, notify the customer of availability before accepting the order. Inform the customer of the delay if the product is out of stock or will take some time to make.

3. Arrange shipments:

It has to be a swift and unavoidable Physical product - choose the best delivery method for quality of service - is the biggest activity for e-logistics in terms of work, energy, money, etc.

4. Insurance:

Customers must have access to this option due to the possibility of product loss or damage during shipping.

5. Replenishment:

This phase is an overview. It should be reviewing every component of a location's physical inventory and placing new orders as necessary: non-products include shipping supplies, spare parts for running machinery, and goods used in the shipping process (such as scanners, bags, carts, etc.). Products include items on store shelves or materials used to make products.

6. Contact with customers:

The consumer needs to be as well-informed as feasible while dealing with an unseen procedure (back-door activities). The following are the most typical forms of communication: order confirmation, payment success, shipping confirmation, tracking details, and any issues encountered during the process.

7. Returns:

Reverse logistics refers to the flow of products from the customer back to the seller. Customers may return or exchange products for the following reasons: damaged, doesn't work, doesn't like it, etc. wrong type, colour, or product

7.3.8 Benefits of E-Logistics:

Support for Real-Time Decisions

Connections between Shipper, Receiver, and Fulfillment Provider

Performance Evaluation

Matching capacity and load

Alerts Based on Exceptions

Transportation Improvement

Wireless Track and Trace Updates

Transportation Paperwork

7.3.9 E-fulfillment:

E-fulfillment is a mixture of the phrase's "ecommerce" and "fulfillment," which are two separate words. Simply put, fulfillment is the process of assembling and sending a customer's order. The orders of consumers are filled in Amazon fulfillment facilities throughout the globe and delivered to them promptly.

The aspect of online stores where products are delivered to clients is called eCommerce fulfillment. E-fulfillment procedures cover a wide range of activities. eCommerce fulfillment involves placing products on the shelves of fulfillment centers. Order fulfillment includes order picking and packing. Third-party logistics operations include shipping schedules and procedures.

In actuality, eCommerce fulfillment has been a crucial component of your company from the beginning. You were your own fulfillment provider when you were filling boxes in your garage. Given the expansion of your company, you might need to outsource to a 3PL.

Fulfillment process:

Picking and packing orders are only one of the fulfillment processes. The top eCommerce fulfillment companies will support the smooth operation of your online retail firm.

Consider the third-party eCommerce fulfillment company as an addition to your company. Your firm becomes more agile if you outsource fulfillment. As your company's demands vary, you can increase and decrease the size of your warehouse. By outsourcing, you can reduce costs and risks.

The e-fulfillment process consists of the following four fundamental parts:

1. **Integration of an online store and fulfillment facility:**

It involves all the transactions and systems of online processes to be integrated properly for smooth functioning.

2. **Receiving and managing inventories:**

Inventories need to be received at the right time, right place and in the right order and to be effectively controlled and managed.

3. **Order Completion:**

Orders need to be executed in order to have customer satisfaction and time management and other order based techniques need to be followed.

4. **Processing of returns:**

Reverse logistics functions and sales return obligations will be involved in processing returns efficiently.

7.4 SUMMARY

Demand Planning is a step in supply chain management that ensures products can be delivered on time and that consumers are satisfied at all times. A successful demand planning strategy can increase the accuracy of revenue predictions, match inventory levels to demand peaks and troughs, and increase the profitability of a specific channel or product. Production and assembly steps are guided by manufacturing flow procedures while applying factors of production to transform raw materials into finished goods.

The sourcing function's responsibilities include choosing the right suppliers, negotiating deals, and managing the acquisition process. First, sourcing must determine whether the requirement can be satisfied by current suppliers or if new suppliers need to be found. In general, sourcing keeps a list of acceptable suppliers for continuing purchases, but it also assesses vendors for brand-new requirements as they arise. Sales return popularly called Reverse logistics, a sort of supply chain management that transfers items from buyers back to sellers or manufacturers, is what it is commonly known as. Reverse logistics are needed for procedures like returns or recycling after a customer receives a product. Sales return begin at the customer and work their way backward through the supply chain to the producer or the distributor. Reverse logistics can also refer to procedures where the customer is in charge of the product's final disposal, such as recycling, refurbishing, or resale. The use of an electronic medium to sell the goods is referred to as the "Electronic market" (also known as the "e-market"). The majority of the time, it relates to the online selling of goods, but the term E market includes online purchase methods as well (for B-To-B). The practice of requesting, ordering, and buying goods and services online is known as electronic procurement, often referred to as e-procurement or supplier exchange. It involves business to business transactions.

