

Logistics and Supply Chain Management

Dr. S. UMASARULATHA

Assistant Professor and Head

Department of Commerce

Annai Violet Arts & Science College

53, Violet College Road, Menambedu, Ambattur,

Chennai, Tamil Nadu 600053, India.



www.jpc.in.net

Logistics and Supply Chain Management

Author(s):

Dr. S. Umasarulatha

@ All rights reserved with the publisher.

First Published: October 2022

ISBN 978-93-91303-39-6



ISBN: 978-93-91303-39-6

DOI: <https://doi.org/10.47715/JPC.B.978-93-91303-39-6>

Pages: 280 (Front pages 10 & Inner pages 270)

Price: 350/-

Publisher:

Jupiter Publications Consortium
22/102, Second Street, Virugambakkam
Chennai, Tamil Nadu, India.
Website: www.jpc.in.net
Email: director@jpc.in.net

Imprint:

Magestic Technology Solutions (P) Ltd.
Chennai, Tamil Nadu, India.

This Book
is
Dedicated to my
Parents

Title Verso

Title of the Book:

Logistics and Supply Chain Management

Author's Name:

Dr. S. Umasarulatha

Published By:

Jupiter Publications Consortium

Publisher's Address:

22/102, Second Street, Venkatesa Nagar, Virugambakkam
Chennai 600 092. Tamil Nadu, India.

Printer's Details:

Magestic Technology Solutions (P) Ltd.

Edition Details: First Edition

ISBN: 978-93-91303-39-6

Copyright: @ Jupiter Publications Consortium

Jupiter Publications Consortium
22/102, Second Street, Virugambakkam
Chennai 600 092. Tamil Nadu. India

@ 2022, Jupiter Publications Consortium
Imprint Magestic Technology Solutions (P) Ltd

Printed on acid-free paper
International Standard Book Number (ISBN): 978-93-91303-39-6
(Paperback)
Digital Object Identifier (DOI): 10.47715/JPC.B.978-93-91303-39-6.

This book provides information obtained from reliable and authoritative sources. The author and publisher have made reasonable attempts to publish accurate facts and information. However, they cannot be held accountable for any content's accuracy or usage. The writers and publishers have endeavoured to track down the copyright holders of every content copied in this book and regret if permission to publish in this format was not acquired. Please notify us through email if any copyright-protected work has not been recognised so we may make corrections in future reprints. No portion of this book may be reprinted, reproduced, transmitted, or used in any form by any electronic, mechanical, or other means, now known or hereafter developed, including photocopying, microfilming, and recording, or in any information storage or retrieval system, without the publisher's written permission.

Trademark Notice: Product or corporate names may be trademarks or registered trademarks and are used only for identification and explanation without intent to infringe.

Visit the Jupiter Publications Consortium Web site at
<http://www.jpc.in.net>

Preface

This book brings together the theory and practice of supply chain management. It does so by drawing on the author's more than 20 years of experience in supply chain and operations management research and consulting with government and industrial organisations. A competitive supply chain can be constructed with the help of the information provided, which includes details on efficient management practices, operational models, decision-making procedures, and technological resources. A fundamental overview of supply chain management covers various topics, including e-commerce, collaborative planning, forecasting, replenishment, data mining, knowledge management, and business intelligence.

This course is designed to cater specifically to Logistics and Supply Chain Management majors' requirements in the Commerce and Management field. The requirements for the operations B.Com degree and the logistics and supply chain management curriculum at the University of Madras and major Indian universities are both intended to be met by this text, which was written with those requirements in mind. The first section of this book is an overview of Logistics and Supply Chain Management that is concise and easy to understand.

- Author

Dr. S. Umasarulatha

Assistant Professor and Head

Department of Commerce

Annai Violet Arts & Science College

53, Violet College Road, Menambedu, Ambattur,

Chennai, Tamil Nadu 600053, India.

LOGISTICS AND SUPPLY CHAIN MANAGEMENT

SYLLABUS

Learning Objectives: The students to gain deeper insights into logistics and supply chain management. Highlight the integrated nature of working in the logistics and supply chain industry. To prepare students to work in logistics and allied industries.

Outcome: On completion of the syllabus, students will understand the basic concepts of logistics and supply chain management, and the student will prepare themselves to work in logistics and allied industries

UNIT 1: Concepts of Logistics ~ Evolution – Nature and Importance – Components of Logistics Management- Competitive advantages of Logistics – Functions of Logistics management – Principles – Logistics Network- Integrated Logistics system, Supply chain management – Nature and Concepts – Value chain- Functions ~ Supply chain effectiveness ~ Outsourcing ~ 3PLs and 4PLs – Supply chain relationships – Customer services.

UNIT 2: Elements of Logistics and Supply chain management – Inventory carrying – Warehousing, Technology in the warehouse: Computerisation, Barcoding, RFID and WMS – Material handling, Concepts and Equipment: Automated Storage and Retrieval Systems ~ Order Processing – Transportation - Demand Forecasting - Impact of Forecasts on Logistics and Supply chain Management- Performance measurements.

UNIT 3: Transportation ~ Position of Transportation in Logistics and Supply chain management- Road, Rail, Ocean Transport - Ships- Types- Measurement capacity of ships ~ shipping information, Air, Transport Multi-model transport – containerisation – CFS ~ ICDS-Cross Docking- Selection of transportation mode ~ Transportation Network and Decision – Insurance aspects of logistics.

