



UNIT-1

Introduction to Supply Chain and Logistics

Learning Outcomes

By the end of this unit the learner will be able to:

- ✓ Describe what is Supply Chain Management.
- ✓ Explore Benefits of Supply Chain and its Working procedures
- ✓ Describe the activities involved in Logistics.

Unit 1

Introduction to Supply Chain Logistics

Defining Supply Chain

The concept of supply chain management originated in late 1980s and became popular in 1990s. Before the arrival of this concept, the terms of operation management and logistics were used by the businesses. Following are few popular definitions of supply chain.

- “A supply chain is the alignment of firms that bring products or services to market.”—from Lambert, Stock, and Ellram
- “A supply chain consists of all stages involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves . . .”—from Chopra and Meindl
- “A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers.”—from Ganeshan and Harrison

A **SUPPLY CHAIN** comprised of the series of organisations and activities that materials move through on their passage from primary suppliers to end customers.

What is Supply Chain Management

Supply chain management is the process of planning and maintaining the *movement* of materials and products among a number of companies to supply goods and services to final consumers. Suppose you want to buy a new car since your current model is worn out. You require a four-cylinder sedan with mechanical gearbox, four doors and air conditioning. This car needs 8,000 parts from 300 suppliers all from different regions of the globe. Consider the basic supply chain for a GM car which includes an ignition module manufactured by a firm called Bosch from metal tools supplied by Kawasaki Steel and assembled into the completed car by G M, which keeps a stock of finished cars. You intend to buy the finished car from a dealership in Melbourne, Australia. The basic supply chain is shown in Figure:

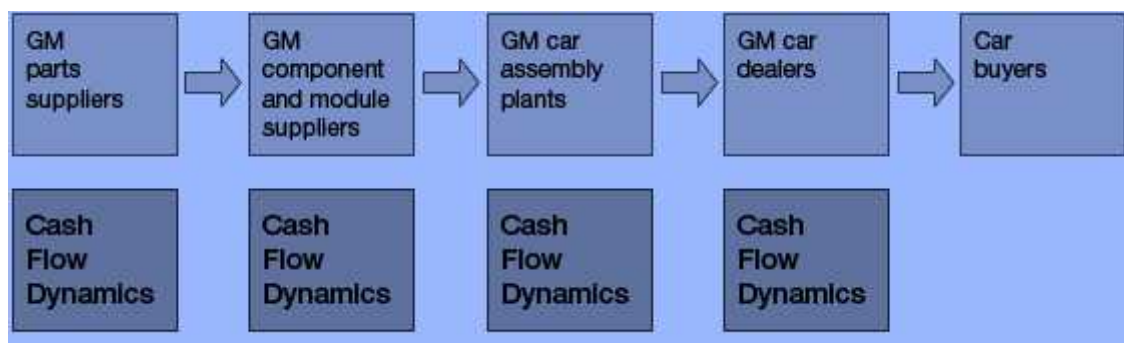


Fig: 1.1

Basic Supply Chain – Physical Movements

Till now, we have emphasized on the flow of materials through a single organisation. In reality, businesses do not work in seclusion, but each one acts as a consumer when it buys material from its own suppliers, and then it acts as a provider when it delivers materials to its consumers. A wholesaler, for instance, acts as a consumer when buying goods from producers, and then as a seller when selling goods to retail shops. A part maker buys raw materials from its suppliers, collects these into components, and passes the outcomes to other manufacturers. Most products flow through a chain of organisations as they travel between primary suppliers and end customers. Milk moves through a farm, tanker collection, dairy, bottling plant, distributor, and supermarket before we purchase it.

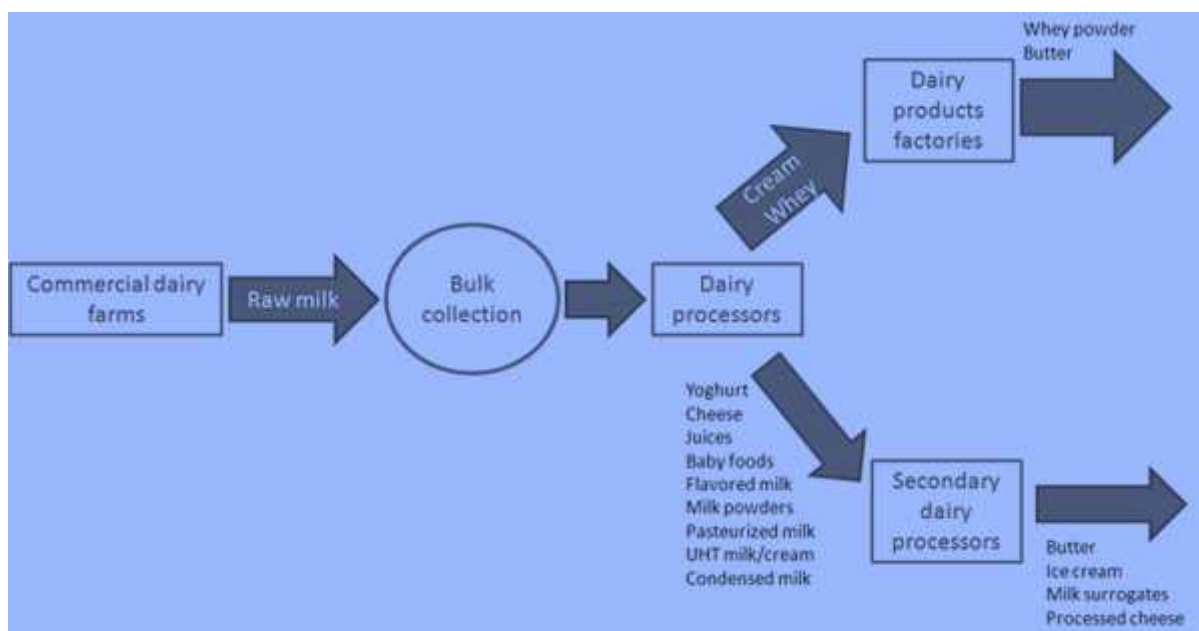


Fig: 1.2

A toothbrush starts its trip with a corporation extracting crude oil, and then it passes through pipelines, refineries, chemical works, plastics companies, manufacturers, importers, wholesalers and retailers before consumed in your bathroom. A sheet of paper moves through numerous organisations before you put it on your desk. People use diverse names for these chains of activities and organisations.



Fig: 1.3

When they highlight the operations, they mean the **process**; when they focus on marketing, they call it a **logistics channel**; when they emphasize the value added, they call it a **value chain**, when they observe how shopper demands are fulfilled, they call it a **demand chain**. All this makes a **supply chain**.

In other words we can say:

A SUPPLY CHAIN is comprised of the chain of activities and organisations that materials flow through on their journey from primary suppliers to end customers.