E-procurement, in contrast to e-commerce, relies on a supplier's closed system and is only accessible to registered users. Through bids, purchase orders, and invoices, electronic procurement streamlines communications between customers and selected suppliers. e-Logistics is a dynamic combination of communication, computing, and collaboration technologies that alter core logistical operations to be customer centric. Delivering the right products in the right amounts to the appropriate Customer at the proper location and time is E-Logistics' ultimate goal. E-fulfillment is a mixture of the phrases "ecommerce" and "fulfillment," which are two separate words. Simply put, fulfillment is the process of assembling and sending a customer's order. The orders of consumers are filled in Amazon fulfillment facilities throughout the globe and delivered to them promptly.

7.5 EXERCISE

Fill in the blanks:

1. ___ covers sale and purchase activities between two entities.

   (E Market, E Logistics, E Procurement, E Fulfillment)

2. Single source procurement involves ___ suppliers.

   (Selected, Two, Sole, Mixed)

3. ____ is the electronic integration of processes for managing activities efficiently.

   (E Market, E Logistics, E Procurement, E Fulfillment)

4. The purpose of Supply chain management is ____.

   (Increase Production, Decrearse supply, Quality Product, Integrating supply and demand)

5. The use of an electronic medium to sell the goods is referred to ___.

   (E Market, E Logistics, E Procurement, E Fulfillment)

Answers:

1. E Procurement

2. Selected

3. E Fulfillment

4. Integrating supply and demand

5. E Market)

True or False:

1. E Procurement does not provide the latest product information and price online.

2. B2B supply chain has majorly shifted to the Internet.

3. Single source purchasing refers to purchases from one selected supplier.

4. E Logistics is the logistics process that governs everything related to E Markets.

5. E fulfillment is electronic integration.

Answers:

True- 2, 3, 4, 5

False- 1

Shorts Notes:

1. Demand Planning
2. E Logistics benefits
3. E Procurement process
4. E Market
5. E Fulfillment.

Questions for Exercise:

1. What is Demand planning in SCM?
2. Write a note on Sourcing of Procurement
3. Explain E logistics and E markets in detail

*****

8

DESIGN OF SCM LOGISTICS AND USE OF INTERNET - II

Unit Structure

8.0 OBJECTIVES

1. To understand ERP
2. To identify importance and role of Inventory Control
3. To appraise Markov Chains application in SCM
4. To appraise Pareoto's Law of Inventory

8.1 INTRODUCTION

Supply chain management systems (SCMS) are created to coordinate all or a large portion of the product movement. Enterprise resource planning (ERP) software features that optimise internal tasks and procedures are occasionally incorporated into SCM systems. These features are pertinent to the operations management industry. Conversely, SCM tools are frequently included in ERP suites, and their capability can be increased by integrating SCM add-ons that are compatible.

8.1.1 Enterprise resource planning:

Enterprise resource planning (ERP) integrates internal and external management information across an entire organisation, embracing finance/accounting, manufacturing, sales and service, etc.

- ERP systems automate this activity with an integrated software application. Its purpose is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders.
- ERP systems can run on a variety of hardware and network configurations, typically employing a database to store data.

- The functional areas of ERP include finance or accounting, cash management, budgeting

Manufacturing, scheduling, capacity, workflow management, quality control, cost management, manufacturing process, product lifecycle management, supply chain management order to cash, inventory, order entry, purchasing, supply chain planning, supplier scheduling, inspection of goods, claim processing, commissions, project management, costing, billing, time and expense, performance units, activity management, customer relationship management, sales and marketing, commissions, service, customer contact, call center support, data services, self–service interfaces for customers, suppliers and employees

The goal of ERP, also known as Integrated Management Software (PGI), is to entralize all business operations (including so-called vertical activities like production and procurement as well as horizontal activities like marketing, sales, and human resource management) around a single information system.

In order to enable cross-service communication and information flow, integrated management software typically offers groupware and workflow features. The name of the MRP (Manufacturing Resource Planning) approach, which was employed in the 1970s to manage the planning of industrial output, is where the term "ERP" originates.

8.1.2 Implementation of ERP:

1. Software System:

ERP is much more than simply software; it's a real project that calls for thorough integration of a software tool within an organisation and a particular structure, which entails high engineering expenditures. However, its adoption in an organisation necessitates considerable adjustments to the working practices of a sizable portion of the workforce. Therefore, it is estimated that less than 20% of the entire cost of putting such a system in place goes toward the cost of the software tool.