UNIT 4: Logistical Information System (LIS) - Operations – Integrated IT solution for Logis and supply chain management- Emerging technologies in Logistics and Supply chain management, Components of a logistic system-transportation-Inventory carrying-warehousing-order processing – Distribution channels- Difference between warehouse and distribution centre.

UNIT 5: Performance- Benchmarking for supply chain improvement- Dimensions and achieving excellence- Supply Chain Measures ~ SCOR model- Logistics score board- Activity Based Costing - Economic Value Added Analysis- Balance Scorecard approach-Lean thinking and six sigma approach in Supply Chain,

Recommended Text

1. John J.Coyle, C. John Langley JR., Robert A. Novack, Brian J.Gibson — Supply Chain Management A Logistics Perspective - CENGAGE, New Delhi
2. Joel D.Wisner, Keah - Choon Tan, G.Keong Leong ~ Principles of Supply Chain Management A Balanced Approach CENGAGE, New Delhi

Reference Books:

- 1, Agarwal, D.K., "Textbook of Logistics and Supply Chain Management, Mac Millan India Lid, 2003.
2. Chase, R.B., Shankar, R and Jacobs, F.R.' Operations Management and Supply Chain Management, McGraw Hill Publications, 13" edition, 2018.
3. Chopra, S., Meindl, P. and Kalra, D.V.' Supply Chain Management, Pearson Education India, 6" edition, 2016,
4. Krishnaveni Muthiah, "Logistics Management and Seabome Trade', Himalaya Publishing House, 2010.
5. Martin Christopher, 'Logistics and Supply Chain Management Pearson Education, 2003.
6. Ronald H. Ballou, "Business Logistics and Supply Chain Management Pearson Education 2004.

Table of Contents

Unit 1: Concepts of logistics	1-78
Unit 2: Elements of logistics and supply chain management	79-138
Unit 3: Transportation	139-174
Unit 4: Logistical information system (LIS)	175-220
Unit 5: Performance	221-270

*This Page
Intentionally Left Blank*

LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Unit -1

1.1 Concept of Logistics

The process of planning, implementing, and controlling the efficient flow of raw materials, work-in-progress goods, finished goods, and related information from the point of origin to the point of consumption is called logistics management. Logistics management aims to ensure that the customer is happy with the product.

Materials management and physical distribution are the two distinct but interrelated subfields that make up the field of logistics. Logistics encompasses various activities connected to manufacturing and delivering consumer products. Material management encompasses all of the actions associated with the manufacture of components and final products, such as the packaging of those products and any eventual recycling or reuse of the materials. Transportation and storage are two of the most important aspects of physical distribution. This aspect encompasses all the operations involved in making components and completed products accessible for purchase.

Because distribution channels extend from suppliers to consumers and responsibility for transport and warehousing is shared between manufacturers, wholesalers, and retailers, it becomes increasingly difficult to differentiate between the physical distribution of goods and the management of the materials used in their production as a supply chain becomes more integrated. Because clients often do not differentiate between a product and the distribution system that distributes it, logistics must remain consistent with the items it supports.

In addition, logistics entails an essential link between the derived and induced demands that its actions impose. Materials management often creates a derived need for physical distribution since the things created need to be moved, stored, and sold to customers. Nevertheless, physical distribution has an induced demand impact on the management of materials since the capabilities of distribution will affect production in

terms of its structure and location. One way to think of the relationship between manufacturing and distribution is as an integrated supply chain. The needs for manufacturing and mobility are integrated (synchronised) inside one another because whatever is being produced must also be transported at a comparable pace through the supply chain.

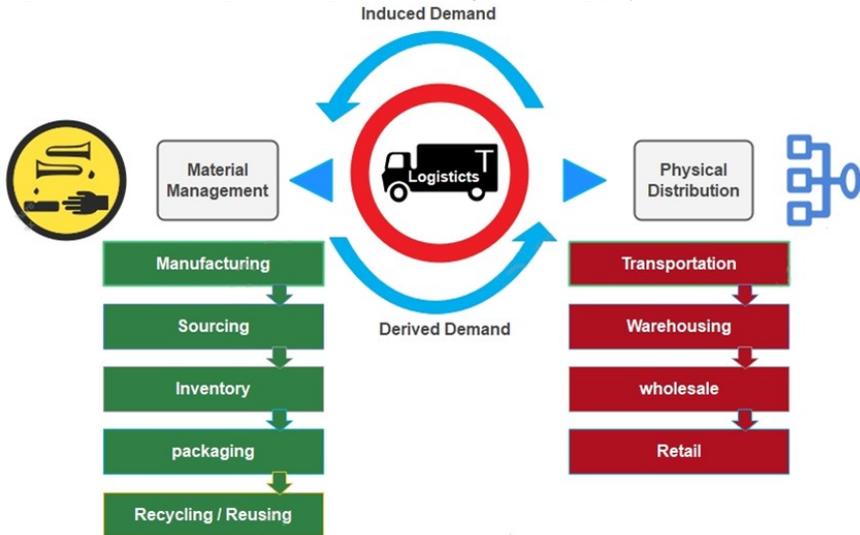


Fig.1 Concept of Logistics

This is one of the significant remarks that can be made about the notion of logistics.

(i) The real job of logistics is primarily supportive. For successful manufacturing and marketing activities, logistical assistance is an absolute need.