Each product has its own exclusive supply chain, and these can be both extended and difficult. The supply chain for Cadbury begins with cocoa beans growing on farms and ends with the delivery of chocolate bars to hungry consumers. The supply chain for Levi jeans begins with cotton growing in a field and ends when you purchase the jeans in a shop. The supply chain represents the entire journey of materials as they flow 'from dirt to dirt'. Along this trip, materials might flow through raw materials suppliers, finishing operations, manufacturers, logistics centres, third party operators, warehouses, transport companies, wholesalers, retailers, and an entire range of other operations. Sometimes, the supply chain moves beyond the end customer to add re-use and recycling of materials.



Fig: 1.4

There is a distinction between the idea of supply chain management and the customary concept of logistics. Logistics usually refers to activities that happen within the boundaries of a particular organization and supply chains means networks of companies that work together and synchronize their actions to bring a product to market. Also, conventional logistics focuses its concentration on activities like procurement, distribution, protection, and inventory management. Supply chain administration acknowledges all of conventional logistics and also comprised of activities like marketing, finance, new product development and customer service.

Structure of the Supply Chain

The simplest vision of a supply chain has a single product passing through a chain of organisations, each of which one way or another adds value to the manufactured goods. Taking one organisation's perception, activities in front of it – flowing materials inwards – are called **upstream**; those after the organisation – flowing materials outwards – are called **downstream**.

The upstream activities are separated into **tiers** of suppliers. A supplier that drives materials straight to the operations is a first tier supplier; one that throws materials to a first tier supplier is a second tier supplier; one that sends materials to a second tier supplier is a third tier supplier, and so on back to the primary sources. Consumers are also divided into tiers. One that obtains a product straight from the operations is a first tier consumer; one that receives a product from a first tier consumer is a second tier customer; one that gets a product from a second tier customer is a third tier customer, and so on to end customers (see Figure 1.5)

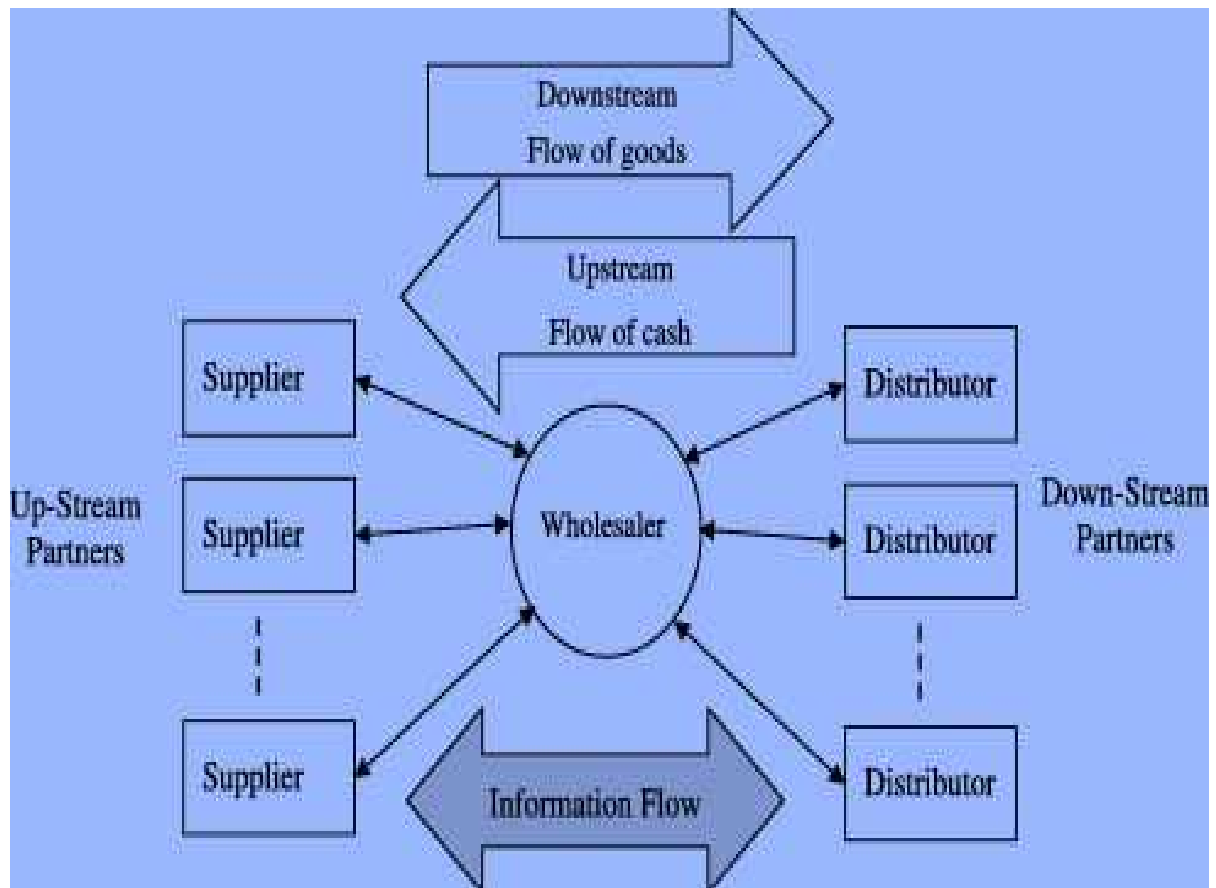


Figure 1.5 Activities in a supply chain

In practice, most of the organisations obtain materials from many suppliers, and sell products to a lot of diverse customers. Then the supply chain converges as raw materials flow in through the tiers of suppliers, and diverges as products flow out through tiers of customers. A producer may see sub-assembly providers as first tier suppliers, parts makers as second tier suppliers, materials suppliers as third tier suppliers, and so on. It may see wholesalers as first tier consumers, retailers as second tier consumers, and final users as third tier customers