2. Application:

The goal of EAI (Enterprise Application Integration) is to ensure communication between the various applications that make up the company's information system, including those of customers, partners, or suppliers. EAI also organises the flow of information between heterogeneous applications.

Therefore, designing an architecture through which the various applications can communicate with one another is the first step in an EAI project. As a result, this calls for the creation of connectors (middleware), which enable the interaction of programmes using various communication protocols (generally proprietary).

However, the EAI project extends beyond application compatibility; it also makes it possible to create a workflow between apps, making it a

more modular alternative to ERP. However, EAI still has limitations due to the rigidity of the legacy, as it is required to adapt the middleware in the event that the applications undergo substantial modifications.

8.1.3 Markov Chain:

A Markov chain is a mathematical mechanism that changes states within a limited range of potential states. It is a collection of potential outcomes and probabilities for a variable, where the condition or state of the variable's future depends heavily on the state of the variable's current situation.

A Markov chain is often referred to as a Markov process or a discrete time Markov chain (DTMC).

Markov chains are typically used to forecast an object's or variable's future state based on its previous state. It uses probabilistic methods to forecast the upcoming condition. Directed graphs, which outline the present and past states as well as the likelihood of changing between them, are used to illustrate Markov chains.

A supply chain is conceptualised as a network of interconnected entities (parts) that play the parts of suppliers and customers. The concept is to view chains from a global perspective, where individual portions operate in diverse regions. These regions need not just be geographically unique; they could also, for example, be distinct from one another in terms of economy, politics, or culture. In order to estimate the type of potential disruptions, the likelihood of their occurring, or the amount of time needed to mitigate the effects of such unforeseen events, individual locations might be examined in terms of their entrepreneurial environment. The supply chains under consideration are capacity-neutral, and a link in the chain that comes after a previous link can process.

Markov Chain, being a model describing a sequence of possible events based on mathematical algorithm which transit from one state to another. Its application in SCM can be analysed in the areas given below:

1. Outlining the structure of the supply chain (assigning supplies chain connects to separate layers).
2. Entering input parameters for each supply link chain.
3. Defining the highest level of performance that the supply chain and the greatest quantity of the whole amount of the budget.
4. Choosing an allocation strategy.
5. Determining the odds of transition between full states of operation and disruption for the supply chain links.
6. Produce every conceivable supply chain condition.
7. Supply chain transformation probability calculation matrix.

8. Supply chain stationary vector calculation state-specific odds of occurrence.

9. Measuring supply chain efficiency in a specific, proven allocation scheme

8.3 INVENTORY CONTROL

Inventory control refers to all the procedures and systems in place for maximising the use of that inventory, including purchasing, shipping, receiving, storing, and reordering. Inventory refers to the raw materials, work-in-progress goods, and finished products that represent the primary source of revenue for any business.

Any business' supply chain includes every step of the process, from obtaining materials from a supplier to shipping a finished product to the client. The majority of business owners don't participate in their suppliers' and carriers' daily activities. Businesses should first concentrate on inventory control in order to maintain efficiency throughout the supply chain process.

Any business that sells products has one of the highest capital expenditures: inventory. This sort of company's balance sheet is likely to show that inventory consumes a significant amount of working capital and makes up a sizable component of current assets.

Controlling inventory helps businesses avoid the significant expenses associated with overbuying inventory and the stress of operating without it. Even though certain businesses that use just-in-time ordering may have incredibly low inventories, almost every industry needs some sort of inventory, which is best controlled through inventory control systems.

A corporation may discover new cash available for growth or profits if it can reduce inventory. A corporation may have better sales and once again higher profits if it needs to carry more inventory and strict inventory control procedures increase inventory levels. Inventory control is a surefire approach to reduce costs and manage any kind of product in your warehouse, stock room, supply room, or storefront.

8.3.1 Importance of Inventory control:

1) Prevents Dead stock, spoilage:

It prevents buffer stock, dead stock and spoilage so it eliminates loss making risks in SCM process

2) Managing Extra storage expenses:

The Extra efforts and expenditure involving space utilisation can be managed effectively if inventory control is given importance in SCM

3) Cost-efficiency:

Because of Prevention of losses and management of stock evils like dead stock it saves cost.

4) Managing sales:

Sales and sales return both can be supervised in proper order if inventory control techniques are applied.

5) Prevents from losing loyal clients:

Customers turn loyal if the order is timely managed and executed properly which is a resultant factor of effective Inventory control.

6) Reducing surplus stock:

The surplus or excess stock is managed and controlled and it leads to minimization of expenses and wastages.