(ii) The idea of logistics is predicated on taking an all-encompassing look at the myriad of tasks involved in transferring resources and commodities from their points of origin to their final consumers. Consequently, management is compelled to think about managing the whole system rather than simply a particular component.

It ought to be common knowledge that the ideas of logistics and the supply chain have developed throughout the last half a century. Research and studies have adhered to a specific ranking presented in the form of a list

chronologically ordered by a decade to be as accurate as possible from a logistical perspective. Nevertheless, before we get into it, an important disclaimer: this viewpoint is just that. It does not cover all of the facts or even the most significant ones about the history of logistics. However, it contains those significant from the perspective of some writers published between 1950 and the current day.

1.2 Evolution of Logistics

As seen in Figure 2, the first form of the chronological development of the logistics and supply chain ideas assumes the presence of seven separate and significant periods.

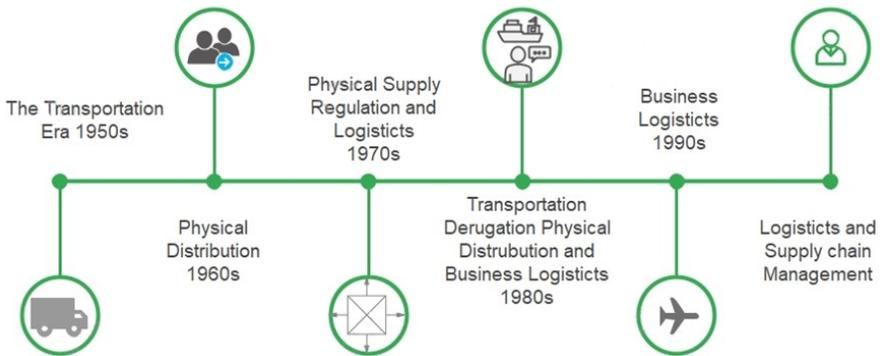


Fig.2 The Chronological Evolution of Logistics & Supply Chain Concepts

The First period was known as the Age of Transportation (the 1950s).

The Second period is the Distribution in the Physical World (the 1960s).

The Third period is Deregulation, Physical Supply, and Logistical Considerations (the 1970s).

The Fourth period is transportation, deregulation, physical distribution, and business logistics (the 1980s).

The Fifth period is Logistics in Business Operations (the 1990s).

The Sixth period is the management of Supply Chains and Logistics (the 2000s).

The Seventh period is the Digitalization of Supply Chains (2010 and Beyond).

➤ The Decade of the 1950s: The Age of Transportation

The transportation industry dominated the decade of the 1950s. Several educational institutions provided training in the sector of transportation. However, subjects such as supply chain management, logistics, physical sourcing, and logistics are not included in these classes. Back then, there were no computers and not even pocket calculators, so there was no way to help quantify the data. In addition, the systems approach and the idea of the total cost are seldom, if ever, brought up in the conversation. At the time, most managers did not place a high premium on the concept of collaborating with either consumers or suppliers. The word "logistics" is most often heard in the military context. In times of conflict, it is essential to have the appropriate supplies available in the appropriate location at the appropriate time.

During the 1950s, the federal government was the most influential actor. For instance, the Federal Aid Highway Act of 1956, which authorised the National Interstate Highway and the Defense Highway System, was the most important event in logistics (or transportation). These two highway networks are still in use today. The Interstate Commerce Commission (ICC), which has been in existence since 1887, is the organisation that is responsible for regulating the economy of road and rail transportation. The International Chamber of Commerce has authority over all duties and rules about the admission of road carriers, including those about road and rail freight as well as rail freight.

Additionally, the ICC is responsible for regulating the closing of railway lines. In the 1950s, several different organisations provided students and practitioners with transportation. Many businesses push their employees in the transportation industry to take and pass the ICC Practitioner test, which is organised and presented by the ICC Practitioners Association (now the Transportation Practitioners Association 1984, the Transportation Law, Logistics and Policy Association 1994).

➤ **The 1960s: A Time for the Distribution of Physical Goods**

In the 1960s, transportation study morphed into the study of logistics and, to a lesser degree, logistics. The National Council of Physical Distribution Management (NCPDM) was founded in 1963 as a representative body for

professional logistics managers. In 1985, this group became known as the Council of Logistics Management (CLM), and in 2004, it became known as the Council of Supply Chain Management Professionals (CSCMP). The CSCMP now has a membership of around 14,000 people. In most circumstances, logistics (outbound logistics) and physical supply (inbound logistics) are separate and independent roles. This was mirrored in the two most essential organisations during this period. The National Association for Purchasing Management (NAPM) covers the incoming side of logistics, whereas NCPDM, founded in 1963, represents the outbound side of the logistics industry. In 1965, the NAPM launched a brand new journal known as Purchasing Magazine. In the 1960s, some notable writers contributed to academic and professional periodicals in addition to writing textbooks. During this decade, Smykay, Bowersox, and Mossman published one of the first textbooks to concentrate on logistics distribution and logistics, titled Logistics Management: Logistics Problems in the Enterprise (R. Neil Southern, 2011).

Although logistics gained much attention in the literature throughout the 1960s, the transportation function was considered the most significant aspect of logistics at that time. The American Transportation Association brought out the inaugural edition of Transportation Magazine in the late summer or early autumn of 1961. Public Law 89-670 was signed into law by President Lyndon B. Johnson in 1966, officially creating the Department of Transportation. Alan S. Boyd was chosen to serve as the first Secretary of Transportation for the United States.