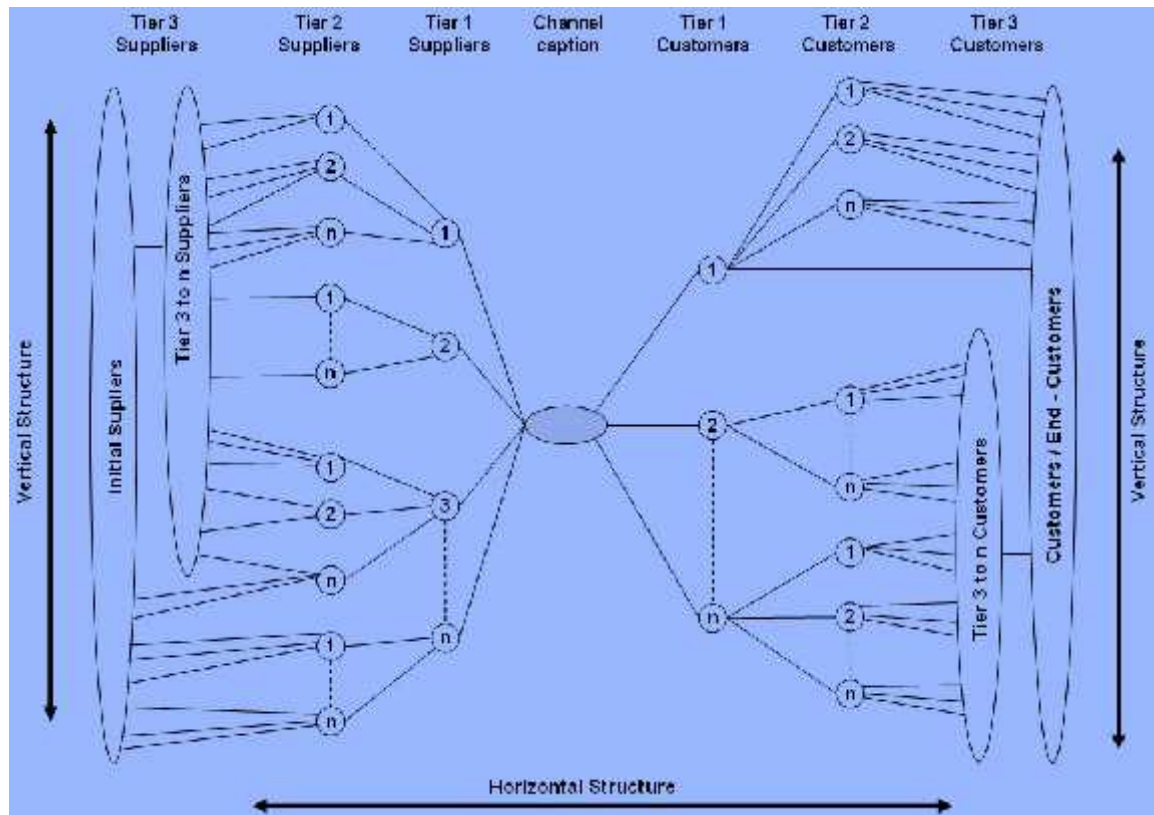


Figure 1.6 Supply chain around a manufacturer

It is quite easy to visualize the figure of a manufacturer's supply chain, but the majority organisations use the similar general approach. Airlines, for instance, shift passengers from pick-up points, through local feeder services to chief 'hub' airports, on to another hub, and then back out via local services to their destinations; banks collect all cheques in central clearing houses prior to sending them back to branches and customers; blood transfusion services have local centres that act as wholesalers for plasma. Every product has its own supply chain, and there are so many different configurations. Some are very small and simple –like a cook purchasing potatoes straight from a farmer. Others are astonishingly long and complex. A daily routine product like a shirt has an extensive trip from the farm growing cotton through to the end consumer. It also has a number of chains merging as buttons, dyes, polyester, and other materials connect the major process.

Supply chains deviate to meet up demand from dissimilar types of consumer. Manufacturers of car components, for instance, sell some products to car assemblage plants, some to wholesalers for garages doing repairs, some to retail shops for customers, and some directly to customers via websites. Then the supply chain split into divided strands with the same product following different routes.

Benefits of Supply Chains

Supply chains are so complex that you may doubt if there is some means of avoiding them. Sometimes this is feasible, when we shift products directly from primary producers to final consumers – when, for instance, farm shops sell vegetables straight to consumers, or authors issue their works on the Internet. In general, there are very fine reasons for having an extended supply chain. Suppose the residents of a town decide to purchase vegetables from a farm shop. This would have a negligible supply chain, but the entire population would travel alone to the farm. It would make more logic to have a transport business for collecting the vegetables and delivering them to a middle location in the town – like a supermarket. If the transport business delivers to one town, without difficulty it can deliver to other nearby towns as well, maybe by stopping at a depot to arrange local deliveries. As there is a depot, vegetables can be placed into storage while the supply is abundant, and detached when there are shortages. If the vegetables require cleaning or preparation, the transport business can redirect to a processing plant. Continuing in this mode, you can observe why a long supply chain expands, and what profits it brings.

Supply chains are developed to beat the gaps formed when suppliers are some distance away from consumers. They permit for operations that are best completed – or can simply be done – at locations that are far-away from sources of materials or customers. For instance, coffee beans are cultivated in South America, but the major consumers are in Europe and North America. The most excellent locations for power stations are away from both their major customers in cities and their fuel supplies.

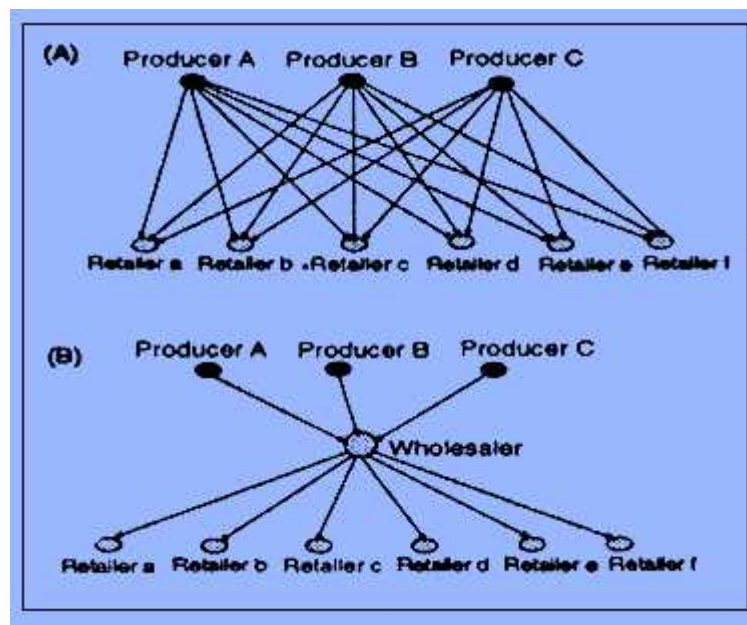


Fig: 1.7

Visualize four factories directly delivering products to eight consumers. Logistics has to systematize 32 diverse delivery routes however if the factories employ a central wholesaler, the number of routes can be cut to 12. The following list puts forward some other benefits of elegant supply chains (where we apply the terms 'wholesaler' and 'retailer' as a suitable label for intermediaries):

- Producers place operations in the finest locations, regardless of the locations of their consumers.
- By focused operations in big facilities, producers can obtain economies of scale.
- Producers do not maintain huge stocks of finished goods, as these are detained further down the supply chain closed to customers.
- Wholesalers put big orders, and producers pass on lesser unit costs in price discounts.
- Wholesalers maintain stocks from a lot of suppliers, giving retailers an alternative of goods.
- Wholesalers are close to retailers and have little lead times.
- Retailers take lesser stock as wholesalers offer reliable deliveries.
- Retailers can have minute operations, giving a reactive service close to customers.
- Transport is simpler, larger and fewer deliveries reducing costs.
- Organisations can expand expertise in particular kinds of operation.