7) Inventory tracking:

Inventory tracking is possible because of Inventory control systems adopted through well balanced techniques like AMC, Economic Order quantity etc.

8) Warehouse management:

Warehousing functions and operations are the main element of inventory control.

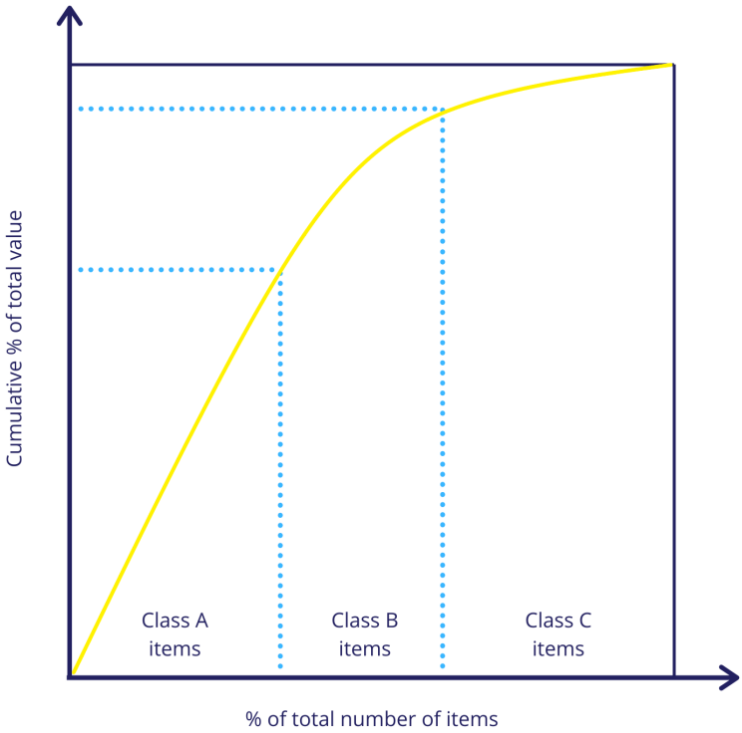
8.3.2 Pareto' s law of Inventory:

Vilfredo Pareto, an economist from Italy who investigated land ownership in the early 20th century and discovered that roughly 20% of the population possessed title to approximately 80% of the property, is remembered by the law's name. According to legend, he further developed the hypothesis after realising that in his garden, 20% of the pea pods produced 80% of the peas. Pareto's law is frequently referred to as the "80/20" rule for this reason. Despite this, there is nothing "magical" about the 80% number. However, while some corporate systems do exhibit an 80/20 link, others do not. However, the main idea is still valid: A small number of factors will produce the majority of the outcomes. Inventory management uses the categorising method known as ABC analysis.

The method is based on the Pareto principle, sometimes known as the 80/20 rule, which claims that 20% of causes account for 80% of consequences, indicating an unequal relationship between inputs and outputs.

By applying this theory to inventory control, we discover that the majority (80%) of the overall consumption value is made up of a limited variety (20%) of stock-keeping units (or sales revenue in case you need to apply the analysis to final products).

Knowing which SKUs make up the majority of your business allows you to prioritise the goods before settling on service levels and safety stocks, deciding on price with suppliers, or allocating staff to jobs like inventory reviews.



Source: https://manufacturing-software-blog.mrpeasy.com/wp-content/uploads/2020/09/abc-pareto-curve.png

According to the Pareto principle, 20% of your SKUs account for 80% of the total consumption value of your inventory.

How to carry out an ABC evaluation

SKUs are divided into three groups based on the ABC analysis:

Items in the A class are scarce (around 20 percent), but they have the highest consumption values (ca. 80 percent altogether).

Although C class items are plentiful (approximately 50%), they have a low consumption value (ca. 5 percent altogether).

Between the two aforementioned groups are B class items (making up about 30 percent of the items with around 15 percent of the consumption value).

It is strongly advised to measure an SKU's worth using its consumption value or revenue generated rather than its number because quantity is frequently a poor predictor of business value. Only when physically organising your inventory should you use an SKU's quantity

The cost per unit of an item can be multiplied by the quantity utilised over a predetermined time period, preferably a year, to get the item's consumption value.

Pareto's Law application to SCM

The following points highlights Pareto's Law to SCM:

1. Reviewing the Inventory:

Businesses that keep goods in stock to sell to clients frequently see a Pareto distribution in the value of that stock. For instance, a business may find that 20% of the items in its inventory represent 80% of the entire value of inventory. Inventory management takes time and money. A corporation can maximise its return on investment by concentrating its inventory control efforts on those specific goods after realising that a small number of things account for the vast majority of inventory value.