➤ **The 1970s: Deregulation, Physical Supply, and Logistical Developments**

At the beginning of the 1970s, a new company took over the logistics system's physical supply (also known as material management) of the input side. Later in the century, there was a trend toward combining the processes of physical distribution and physical delivery processes, with a focus placed on more general concepts of logistics. The 1970s were a crucial decade for developing the idea of logistics further in the decades that followed. Universities, academic publications and textbooks, as well as

professional organisations, were all contributors to the decade's overall level of productivity.

In addition, a stronger emphasis is placed on transportation as an essential part of logistics management. The decade of the 1970s saw the rise of the *Transportation Journal* to its current position as one of the most influential academic publications within the field of transportation and logistics. This is because the latter has produced a collection of publications in economics, industrial management and transportation, physical distribution, logistics, regulation, public policy, education, and communication, as well as other related issues. The *Journal of Business Logistics (JBL)*, which was first released in 1978 and is now considered one of the most prestigious academic publications in its field, is yet another academic journal that focuses on the logistics industry and was first published by the NCPDM. The Ohio State University served as the location for the production of JBL. According to Miyazaki, Anthony D., and others' (1999) research, Professor Bernard "Bud" LaLonde was the journal's initial editor.

➤ **The 1980s: Deregulation of the Transportation Industry, Physical Distribution, and the Emergence of Business Logistics**

The Motor Carrier Act of 1980, which lowered regulation of road freight rates and entrance requirements, was one of the laws that contributed to the continuous deregulation that took place during the 1980s, particularly in the transportation industry. The Staggers Rail Act of 1980 granted the railroads the authority to negotiate contracts and conduct business with a reduced level of control from the ICC.

The CAB terminated operations in 1984, and the federal government sold off its common shares in Conrail the following year, in 1987. The United States' transportation sector has become more competitive and adaptable due to the federal government's deregulatory efforts. During the 1980s, the word "logistics" started to take the place of "physical distribution," which was beginning to lose popularity.

➤ **The 1990s: A Decade Focused on Business Logistics**

The decade of the 1990s saw a continuation of the importance placed on corporate logistics as a significant component. The vast majority of

businesses focusing on cost have realised that there are chances for cost reductions via the deployment of the systems approach and the total cost concept, as well as through negotiations with carriers. In the fourth edition of their textbook, Johnson and Wood changed the name of the book from Contemporary Distribution to Contemporary Logistics without the phrase "Physical Distribution" in the title. Many transportation firms have taken advantage of logistics by approaching it from a theoretical standpoint. As a result, they have promoted the notion that they are not only transportation businesses but also logistics carriers or that they provide logistical solutions.

The fast growth of electronic and communication technologies throughout the 1990s, such as the Internet and electronic data exchange, were the primary causes that impacted logistics. Significant progress has also been made in developing strategic alliances, partnerships, and third-party logistics companies. It has recently come to the attention of businesses that logistics is an essential component of overall company strategy.

➤ **The decade of the 2000s: Management of Logistics and Supply Chains**

In both the academic and commercial worlds, the early years of the 21st century have gradually transitioned from supply chain management to logistics. The notion of a supply chain has been slower to catch on in the world of small and medium businesses, which are a component of the business sector.

Therefore, supply chain management has evolved to be considered a chain that involves the planning and management of all activities involved in sourcing and converting and all logistics activities. This includes the planning and management of all operations. According to a passage in the textbook entitled "Transport and Logistics Basics," "The supply chain encompasses all stakeholders in the logistics process." The goal is to provide seamless information exchange among all parties involved in a given transaction, including retailers, wholesalers, and manufacturers.

This analysis of the evolution of logistics and supply chain management over the last several years would not be complete without discussing the

progress made in these fields via online and remote education. It would be pretty unusual to come across a college or institution that did not have a presence of some kind on the internet. Learning at a distance is an essential component of the logistics of education. According to its website, the Logistics Management Institute is the world's oldest institution offering logistics courses through remote learning.

➤ **The years 2010 until the present The Age of Digitalization Within the Supply Chain**

The dematerialization of information processing is analogous to the digitization of the supply chain. This digitization allows for improved management of data flows and an unprecedented level of dependability of information about Supply Chain processes. Therefore, the digitization of flows, whether physical logistics flows or just-in-time logistics flows, is necessary for effective production flow management.

These days, all kinds of firms must contend with an intensified rivalry brought on by the expansion of international trade. The need to digitise the supply chain became crucial for businesses to maintain their competitive edge. There is no longer any doubt about the positive effects that the digitalization of supply chains may have.

1.3 Nature and Importance of Logistics

Logistics management aims to manage several processes involved in the supply chain while also providing the maximum degree of accuracy possible to fulfil the customers' requirements. It does this by providing visibility with updated data in real-time, which helps streamline the delivery process and prevent interruptions. The manufacturing process and the distribution of products or services are both aided by the logistics process. It plans, optimises, and controls each necessary process to achieve more agility in the transportation business. The use of logistics in the supply chain tends to raise the overall quality of business operations and allows companies to adjust rapidly to shifting market trends. In addition, it can forecast demand and provide solutions to problems that arise inside supply chains. As a result, the logistical process is an essential component of supply chain management.