There is a fundamental outline to the practice of supply chain management. Every supply chain has its own exclusive set of market demands and working challenges and yet the issues remain fundamentally identical in each case. Businesses in any supply chain must take decisions individually and jointly concerning their actions in the following five areas:

1. **Production**—What products does the market demand? How much of which products should be manufactured and by when? This activity comprises of the formation of master production schedules that consider plant capacities, quality control, workload balancing, and equipment preservation.
2. **Inventory**—What inventory should be placed in stock at every phase in a supply chain? How much stock should be held as raw materials, semi finished, or finished goods? The main reason of inventory is to act as a cushion against ambiguity in the supply chain. However, holding inventory can be costly, so what are the best inventory levels and reorder points?
3. **Location**—Where should production facilities and inventory storage space be located? Where are the most inexpensive locations for production and for storage of stock? Should present facilities be used or new ones established? Once these decisions are taken they decide the potential paths accessible for product to flow through for delivery to the final customer
4. **Transportation**—How should stock be flown from one supply chain site to another? Air freight and truck delivery are usually fast and consistent but they are costly. Shipping by sea or rail is much less costly but generally involves longer transit times and more doubt. This doubt must be remunerated for by stocking higher levels of inventory. When is it better to utilize which form of transportation?
5. **Information**—How much data should be gathered and how much information is to be shared? Timely and accurate information holds the guarantee of better coordination and better decision making. With fine information, people can make effective decisions concerning what to make and how much, about where to place inventory and how best to transfer it.

All these decisions will describe the effectiveness and capabilities of a company's supply chain. The things a business can do and the ways that it can struggle in its markets are all very much reliant on the success of its supply chain. If a company's policy is to serve a mass marketplace and fight on the basis of price, it had better have a supply chain that is optimized for lowest possible cost. If a company's strategy is to supply a market segment and fight on the basis of consumer service and expediency, it had better have a supply chain optimized for receptiveness. What a business is? and what it can do? This is shaped by its supply chain and by the markets it caters.

How the Supply Chain Works

As we saw in the earlier section, there are five areas where businesses can make decisions that will describe their supply chain capabilities:

- Production
- Inventory
- Location
- Transportation
- Information

Chopra and Meindl describe these areas as performance drivers that can be run to generate the capabilities required for a given supply chain.

Effectual supply chain management calls first for a thoughtfulness of every driver and how it operates. Every driver has the skill to directly influence the supply chain and allow certain capabilities. The next step is to expand an approval for the results that can be acquired by mixing diverse combinations of these drivers. Let's begin by looking at the drivers individually.

Production

Production refers to the capability of a supply chain to create and store products. The facilities of production are warehouses and factories. The basic decision that managers encounter when making manufacturing decisions is how to decide the trade-off between efficiency and responsiveness. If warehouses and factories are constructed with a lot of surplus capacity, they can be extremely flexible and react quickly to broad swings in product demand. Whereas the facilities where approximately all capacity is being used already they are not able to responding easily to variations in demand. On the other hand, capacity costs cash and surplus capacity is inactive capacity not in use and not producing revenue. So the more surplus capacity that exists, the less well-organized the operation becomes. Factories can be constructed to house one of two approaches to manufacturing:

1. **Product Focus**—A factory that takes a product focus performs the variety of diverse operations necessary to make a given product line from production of diverse product parts to assembly of these parts.

2. **Functional Focus**—A functional approach focuses on performing only a few operations like simply making a select collection of parts or only doing assembly. These functions can be performed for making a lot of different types of products.

A product approach aims to result in developing skills regarding a given set of products at the cost of expertise regarding any specific function. A functional approach usually results in proficiency about particular functions rather than expertise in a given product. Companies need to make a decision which approach or what combination of these two approaches will provide them the ability and expertise they require to best react to consumer demands. As with factories, warehouses also can be built to house diverse approaches. There are three major approaches to utilize in warehousing:

- **Stock Keeping Unit (SKU) Storage**—In this conventional approach, all of the same kind of product is stocked up together. This is a competent and simple to understand means to hoard products.
- **Job Lot Storage**—In this method all the different products associated to the needs of a definite type of consumer or related to the requirements of a particular job are stored together. This permits for a well-organized picking and packing process but generally requires more storage room than the conventional SKU storage approach.
- **Cross docking**—An approach that was founded by Wal-Mart in its drive to boost efficiencies in its supply chain. In this method, product is not really warehoused in the facility. In its place the facility is deployed to house a procedure where trucks from suppliers enter and unload huge quantities of dissimilar products. These large lots are then broken down into smaller lots. Smaller lots of dissimilar products are recombined according to the requirements of the day and rapidly loaded onto outbound trucks that carry the products to their end destination.

Inventory

Inventory is spread all through the supply chain and consists of everything from raw material to work in process to finished goods that are detained by the manufacturers, distributors, and retailers in a supply chain. Again, administrators must choose where they want to place themselves in the trade-off between efficiency and responsiveness. Holding large sum of inventory allows a business or a whole supply chain to be extremely responsive to variations in customer demand. However, the formation and storage of stock is a cost and to attain high levels of efficiency, the outlay of inventory should be reserved as low as possible. There are three essential decisions to make concerning the creation and holding of stock:

1. **Cycle Inventory**—This is the quantity of inventory required to satisfy demand for the product in the time between purchases of the product. Companies tend to manufacture and to buy in large lots in order to increase the benefits that economies of scale can carry. However, with big lots also come improved carrying costs. Carrying costs come from the expenditure to store, handle, and indemnify the inventory. Managers face the trade-off between the decreased cost of

ordering and superior prices offered by purchasing product in big lots and the augmented carrying cost of the cycle stock that comes with purchasing in large lots.

2. **Safety Inventory**—This is the inventory that is held as a cushion against ambiguity. If demand anticipation could be made with perfect accuracy, then the only inventory that would be required would be cycle inventory. But as each forecast has some level of uncertainty in it, we wrap that uncertainty to a greater or lesser quantity by holding further inventory in case demand is unexpectedly greater than predictable. The trade-off here is to consider the costs of carrying additional inventory against the costs of losing sales because of having insufficient inventory.
3. **Seasonal Inventory**—This is inventory that is stocked up in expectation of expected increases in demand that happen at certain times of the year. For instance, it is expected that demand for antifreeze will rise in the winter. If a business that manufactures antifreeze has a permanent production rate that is costly to change, then it will try to produce product at a stable rate all year long and build up supply during periods of low demand to cover for periods of high demand that will go beyond its production rate. The alternative to maintaining a seasonal inventory is to invest in flexible manufacturing facilities that can quickly change their rate of production for different products in response of increase in demand. In this case, the trade-off is between the cost of having seasonal inventory and the cost of having more stretchy production capabilities.

Location

Location means the geographical settings of supply chain facilities. It also consists of decisions that are related to the activities that should be carried out in every facility. The efficiency versus responsiveness trade-off here is the choice whether to consolidate activities in fewer locations to expand economies of scale and efficiency, or to distribute activities in several locations close to consumers and suppliers in order for operations to be more receptive.

When making location based decisions, managers are required to consider various factors that relate to a given site including the cost of facilities, labour cost, skills available in the workforce, transportation conditions, taxes and tariffs, and nearness to suppliers and consumers.

Location decisions are fairly strategic decisions as they involve large amounts of money to long-term plans. Location decisions have powerful impacts on the performance and cost of characteristics of a supply chain. Once the number, size, and location of facilities are determined it also helps in defining the number of feasible paths through which products can run on the way to the end customer. Location decisions depict a company's fundamental strategy for building and delivering its products to market.