2. ABC Evaluation:

The ABC analysis inventory control method expands on Pareto's law. In an ABC analysis, a business looks through its inventory and divides everything into three groups, referred to as "A" things, "B" items, and "C" products. The usual breakdown might appear as follows: Inventory type "A" contains 20% of products and has an 80% value, whereas inventory type "B" contains 30% of products and has a 15% value. 50% of items, 5% of value is the "C" incentive. Again, the figures for a certain organisation might be different, but managers ought to be able to spot a similar kind of pattern.

3. Control Techniques:

A business can create an inventory-control strategy that concentrates effort where it will have the biggest impact once it has completed its ABC analysis. Items in "A" inventory are tightly controlled, which means the company closely monitors how much inventory it has on hand, closely monitors current demand and demand projections, and carefully plans its ordering to avoid running out of stock or having too much excess inventory that could become obsolete. Although the corporation pays special attention to items in "B" inventory as well, it does not frequently examine its ordering policy. The corporation can order things in "C" inventory in large quantities and with minimum oversight because they are the least expensive. The most important thing is that the company does this.

8.4 SUMMARY

Enterprise resource planning (ERP) integrates internal and external management information across an entire organisation, embracing finance/accounting, manufacturing, sales and service, etc. ERP systems automate this activity with an integrated software application. Its purpose is to facilitate the flow of information between all business functions

inside the boundaries of the organization and manage the connections to outside stakeholders.

A Markov chain is a mathematical mechanism that changes states within a limited range of potential states. It is a collection of potential outcomes and probabilities for a variable, where the condition or state of the variable's future depends heavily on the state of the variable's current situation.

A Markov chain is often referred to as a Markov process or a discrete time Markov chain (DTMC).

Inventory control refers to all the procedures and systems in place for maximising the use of that inventory, including purchasing, shipping, receiving, storing, and reordering. Inventory refers to the raw materials, work-in-progress goods, and finished products that represent the primary source of revenue for any business.

Any business' supply chain includes every step of the process, from obtaining materials from a supplier to shipping a finished product to the client. The majority of business owners don't participate in their suppliers' and carriers' daily activities. Businesses should first concentrate on inventory control in order to maintain efficiency throughout the supply chain process.

Vilfredo Pareto, an economist from Italy who investigated land ownership in the early 20th century and discovered that roughly 20% of the population possessed title to approximately 80% of the property, is remembered by the law's name. According to legend, he further developed the hypothesis after realising that in his garden, 20% of the pea pods produced 80% of the peas. Pareto's law is frequently referred to as the "80/20" rule for this reason. By applying this theory to inventory control, we discover that the majority (80%) of the overall consumption value is made up of a limited variety (20%) of stock-keeping units (or sales revenue in case you need to apply the analysis to final products).

8.5 EXERCISE

Fill in the blanks:

a. ERP system is the heart of ____.

(Customers. Shareholders, Database, Information)

b. ___ was the Founder of Pareto's Law.

(Philip Kotler, Henry Fayol, Vilfredo pareto, John Coyle)

c. ERP help streamlining business ___.

(Strategies, Activities, Processes, Operations)

d. Pareto law is called ___.

(80-20 rule, Just in time, BullWhip, FSN analysis)

e. A ___ is a mathematical system that experiences transition from one state to another.

(Markov Chain, ERP, Pareto Law, SCOR)

Answers:

1. Information

2. Vilfredo Pareto

3. Processes

4. 80-20 rule

5. Markov Chain

Match the Column:

A	B
1. ERP	a. Integrated Network
2. ABC Analysis	b. Demand Forecasting
3. Markov Chain	c. Pareto Law
4. Safety stock	d. Machines
5. Inventory	e. Mathematics

Answers: 1-a, 2-c, 3-e, 4-b, 5-d

Shorts Notes:

1. Markov Chain
2. Pareto Law
3. ERP elements
4. Inventory Control- Importance

Questions for Exercise:

1. What is ERP? What are its Elements?
2. Write a note on Importance of Inventory Control
3. Write a note on Pareto's Law.

8.6 REFERENCE

- Bowersox, D. (1969) Physical distribution development, current status, and potential, Journal of Marketing, vol. 33, 63–70

- Chopra, S., &Meindl, P. (2007). Supply chain management. Strategy, planning & operation. In Das summa summarum des management (pp. 265-275). Gabler.
- Chopra, S., & Sodhi, M. S. (2004). Supply-chain breakdown. MIT Sloan management review, 46(1), 53-61.

*****