Ten reasons why logistics is of the utmost importance

1. Increase the Profitability of our Company

Our company's capacity for growth and expansion is directly proportional to its level of operational excellence, which may be improved by using this capability. The management of logistics is essential since it enables businesses to get a comprehensive understanding of the supply chain. This not only boosts the pace at which orders are fulfilled but also allows significant commercial results. The operations may see increased productivity and profitability if they focus on adding value for their consumers via the most recent technology developments.

2. Improve Customer Experience

The most important part of the logistics process is to keep track of the various components of the supply chain. It enables businesses to offer clients a service that is both quick and of high quality while also facilitating good communication with customers. As a result, logistics operations that run smoothly provide excellent value for clients, which in turn helps to establish the business's reputation. Improved customer service is one of the most important factors determining a company's overall success.

3. Bring down the costs of operations

Keeping an eye on all of the different links in the supply chain is the aspect of the logistics process that is considered to be the most crucial. It makes it possible for companies to provide consumers with speedy and high-quality service while making it easier for companies to communicate effectively with customers. Because of this, logistical operations carried out without hiccups deliver significant value to customers, which in turn helps to create the company's credibility. An increase in customer service quality is an essential variable that determines a business's overall success.

4. Ensure a Smooth Delivery of the Goods

When professionally organised, logistics often results in the delivery of the appropriate items at the appropriate time. Because quick and secure shipment adds value to the shopping experience, delivery procedures in the contemporary world are continuously being updated and improved. Effective logistics management aims to ensure that items are delivered to

clients on time or before schedule. Because of this, timely delivery should be the primary emphasis of any well-organized supply chain management technique.

5. The Effectiveness of the Supply Chain

Logistics management is concerned with various areas of the supply chain, including manufacturing, the automation of tasks, material processing, and distribution. Monitoring the various forms of networking that occur throughout the supply chain is essential to ensuring that corporate activities are carried out effectively. In addition, effective management of our supply chain may assist us in increasing our company's value. In addition, businesses have the potential to obtain a distinct edge over their rivals.

6. Enhance Warehousing Operations

Control and visibility into the warehouse's operations become possible, optimising logistics. It is usually recommended that firms centralise the complicated process by designing warehouse inventory strategies. Goods storage and material handling are essential to warehouse management. Distribution is a vital part of the transportation sector, beginning with auditing and monitoring and ending with the ultimate delivery of products.

7. Enhancing Visibility

The proper management of our company's logistics is essential to the expansion of our company since it plays a significant part in enhancing the connection, interoperability, and visibility of the operations. We can do real-time analysis on every level of our supply chain. Obtaining vital information helps organisations to exercise cost management and determine where there are opportunities for efficiency gains. Therefore, maintaining openness across the supply chain may help satisfy our customers' needs and limit the number of times breakdowns occur. Ensuring supply chains are synchronised is essential to help both the company and the consumers.

8. Intelligent Route Planning

Excellent customer service may be achieved while keeping costs minimum when delivery and logistics operations are carried out with intelligent route planning software. Regarding logistics management, optimising routes with the help of the most effective GPS tracking company in Jaipur is considered an important aspect. This is because using route planning software helps reduce the amount of dependence on manual processes and boosts timely delivery. In addition, it also makes driving goods and automobiles safer for drivers. Regarding a company's expansion, logistics and transportation management are essential tasks.

9. Risk Management

The ability of company owners to comprehend interruptions clearly and efficiently is facilitated by the development of a risk management strategy. Evaluating the activities within our supply chain to assess the effect of operations may direct the company toward accurately predicting both supply and demand in advance. An efficient risk management method may be developed via logistics management to lessen the adverse effects of potential risks to a firm. It is essential to simplify and streamline the logistics planning procedures to provide customers value.

10. Scalability

Managing and monitoring the distribution network is essential to keep up with the rising market expectations. The software may make the firm more scalable by improving its capacity to react rapidly to changes in the market. Therefore, cutting-edge software emphasises the growth and scalability of logistics in response to customer demand. It is possible to improve the precision of operations by optimising logistics planning processes and spotting new developments.

The supply chain is an ongoing process that includes manufacturing, warehousing, packing, and transporting items to their ultimate destination. The smoother the flow of each transaction, the more business we generate and the more money we make. Customers value safety and quick turnaround times, so giving them what they want will set us apart from the competition. While it is true that effective marketing is essential

to growing our business and attracting new clients, the quality of service we provide to our current clientele is just as crucial. Each shipment is its entity that must be handled with exceptional skill. A reliable logistics provider is essential for doing this. If we do not, we will lose money.

1.4 Components of Logistics Management

For businesses to effectively manage their supply chains, logistics management must be handled on a complicated level. The primary elements are responsible for establishing and maintaining uniformity in the flow of products from the producer to the distributor or the customer. It defines the logistical activities that take place throughout the supply chain.

Because of the rapid changes in the industry and the increasing demand for faster and more efficient logistics to get a product into the hands of the consumer or distributor, it is essential to have in-depth knowledge and understanding of the critical components of logistics management.

In order to contribute to the process's overall improvement, one must first investigate the process's major components. The following is a list of the five most important aspects of logistics management:

- ❖ Planning: storage, warehousing, and materials handling
- ❖ Packaging and utilization
- ❖ Inventory control
- ❖ Transportation
- ❖ Information and control

1. Planning: Storage, Warehousing, and Materials Handling

The market is inherently unpredictable and highly vulnerable to imbalances between supply and demand. Even if there could be a consistent supply of commodities, there is never a consistent demand from customers for those things. It is impossible to forecast its behaviour since various elements directly influence it.