Fig: 1.8

Transportation

This means movement of everything from raw material to completely manufactured goods between various facilities in a supply chain. In transport the trade-off between efficiency and responsiveness is manifested in the selection of transport form. Fast means of transport like airplanes are very reactive but also more expensive. Slower modes like ship and rail are very inexpensive but not as receptive. Since transportation costs can be as much as a third of the operating cost of a supply chain, decisions made here are very significant.

There are six critical modes of transport that a business can pick from:

1. **Ship** is very cost effective but at the same time it is the slowest means of transport. It is restricted to use between sites that are located next to crossable waterways and facilities like canals and harbours.
2. **Rail** which is also very cheap mode but can be slow. This is also restricted to be utilized between locations that are served by rail lines.
3. **Pipelines** can be very flourishing but are inadequate to merchandise that are gases or liquids such as water, natural gas or oil.
4. **Trucks** are moderately rapid and highly flexible means of transport. Trucks can go about anywhere. The cost of this mode is subject to variations though, as the outlay of fuel fluctuates and the state of roads varies.
5. **Airplanes** are extremely rapid means of transport and are quite responsive. This is also the most luxurious mode and it is rather limited by the accessibility of suitable airport facilities.
6. **Electronic Transport** is the fastest means of transport and it is really cost efficient and flexible. Though, it can only be utilized for flow of particular kinds of products like electric energy, data,

and products made up of data like pictures, music and text. Someday technology that permits us to convert matter to energy and back to matter again might fully rewrite the theory and application of supply chain management. With these available means of and the site of the facilities in a supply chain, supervisors need to plan routes and networks for making products flow. A route is the course through which products shift and networks consist of the group of the paths and facilities connected by those paths. As a universal rule, the higher the worth of a product (like electronic parts or pharmaceuticals), the more its transport system should highlight responsiveness and the lower the worth of a product (like bulk commodities e.g. grain or lumber), the more its system should stress efficiency.

Information

Information is the foundation upon which to make decisions concerning the other four supply chain drivers. It is the link between all of the operations and activities in a supply chain. To the degree this link is a strong one (i.e., the data is precise, well-timed, and complete), the companies in a supply chain will each be able to make fine decisions for their own operations. This will also be inclined to get the utmost profitability of the supply chain as a whole. This is the way stock markets and other free markets function and supply chains have a lot of the same dynamics as markets.

Information is utilized for two purposes in organization's supply chain:

1. **Coordinating Daily Activities** are related to the implementation of the other four supply chain drivers:

- Production
- Inventory
- Location
- Transportation

The organizations in a supply chain utilize accessible data on product supply and demand to make a decision on weekly inventory levels, production schedules, transportation passages, and stocking sites.

2. **Forecasting and Planning** to foresee and convene future demands. Available information is utilized to make planned forecasts to guide the situation of monthly and quarterly production schedules and timetables. Information is also utilized for strategic forecasts to direct decisions regarding whether to construct new facilities, enter a new market, or leave a present market.

The Evolving Structure of Supply Chains

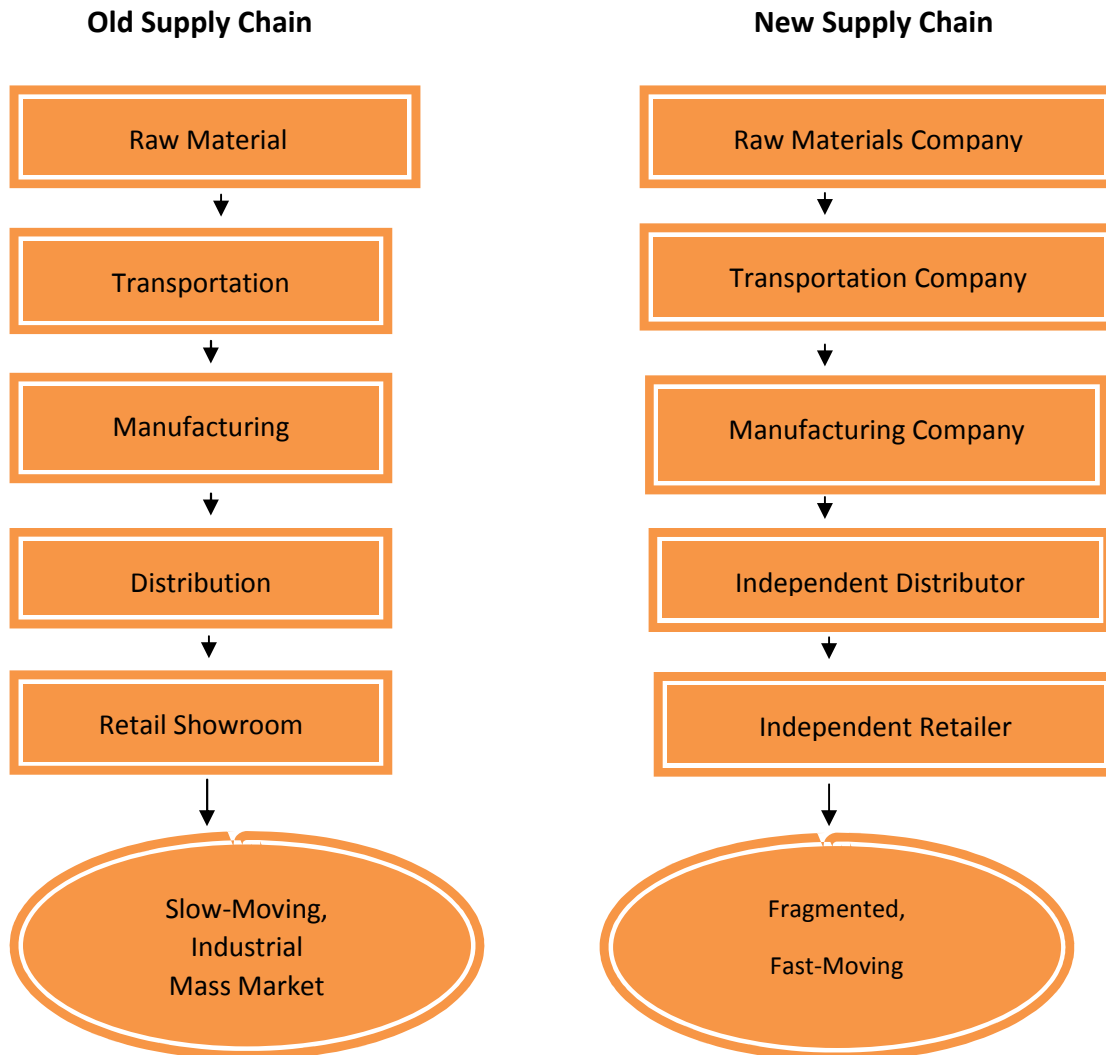
The participants in a supply chain are constantly making decisions that influence how they administer the five supply chain drivers. Every organization tries to exploit its performance in dealing with these drivers through a blend of outsourcing, partnering, and internal expertise.

In the fast-moving markets of our current economy, a company generally will emphasize on what it considers to be its major competencies in supply chain management and contract out the rest. This was not always the case although. In the slower-moving mass markets of the manufacturing age it was

ordinary for winning companies to try to own much of their supply chain. That was termed as vertical integration. The plan of vertical integration was to gain greatest efficiency through economies of scale.

Old Supply Chains versus New

Vertically integrated businesses serving slow-moving mass markets once tried to own much of their supply chains. Today's speedily moving markets need more flexible and receptive supply chains.



This was a money-making way of doing trade in the more expected, one-size-fits-all industrial market that existed in the beginning of 1900s. Ford and other businesses churned out mass quantities of basic products. But as the markets expanded and consumers became more conscious about the type of products they wanted, this form started to break down. It could not be open enough or create the range of products that were being demanded.

Globalization, highly spirited markets, and the fast pace of technological revolution are now driving the growth of supply chains where manifold companies work jointly, every company focusing on the activities that it can do best. Mining companies stress on mining, timber companies emphasize on sorting

and making lumber and manufacturing companies pay attention to different kinds of manufacturing from making basic parts to doing complete assembly. This way people in every company can keep up with quick rates of change and keep developing the new skills required to work in their particular business.

Where companies once regularly ran their own warehouses or run their own trucks' fleet, they now have to think whether those processes are really a core skill or whether it is cheaper to outsource those operations to other businesses that make logistics as their core business. To attain high levels of operating competence and to keep up with ongoing changes in technology, companies are required to focus on their central competencies. It requires this type of focus to stay aggressive.

In spite of vertical integration, businesses now perform "virtual integration."

Companies locate other companies whom they can work with to carry out the activities called for in their supply chains. How a business defines its centre competencies and how it positions itself in the supply chain it serves is one of the most significant decisions the business makes.

Participants in the Supply Chain

In any given supply chain there is some blend of companies who carry out different functions. There are businesses who are producers, distributors or wholesalers, retailers, and businesses or individuals who are the customers, the final consumers of a product.

Producers

These are the organizations that make a product. This includes businesses that are producers of raw materials and corporations that are makers of finished goods. Producers of raw materials are businesses that drill for oil and gas, mine for minerals, and cut timber. It also consists of organizations that raise animals, farm the land, or catch seafood. Producers of finished goods utilize the raw materials and subassemblies produced by other producers to make their products.

In any supply chain there is variety of companies who perform different functions. Producers can make products that are not tangible items like music, software, entertainment, or designs. A product may also be a service like mowing a lawn, cleaning an office, performing surgery, or teaching a skill. In a lot of instances the producers of tangible, industrial products are shifting to areas of the world where there is costly labour. Producers in the developed world of Europe, North America, and parts of Asia are increasingly producers of non tangible items and services.

Distributors

Distributors are businesses that take inventory in mass from producers and supply a bundle of associated product lines to consumers. Distributors are termed as wholesalers. They usually sell to other businesses and they sell products in bigger quantities than an individual customer would generally buy. Distributors cushion the producers from variations in product demand by stocking inventory and doing a lot of sales work to discover and service consumers. For the consumer, distributors complete the "Time and Place" function—they supply products when and where the consumer wants them.

A distributor is normally a business that takes possession of important inventories of products that they purchase from producers and sell to customers. In addition to product advertising and sales, other functions the distributor carries out are inventory administration, warehouse operations, and product transportation along with customer support and post-sales service. A distributor may also be a business that only brokers a product between the manufacturer and the consumer and never takes possession of that product. This type of distributor performs mostly the functions of product advertising and sales. In both these cases, as the requirements of customers develop and the range of obtainable products changes, the distributor is the mediator that repeatedly tracks consumer needs and aligns them with products available.

Retailers

Retailers stock inventory and sell in lesser quantities to the common public. This business also closely tracks the demands and preferences of the consumers that it sells to. It advertises to its consumers and often utilizes some blend of price, service, convenience and product selection, as the primary draw to attract consumers for the products it sells. Discount department stores draw customers using price and extensive product selection. Upscale specialty stores suggest an exclusive line of products and high levels of service. Fast food hotels use ease and low prices as their draw.

Customers

Customers are any organization that buys and consumes a product. A customer organization might buy a product in order to integrate it into another product that they in turn sell to other consumers. Or a consumer might be the final end user of a product who purchases the product in order to consume it.

Service Providers

These are groups that offer services to producers, distributors, retailers, and consumers. Service providers have come up with special expertise and skills that emphasize on a specific activity required by a supply chain. Because of this, they are capable to carry out these services more successfully and at a superior price than producers, distributors, retailers, or customers could do on their own.

Some general service providers in any supply chain are those providers of warehousing services and transportation services. These are trucking businesses and public warehouse companies and they are termed as logistics providers. Financial service providers deliver services like making loans, gathering past due invoices and doing credit investigations.

These are banks, credit rating companies, and collection agencies. Some service providers deliver market research and advertising, while others provide product design, engineering services, legal services, and management advice. Still other service providers offer information technology and data collection services. All these service providers are integrated to a greater or lesser degree into the ongoing operations of the producers, distributors, retailers, and consumers in the supply chain.

Supply chains consist of repeating sets of participants that fall into one or more of these categories. Over all need of the supply chain as a whole remains fairly constant. What changes is the mix of contributors in the supply chain and the roles that each contributor performs.

In some supply chains, there are only few service providers because most of the participants of the supply chain perform these services on their own and they do not need to outsource these services, while others prefer to hand over these services to specialised professionals instead of performing them by themselves.

Activities Involved In Logistics

Logistics is all about mobility of materials and their storage via supply chain. It includes the following activities if you inspect the supply chain.

- **Procurement or Purchasing.**

After the initiation of procurement orders, the flow material in organization starts. The procurement order imposes responsibilities on the staff to find best possible suppliers, negotiate with them the terms and conditions, manage delivery orders, make insurance and payment and do everything that is essential for having smooth flow of material within an organization.

- **Inward Transport Or Traffic**

The materials that are procured need to be transported to the organization. Hence the choice of the type of transport is another important decision. It is the duty of the procurement staff to find the best transportation type (road, rail, air and so on), make sure that it fulfils all safety and legal requirements and deliver within deadline with reasonable cost.

- **Receiving**

It assures that timely delivery of material, receipt acknowledgement on time, unloading of delivery vehicles and inspection of material.

- **Warehousing Or Stores**

It keeps materials into storage and keeps monitoring them till needed. There are kinds of materials that need special care liker drugs, frozen food, chemicals etc. It also takes into consideration that whether materials are available on time when needed and it also makes sure that materials are kept in good condition and are being treated and packaged properly.

- **Stock Control**

It makes regulations for inventory. It also monitors the stored material, the overall cost, stock level, order timing, customer service, order sizes and so on.

- **Order Picking**

It finds the needed materials and moves them away from stores. Materials ordered by customers are located, evaluated, and then moved to a departure area for loading into vehicles.

- **Materials Handling**

It looks after the movement of materials while they are being used in operations within an organization. It takes care of movement of material during operations as they move from one step to another and also up to some extent, from stores as well. The objective is to make this movement as

efficient as possible by using short routes, suitable equipment utilization, avoiding potential damages and special packaging done for protection.