Logistics administration is essential in guaranteeing a steady and unbroken flow of products from the point of production to the final customer. When maintaining a robust supply chain, meticulous planning is essential.

As a result of the ebb and flow of supply and demand, there is sometimes an inadequate supply of commodities on the market, while at other times, there is an excess of items that have been manufactured. When this occurs, using storage compartments and warehouses becomes an integral element of the process. It is necessary to do careful logistical planning to achieve structure and synergy since this is the only way to guarantee that the commodities will be maintained and handled appropriately.

The proper planning of logistics is essential in order to maintain a healthy balance between supply and demand. It requires handling things like warehousing, storage, and handling materials. The importance of careful planning cannot be overstated when it comes to preventing issues such as an inadequate or incorrect supply of products, damage to the produced product or raw material, poor storage, and various other issues.

The planning process is among the most significant aspects of logistics management. Ensuring that all process components are effectively coordinated and executed is essential. It does this by designing and implementing the necessary systems and procedures to ensure that items are delivered on time.

2. Packaging Unitisation

For the supply chain to function correctly, the items and commodities must be cared for and conditioned. Regarding logistics management, the correct handling and storage of items are essential.

A significant amount of research is required for the packaging of the items. As part of the research and strategy, it is essential to consider how the products are kept to maintain the highest possible level of quality. Additionally, it is essential to consider how the packaging may be processed and handled. In addition, the logo and colours play a significant role in making confident that the customer has a favourable experience.

To ensure that the product is delivered in the best condition possible to the intended recipients, careful consideration was given to every aspect of the packaging's design, including its dimensions, composition, and hues. When a product is in transit from the hands of the maker to those of the customer or the distributor, the product is safeguarded by its packaging.

However, because of fluctuations in supply and demand, the shipment could have to wait at a warehouse while the procedure is being completed. The packaging plan must consider this as well. In such circumstances, it must preserve and condition the product without compromising quality. The storage and transportation of commodities and products are simplified thanks to the unitization process. In its most basic form, it may be described as "grouped or packaged cargo, wrapped into packages, and put into or inside of a larger unit."

Proper packaging is required to ensure the upkeep and safety of the transportation process and the delivery of the products. As a result, it is considered to be one of the most important aspects of logistics management. In most cases, businesses will pack their wares in a cuboidal shape to make them simpler to store, transfer, and transport.

The ultimate objective is to put all the items and things inside a cube, which is the most compact and space-efficient form. Packaging and unitisation are complementary processes that work together to pack items and things of varying sizes and forms into a cuboid configuration.

1. Inventory Control

Inventory is strongly connected to storage and warehousing, and it is essential to have enough amounts of both to satisfy customers' needs. Controlling the flow of commodities and products into and out of the warehouses is an integral part of this process. It decides how much inventory to have on hand, where it should be housed, and how much of it should be kept there.

With sales data and mathematical and statistical methods, inventory management makes educated guesses about customers' demand for specific products. As was noted before, there is much fluctuation in the market, which may also be unexpected.

Maintaining information on the current stock, availability of warehouses, market needs, and other factors connected to inventory management are all part of inventory management. Companies can strike a healthy balance between supply and demand with effective inventory control and management. They can decide where the stock should be placed, how

much it should be put there, and how much it should be stored there. Controlling inventory may result in several positive outcomes, including accurate order fulfilment, expedient order planning and organisation, efficiently managed warehouses, improved benefits, and continued patronage by existing customers.

The management of inventories is not a precise science. However, it is an essential component of logistics that plays a role in assisting with the management of the flow of commodities through the supply chain. It is terrible for the supply chain as well as the profitability of the firm if there is a substantial inventory balance.

4. Transportation

The logistics management component of transportation is notoriously difficult and expensive. Because it may make up as much as half of the budget for logistics, it puts a lot of pressure on businesses to discover the quickest and most cost-effective method to deliver their products and commodities to those who buy and distribute them. The term "transportation" refers to a broad category that encompasses a variety of mediums and methods, including automobiles, freight trains, cargo ships, and aeroplanes.

However, many other commodities travel from all over the globe, which adds a layer of complication to the operation. This layer of complexity includes tax codes, customs clearance, and various payment methods. These things must be taken care of before the merchandise can even be sent out of the warehouse.

The movement of commodities is referred to as transportation, which is required practically everywhere along the production chain, from initial manufacture to final delivery. Transportation management is responsible for the planning, executing, and managing the forward and reverse movement of products through the land, air, and sea transport modes. The proper management of transport results in several benefits, including reducing costs, minimising carbon footprints, and other advantages.

In the rapidly expanding sector of e-commerce, transportation is an essential factor to consider. The customer has high expectations not just for

the timely and accurate delivery of the product but also for the ability to return it. When forming a partnership with a 3PL, it is essential to collaborate with a business that offers trustworthy and open-book logistical services to guarantee quality and efficiency.

5. The Role of Information and Control

Data-driven logistics will determine the future of the industry. Providing quick and correct service to the producers or consumers is impossible without a steady flow of information through the logistics management process.