- **Outward Transport**

It carries materials from the departures to the customers.

- **Physical Distribution Management**

It is a term that is used for the delivery of final goods to customers. It also includes outward transportation. It bears important linkage with marketing department and keeps an eye on downstream activities.

- **Recycling, Returns And Waste Disposal.**

The function of logistics is vast that it even never ends after delivery to customers. There are many problems that can potentially happen in future. These may include faults and damages associated with materials. Activities that are concerned with return materials back to vendors are called reverse logistics or reverse distribution.

- **Location.**

Logistics activities are not confined to single locations. For example, finished goods stock can be stored at the end of the production process. It is necessary for the logistic to select locations with careful analysis.

- **Communication**

Along with flow of materials, the smooth flow of communication is also essential. The entire supply chain runs through communication and passing information regarding customer demands, products, need of material movement, stock levels, problems, timings, costs and so on.

According to many logistics managers, maintain the coordination and communication for effective movement of goods is very challenging. Many researchers and authors have described supply chain as the processing of information not just movement of materials.

Sometimes other activities like sales forecasting, customer service management, production scheduling, third party operations, overseas liaison and so on can also be included in logistics. The boundaries should be clear between functions, but there is a need to recognise that they all work together to result in an efficient flow of materials.

Organising Logistics

Logistics in organisations appear in different forms. The arrangement of activities varies from organization to organization but there is without doubt no single 'best' way. The scale of logistics activities also depends upon scale of organization. A small organization might have just one person to look after the things while in large scale organization, over hundreds of workers might be there under the department. Sometimes organizations that lack physical and financial resources for in house logistics department outsource this function to outside third parties.

Aims of Logistics

Logistics looks after the entire supply chain. This function is also termed as supply chain management. Researchers have been debating upon the scope of logistics and supply chain management, since long. Usually logistics is supposed to have narrower scope having being restricted to a single organization than supplies chain management that is supposed to be associated to more than one related organizations. However, this paper will refer the both as same. This assumption has also been taken by Institute of Logistics and Transport that has given the following official definitions.

LOGISTICS

It is the time based allocation of resources or the long term management of the entire supply chain.

The SUPPLY-CHAIN

It represents a chain of activities and events that aim to serve customers materials needs.

Logistics managers basically perform two major functions. First, they need to carry out the procedure for movement of materials into, within and outside the organization. Second, they are required to keep these procedure and movement of materials as efficient as possible.

The terms “efficient” is bit vague. People usually refer this term to low cost, minimum input and wastage, quick delivery, higher productivity and few mistakes. However, restricting efficiency just to these terms would not be justified and real objectives of the organization are wider in scope than usually assume by many managers.

The success of any business solely depends upon its customer satisfaction. If it does not please customers, it is doubtful to stay alive in the long term, left alone making profit, have more return on assets, more shareholder value, or attain any other means of success.

Unfortunately, customers see any business or a product in a whole package consisting of easy of buying, quality, price, features, styles, delivery, defects and sales staff. Most of these factors greatly depend upon effective functioning of logistics department. So, a good customer service and care is not possible without logistics as it arranges and looks after the movement of materials in the best possible way in order to satisfy the customers to the best.

Thus the overall **objective of Logistics** is to attain high customer contentment. It must offer a high quality service with lowest possible costs for customers.

Importance of Logistics

Essential and Expensive

Logistics is like a backbone for any organization as without it no movement of material occurs, no production is achieved, no product is delivered and thus it leads to zero customer satisfaction.

The logistics related costs vary from material to material type, however by using latest logistics technologies; cost can be reduced to minimum.

Effects on Financial Performance

Logistics is bit expensive function, though; it holds a big impact on the financial performance of the organization.

The impact can be illustrated by discussing various financial terms, starting from the Return on Asset.

The return on assets is the pre-tax profit that an organisation earn, divided by the worth of the assets utilized. The formula is:

$$\text{Return on assets} = \frac{\text{profits earned}}{\text{Assets employed}}$$

This figure actually gives an accurate view that how well the organization has been using its resources. The higher this figure, the better is the performance, whereas; the assets can be both current assets (cask, stocks, receivable etc) and fixed assets (building, equipments etc).

Effective movement of material leads to lower stock level. Though it means less current assets however it can be debated that it also lessen the number of fixed assets and increasing profit.

- **Current Assets.**

Effective functioning leads to lower stock level and thus lesser current assets. By saving the cash invested in stocks, organization can use it for more lucrative production opportunities and reduce its dependence on borrowing.

- **Fixed Assets.**

Fixed assets can be building, equipment, land, property etc. Logistics does not only employ all these resources but the transport fleets, warehouses, material handling machines and other related facilities also come under the control of logistics. These are also fixed assets.

- **Sales.**

If a product is really innovative and appealing, then logistics can make it even more successful by making it readily available in the market and thus can lead to higher sales and higher market share.

- **Profit Margin.**

Effective functioning of logistics leads to lower costs that helps to increase profit.

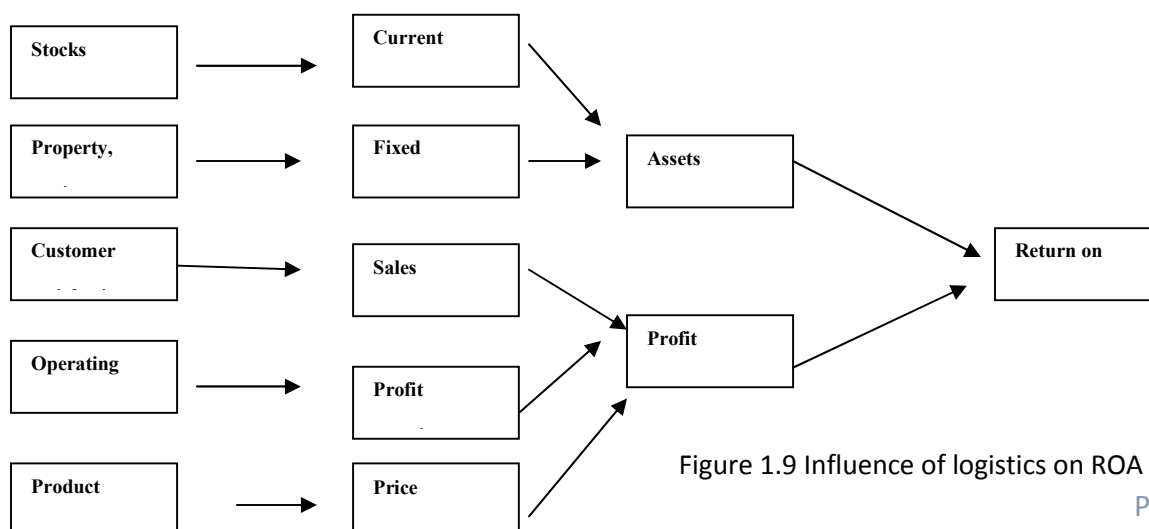


Figure 1.9 Influence of logistics on ROA

- **Price.**

Logistics can actually justify the pricing of products by ensuring that it is readily available in the market, speedy delivery and shorter lead time. Thus it helps to make organization's appealing products to get premium price.

It should be noted the first two indicators were related to lower current assets while the other three were related to higher profit. These indicators together raise ROA and have positive impacts on share price, borrowing and ROI.

Current Trends in Logistics

Improving Communications

With the passage of time, logistics is getting changed and adopting new trends. The major change observed nowadays is the use of latest technology on an increasing basis. The technology is directly getting involved in movement of materials, for example, electronic guidance system and packages identification. However, the impact and recent trend in communication is the most interesting trend to be discussed.

In the past, organizations had to rely on manual system and paper works for generating material description, price request, orders, invoices, conformations, agreements and so on. It used to take lots of time and was still not error free. In last few decades, latest and advanced technologies have shifted the entire system from manual to electronic mode. Development started initially with fax machines that used to send electronic copies of orders to remote locations in just few seconds, however, it requires the entire procedure to be completed i.e. printing of paper, feeding into fax machine and the sending over telephone lines.

In 1990s, the concept of Electronic Data Interchange (EDI) removed the need of intermediaries to exchange data. Early consumers were supermarket who attached their stock control system straight to suppliers' order processing system. In case of stock needed the order could be generated and sent to suppliers automatically. Then the use of EPOS (Electronic Point of Sale) greatly helped in reducing paper work, lowering transactions' cost faster interaction, more collaboration, less number of errors and strategic business relations.

Another technology is called EFT (Electronic Fund Transfer) which automatically debits the client's bank account credits the vendor's on the acknowledgement of materials' delivery.

Improving Customer Service

Every organization wants to keep its logistics cost to the minimum level. This is because lower cost ensures competitiveness and satisfaction of customers as most of them want to buy products at lower prices. Lower cost enables business to sell its products over broader geographic areas, for example, Japanese manufacturers usually keep lower transportation cost so as to achieve market competency and advantage in pricing as compared to local producers in other regions.

By effectively, speedily and safely moving products over long distances, there is no need to have any traditional storeroom or warehouse nearby to customers.

Other Significant Trends

Some of the most significant trends in logistics include the following:

- **Globalisation:**

With advanced technologies and improved transport system, physical distances are getting reduced and the world has become a global village. Businesses are now global in nature in terms of entire outlook of logistics ranging from buying activities to delivery of finished products across the borders. Now there is a global market as well. It is increasing the competition in world's economies as well. Now organizations have to face competition not just locally but globally as well.

Effective logistics have made access to global markets easy for the business by providing the factors that encourage global trade. This has provided many advantages to businesses. You must have noticed that many organizations are availing economies of scale by expanding their production facilities in the areas where the cost is low. This is the reason why German businesses open their production facilities in Poland, American businesses establish themselves in Mexico and Japanese tend to operate in China.

- **Reduced Number Of Suppliers:**

In the past there was a trend of keeping lot of suppliers in contact and working relationship so as to make the most of the best. This has resulted in increased competition in the past. However, the latest trend that is being followed today is having selective vendors on board and keeping strategic relationship with the best.

- **Concentration Of Ownership:**

Larger companies, because of having economies of scale seem to dominate a lot of supply chains. Though there are many transport companies and shops, but the biggest companies are expanding at the expense of smaller one. This is resulting in increased concentration of ownership as observed in logistics sectors of various economies.

- **Outsourcing:**

Many organizations seem to take the advantage of specialized firms for logistics tasks, so that they can pay attention to their core activities and increase their efficiency. According to McKinnon, 'Outsourcing has been one of the dominant business trends of the 1980s and 1990s' and surveys suggest that around 30 per cent of logistics expenditure is outsourced in the EU.

- **Postponement:**

Conventionally, manufacturers shift finished commodities out of production and hoard them in the delivery system until they are required. When there are a lot of differences on a basic product, this can present high stocks of alike products.

Postponement shifts nearly finished goods into the distribution system, and holds-up final alterations or customisation till the last possible moment. You can visualize this with 'package-to-order', where a corporation keeps a manufactured goods in stock, but simply puts it in a box written in the suitable language when it is about to transport an order.

Producers of electrical equipment, such as Hewlett-Packard, Phillips used to construct into their commodities the transformers and plugs required for different markets. Then they had to maintain separate stocks of products intended for every country. Now they build the transformer and cables as distinct, external units. They only maintain stocks of the fundamental, standard products, and modify them for diverse markets by adding the appropriate transformers and plugs at the last moment. The result is much lower stocks.

- **Cross-Docking:**

Conventional warehouses shift materials into storage, maintain them until required, and then move them out in accordance with demand. Cross-docking directs the supply and delivery, so that merchandise arrives at the receiving region and is transferred directly to a loading area, where they are loaded onto delivery vehicles.

- **Direct Delivery:**

More clientele are buying via Web, or discovering other ways of trading previously in the supply chain, like mail order or buying straight from producers. This has the advantages of dropping lead times, reducing costs to clients, having manufacturers talking directly to their end customers, allowing clients access to a wider choice of products, and so on. It also implies that logistics has to shift small deliveries rapidly to final customers. This is optimistic for the growth of couriers and parcel delivery services like FedEx, DHL and UPS.

- **Other Stock Reduction Methods:**

Keeping stock is costly, so organisations frequently look for tricks for reducing the stock in the supply chain. There are numerous ways of doing this. One method uses just-in-time based operations to synchronize activities and lessen stock levels. Another way is **vendor managed inventory**, where providers administer both their own stocks and those held further down the supply chain. Enhanced co-ordination lessens overall costs and can award economies of scale.

- **Increasing Environmental Concerns:**

There is rising concern about, water pollution, air pollution, energy consumption, urban expansion and waste dumping. Logistics does not hold a good standing for environmental safety –

demonstrated by the releases from weighty Lorries, employment of green field locations for warehouses, calls for new road building, utilization of wide-ranging packaging, ships unlawfully flushing their energy tanks, oil spillages from tanker accidents, and so on.

On the optimistic side, logistics is shifting to 'greener' practices. Businesses use more energy efficient means of transport, control drain emissions, recycle packaging, switch to environment friendly options of transport, boost recycling through reverse logistics, add security features to ships, expand brown-field sites, and so on. They ever more make out that careful administration can bring both ecological protection and lesser costs. A fair evaluation may be that logistics is making development on environmental issues, but it would need some time.

- **More Collaboration Along The Supply Chain:**

Organizations carrying out the function of logistics are aware of the fact that they also have to satisfy final consumers, if they want to have success. Hence, they should better cooperate than compete with one another in order to deliver customer satisfaction, in the end. Competitors are not just within the same supply chain but they are also present in other supply chains. Christopher has very well said,

“Supply chains compete, not companies”.

Further Reading:

- ✓ *Introduction to Supply Chain Management Technologies, Second Edition, (2010) By David Frederick Ross*
- ✓ *International Logistics and Supply Chain Outsourcing: From Local to Global, (2007) By Alan Rushton*
- ✓ *Introduction to Logistics Systems Management, (2013) By Gianpaolo Ghiani, Gilbert Laporte, Roberto Musmanno*