Information increases the efficiency and performance of operations in a supply chain in every aspect, from the movement of goods to the operation of warehouses and transportation.

The improvement of corporate efficiency brought about by information and control aids in executing more conventional management procedures and functions as a contemporary instrument for accomplishing strategic objectives.

It is essential to keep the proper flow of information to generate helpful insights and come to better conclusions about logistics management. In addition, it is of the utmost importance to make the most of available technology and to devise more effective algorithms for each step of the logistics management process.

As developments continue to shape the components of logistics management, transform the industry, and enhance technology, it is a constructive business practise to analyse and comprehend the five components of logistics management in depth.

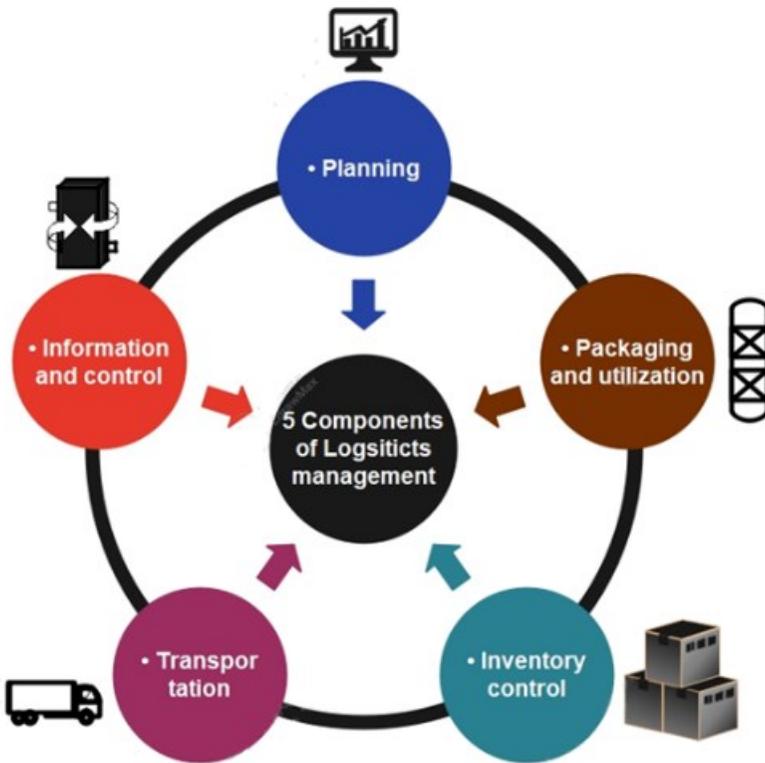


Fig. 3 Five Components of Logistics Management

1.5 Competitive Advantages of Logistics

Logistics management comprises various tasks, including the processing of orders, the packaging of goods, the warehousing of goods, and the administration of inventories, among other things. It assists companies in making the most efficient choices about their routes and operations, which helps an organisation maximise the use of its driver and fleet resources. Therefore, logistics management is responsible for controlling and managing the efficient movement of commercial items across the supply chain, which tends towards over-accelerate delivery fulfilment.

The 15 Major Benefits of Logistics Management

In logistics, the transportation of products is efficiently handled, contributing to the possibility of businesses achieving sustained success.

Today's supply chain and logistics are driven by advanced technology to satisfy customers' needs quickly. The following is a list of some of the most significant benefits of logistics management:

1. Visibility in Real Time

Managing a supply chain comprises several operations related to one another, and one of the most critical aspects of this process is logistics. Logistics management offers insight in real-time across all aspects of the operation, enabling organisations to make choices based on accurate information. By simplifying communication with in-depth insights and data, organisations are given the ability to identify issues in the supply chain and boost their overall efficiency. Therefore, using modern technology and highly developed automated processes will get us access to information in real-time, allowing us to achieve higher levels of transparency and open up new doors of opportunity.

2. An Improved Experience for the Customer

The optimization of logistics helps improve both internal and external communications, which in turn increases operational transparency. Customers can get more information about the time frame in which their orders will be delivered as a result of this. The comprehensive data collection and analysis are helpful to companies because they enable them to respond instantly to customer questions. Unquestionably, the management of logistics tends to play a significant role in the creation of a better experience for the consumer. Because providing a real-time response to a client's concern is fundamental to providing excellent service, logistics improves customer loyalty.

3. Reduced Expenditures in Operation

The primary benefit of logistics management is its ability to save overhead costs by automating and streamlining processes. This is one of how it excels. It can exercise control over the inventory levels and put into action a strategy that has been carefully designed to evaluate both the demand and the supply. As a result, taking preventative measures ensures that companies do not buy duplicate goods in logistics. Additionally, logistics management may be used for preventative maintenance to save money

and avoid vehicle breakdowns, both of which are costly events. As a result, it helps to facilitate more organised movement when the vehicle is in transportation by streamlining the entire procedure.

4. Scalability

The ability to effectively manage logistics tends to raise demand or growth by optimising the management of the whole supply chain. It determines how much inventory is required and creates a strategy to meet the requirements set by the customers. Therefore, logistics offers flexible solutions that are intended to guarantee responsiveness. Having complete insight across the whole supply chain path benefits growth and assists firms in developing synergistic collaborations. Agile logistics techniques use cutting-edge technologies to make businesses more scalable.

5. Risk Management

Access to a risk management strategy is an efficient approach to preparing ahead and avoiding interruptions in the future. In a market as unpredictable as this one, the organisations' operations might be negatively impacted by unwelcome interruptions in logistics. Therefore, investing in a reliable fleet management system capable of forecasting demand and supply is recommended. An efficient method of risk management may give valuable data by evaluating the efficiency of the logistics operations, which is one of its primary functions. In addition, it is necessary to design the most appropriate approach to deal with the interruptions and put our backup plan into action.

6. Warehouse Management

Monitoring and maintaining control over a warehouse's processes is one of the most significant benefits of logistics management. By ensuring that all areas, such as picking and packaging, inventory management, storage, and shipment, are scheduled, it is possible to improve the timely distribution of the items. Logistics often involves using the least amount of space possible to hold the most outstanding amount of goods. Since the warehouse is often regarded as the industry's fundamental support structure, its efficient transportation is necessary for its continued existence. Businesses can realise increased productivity levels in their

warehousing operations by carefully selecting the appropriate technological tools.

7. Preventive Repairs and maintenance

It is possible that the planning and scheduling of vehicle maintenance is an incredibly significant part of supply chain operations. Using cutting-edge technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), Big Data, and Machine Learning may assist businesses in inventory monitoring regularly and consistently. Also, logistics management is aware of how much stock is required, making the inspection or maintenance process much more straightforward. As a result, it extends the inventory's life and enhances the equipment's dependability by reducing the amount of unscheduled downtime that machines experience.

8. Increase the Profitability of Our Business

The employment of new technology in the logistics process contributes to an increase in both the efficiency and profitability of the company. By regulating and maintaining the supply chain's ecology, it eliminates any flaws or deviations that may have been present in the overall operations. However, to achieve a competitive advantage, businesses must ensure that their purchases are appropriately delivered to the appropriate clients. One of the most significant benefits of logistics management is that it enables businesses to improve their operational visibility, which is widely recognised as among the most critical factors influencing the expansion of a company.

9. Planning Our Route

The process of selecting the routes that are the most cost-effective may result in both excellent customer service and cost savings. As a result of the use of real-time route planning software for enhancing timely delivery, the manual dependencies associated with logistics management are reduced. Fleet managers can keep tabs on the drivers and vehicles in their charge to determine whether or not they are obeying the laws and regulations governing road safety. A decrease in fuel usage and the elimination of unexpected delivery delays are two further benefits of meticulous route planning. Choosing the right route planning software may help enhance

to utilise a measure, we should consider whether it helps minimise long-term expenditures or payments, lowers investments in resources, or increases the number of items sold. We must question the metric's validity if it does not assist with these three aspects.

The Lean Six Sigma approach may assist supply chain managers in ensuring that all aspects of their processes are error-free and centred on the customer's needs. Businesses can connect all of their process improvements to service their customers in a distinguished manner if they begin the DMAIC/DMADV process by identifying their customer base and the demands of their consumers as early as possible. Every team member can focus on the overarching objective, ensuring that the consumer is satisfied with their purchase. What makes Lean Six Sigma such a valuable and high-impact skill set is that it simultaneously places equal emphasis on the customer and the process. Businesses flourish when all employees work together toward the same goal of satisfying customers.

Bibliography

- Christopher, M. (2016).** *Logistics & supply chain management*. Pearson Uk.
- Mangan, J., & Lalwani, C. (2016).** *Global logistics and supply chain management*. John Wiley & Sons.
- Copacino, W. C. (2019).** *Supply chain management: The basics and beyond*. Routledge.
- Gattorna, J., & Jones, T. (Eds.). (1998).** *Strategic supply chain alignment: best practice in supply chain management*. Gower Publishing, Ltd..
- Richey, R. G., Roath, A. S., Adams, F. G., & Wieland, A. (2022).** A responsiveness view of logistics and supply chain management. *Journal of Business Logistics*, 43(1), 62-91.
- Rushton, A., Croucher, P., & Baker, P. (2022).** *The handbook of logistics and distribution management: Understanding the supply chain*. Kogan Page Publishers.
- Yan, Y., Chow, A. H., Ho, C. P., Kuo, Y. H., Wu, Q., & Ying, C. (2022).** Reinforcement learning for logistics and supply chain management: Methodologies, state of the art, and future opportunities. *Transportation Research Part E: Logistics and Transportation Review*, 162, 102712.
- Shamout, M., Ben-Abdallah, R., Alshurideh, M., Alzoubi, H., Kurdi, B. A., & Hamadneh, S. (2022).** A conceptual model for the adoption of autonomous robots in supply chain and logistics industry. *Uncertain Supply Chain Management*, 10(2), 577-592.
- Nugroho, A., Christiananta, B., Wulani, F., & Pratama, I. (2022).** Exploring the Association Among Just in Time, Total Quality and Supply Chain Management Influence on Firm Performance: Evidence from Indonesia.
- Cheung, K. F., Bell, M. G., & Bhattacharjya, J. (2021).** Cybersecurity in logistics and supply chain management: An overview and future research directions. *Transportation Research Part E: Logistics and Transportation Review*, 146, 102217.
- Waters, D. (2021).** *Logistics An Introduction to supply chain management*. Palgrave macmillan.
- Vipin, B., Rajendran, C., Janakiraman, G., & Philip, D. (Eds.). (2021).** *Emerging Frontiers in Operations and Supply Chain Management: Theory and Applications*. Springer Singapore.